Child Social Maladjustment and Adult Employment Dynamics

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ABSTRACT[*]

This paper investigates the effect of social maladjustment at age 11 on adult employment probability. Social maladjustment is measured according to the British Social Adjustment Guide score provided by the National Child Development Study that also provides information on cohort-members both in childhood and adulthood, including current employment status and past working history. The econometric method consists in a dynamic probit model with unobserved heterogeneity accounting for true state dependence and initial conditions problem. Consistently with the previous literature, we find that social maladjustment during childhood determines a lower employment probability in adulthood. This result holds also after controlling for true state dependence and past working history. Interestingly, the adult employment probability of socially maladjusted children is prone to greater variability according to life experiences than that of socially adjusted children. We find that being employed in the previous period, education, young-adulthood working experiences and, for females, early working experiences increases the adult employment probability for all cohort-members. However the positive effect is stronger for socially maladjusted children and, overall, investment in higher education seems to be relevant. This suggests that interventions during life development for socially maladjusted children could be important to reduce inequality in adult employment probability.

Keywords: social maladjustment, employment dynamics, child development, true state dependence, initial conditions.

JEL codes: J31, J24, C23

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Introduction

The interest in formation, development and later effects of cognitive and non-cognitive skills on socio-economic outcomes has become an important issue in economic research. As Cunha and Heckman (2009) argued, deepening their comprehension is important to understand the origins of inequality and excellence among people and to adopt effective child investment strategies. However, while the role of cognitive skills has been debated in the context of the human capital literature and their relevance in affecting later outcomes is a well established result, the role of non-cognitive skills only recently has drawn the interest of economists (ter Weel, 2008).

Different distribution in non-cognitive skills is suspected to lead relevant differences in socio-economic outcomes. Emerging literature (e.g. Heckman and Rubenstein 2001, Heckman, Stixrud and Urzua 2006), has showed that non-cognitive skills are as important as or even more important than cognitive skills in determining later outcomes. They operate directly on later outcomes or may be intermediated by other factors, such as educational attainment. Previous studies (e.g. Carneiro, Crawford and Goodman 2007, Cunha and Heckman 2008) have also shown that cognitive and non-cognitive skills may affect differently adult outcomes, as they may act both as substitutes and as complements in determining later outcomes. Besides of interacting, cognitive and non-cognitive skills evolve over the life accordingly to external stimulation and parental inputs. However, while parental inputs affect the cognitive skills formation early in life (Cunha and Heckman, 2008), non-cognitive skills remain more malleable at later ages than cognitive skills (Carneiro and Heckman 2003, Cunha and Heckman 2008, and Borghans et al. 2008).

Taking into account for non-cognitive abilities may strongly contribute to reduce the unexplained variance in many individual outcomes. Bowles, Gintis and Osborne (2001) have noted that much of the individual differences in earnings remain unexplained controlling just for conventional explanatory variables, as cognitive performance, schooling, working experience and parental economic status, while controlling for behavioral traits is helpful to reduce unobservable variability. The relevance of taking into account also for non-cognitive skills has been argued also by Heckman and Rubenstein (2001) in the context of evaluating educational systems. Among others, Heckman, Stixrud and Urzua (2006) found that non-cognitive skills strongly influence schooling decisions and also affect wages, given schooling decisions. Sohn (2010) found that non-cognitive skills, as well as cognitive skills, are related to over- and under-education. Agan (2011) found that child non-cognitive skills are an important factor when predicting adult criminal activity.

Other authors focused on specific personality traits and later outcomes. For example, Healey, Knapp and Farrington (2004) found a negative impact of antisocial behavior during childhood and

adolescence on young adult labour market outcomes, as earnings, employment participation and unemployment duration. Robst and Weinberg (2010) showed that boys exhibiting (social maladjustment) externalizing behaviors are more likely to drop out of school, while the result is weaker for girls. Koning et al. (2010) found that early conduct disorder problems affect both human capital accumulation and violent and criminal behavior over the life course, overall if they occur earlier in life. Goldsmith, Veum and Darity (1997), as well as, Waddell (2006) and Drago (2008) focused on the relevance of self-esteem, considered as a broad measure of psychological capital, in determining educational attainments, employment and earnings. Kuhn and Weinberger (2005) showed that leadership skills matured early in life positively affect adult wages. Finally, Borghans, ter Weel and Weinberg (2008) argued that interpersonal styles are relevant for labour market outcomes: for example, workers are most productive when their works in a job that best match their style.

This paper analyzes the long-term effect of non-cognitive skills at age 11 on adult employment dynamics using information from the National Child Development Study (NCDS). Specifically, we focus on an aspect of non-cognitive skills, namely social maladjustment (or maladaptive behavior), identified according to the measurement provided by the Bristol Social Adjustment Guide (BSAG) total score[2]. The BSAG consists of a large number of "phrases" which describe a child's behavior. On the basis of teachers' reports it provides a global score to measure the level of child social maladjustment.

We are not the first using NCDS dataset to explore the relationship between non-cognitive skills and employment or other socioeconomic outcomes, and either in measuring poor non-cognitive skills using the BSAG score. Carneiro, Crawford and Goodman (2007) use BSAG score and its sub scores from NCDS cohort to study the effect of having good social skills at age 11 on many later outcomes, such as education, labour market outcomes, adolescent and adult social outcomes. Consistently with non-cognitive skills literature they found significant effects both on short and long-term outcomes. Overall, they found that having good social skills at age 11 increases the employment probability at age 42. Other studies using BSAG score and NCDS data include Weiss (2010) and Jones, Rice and Rosa Dias (2010). The former studies the effect of cognitive and non-cognitive skills, measured from different perspectives (mother and BSAG-teacher), on adult earnings using a quintile regression approach, finding a U shaped effect of non-cognitive abilities. The latter investigate the long-term effects of cognitive skills, social maladjustment, according to BSAG test, and education on health and lifestyle in the context of a schooling reform evaluation.

[2] McDermott and Watkins (1981) underlined that the popularity of the BSAG, as a method to detect and to measure children's malbehaviors, has benefited of its inclusion in the NCDS.

Studies focusing on employment perspective of individuals experiencing poor non-cognitive skills during childhood are limited to static outcomes in adulthood, leaving out the dynamic component of the employment probability. Even though employment probability very much depends on personal characteristics, including child non-cognitive skills, the past labour market history (including state dependence) possibly plays a relevant role in determining adult employment probability. The distinction between true state dependence and pure heterogeneity (Heckman, 1981) concerns the question whether the current employment status is caused by an individual's past employment history or it is just the result of personal observed and unobserved characteristics. Not taking into account for past working history usually results in estimation bias, possibly determining misleading conclusion about the role of non-cognitive skills.

This paper studies the impact of experiencing social maladjustment at age 11 on adult employment controlling for past working history in two ways. First, we consider a dynamic approach introducing a lagged employment variable to control for true state dependence (unobserved heterogeneity is controlled for). Second, we control for working experiences cumulated during adolescence/youth and young adulthood. Besides to reduce the risk of misleading estimates, the introduction of variables accounting for past working histories gives us the possibility of analyzing two other issues.

First, controlling for true state dependence allows us to control if individuals with different child BSAG score experiences different employment persistence (or mobility) in adulthood. This could be interesting as, for example, individuals experiencing social maladjustment during childhood, could be more prone to lose their job in adulthood or face greater difficulties to find a job if they are unemployed. This is because, for example, child social maladjustment is associated with lower educational attainments, criminal activities, worse health style, poor social skills or psychological problems (see Done et al., 1994) in adulthood, all associated with poorer adult (re)employment perspective. Second, controlling for previous work experiences, including during the adolescence/youth, allows us to determine if individuals experiencing social maladjustment at age 11 benefit from cumulating early working experiences or if higher education is preferable to improve their employment perspective. This could be relevant, as experiencing early working periods rather than schooling in adolescence/youth, may contribute to different evolution of non-cognitive skills formation with possible long-term effects.

We use information from NCDS sweeps. The BSAG total score has been drawn from the 2nd sweep. Childhood covariates have been drawn from sweeps 0 and 1. 6th, 7th and 8th sweeps provide information about adult employment status and adult controls. Finally, information from the employment histories 1974-2000 have been used to account for past work experiences and to determine the employment status at period 1. Econometric specifications consist in random effects

dynamic probit models, accounting for true state dependence. Besides standard version, we also run specifications taking into account for correlation between unobserved heterogeneity and covariates (Mundlak, 1978) and initial conditions problem, following the Wooldridge approach (2005).

We find that social maladjustment at age 11 determines a significant reduction in adult employment probability. This finding holds and is reinforced after controlling for true state dependence and past working history. Moreover, while there is not clear evidence about different persistence in employment status according to the BSAG score, quite strongly emerge that socially maladjusted children react differently from socially adjusted ones to life experiences, as previous employment status, previous working experiences and educational attainments. Resuming, our results suggest that the probability of being employed in adulthood for socially maladjusted children is exposed to greater variability according to life events experienced by cohort-members. It emerges, that being employed in the previous period, having cumulated previous working experiences, including early in life for females, and overall being medium-high educated contributes to reduce the negative gap in terms of adult employment probability of socially maladjusted children. This determines policy implications about the relevance and, possibly, the effectiveness of investment during life development of socially maladjusted children.

The remainder of the paper is organized as follows. Section 2 describes data and provides descriptive analysis. Section 3 focuses on econometric methods, while Section 4 provides empirical evidence. Finally, Section 5 concludes.

2. Data and descriptive analysis

2.1 The National Child Development Study

National Child Development Study (NCDS) collects information about individuals born in the week 3rd - 9th March 1958 in England, Wales and Scotland, selecting data from the Perinatal Mortality Survey. Information about cohort members have been gathered at different points in time and from a variety of sources: self-report, parents, medical examination and ability and behavioral tests at school. Besides 1958 information, NCDS sweeps were carried out in 1965, 1969, 1974, 1981, 1991, 1999-2000, 2004-2005 and 2008-2009. NCDS also collects information about specific issues concerning cohort-members, including the employment histories 1974-2000. The study gathers information about cohort-members' health, education, behaviour, parental background, economic conditions, social and labour market outcomes. Finally, NCDS provides test score information about cognitive and non-cognitive skills during childhood and adolescence.

NCDS is particularly well-suited to our goals. It allows to measure child social maladjustment through the BSAG total score and it provides information about the employment status in different points in time of adulthood; it also provides numerous information to control for heterogeneity among cohort-members. Specifically, we use BSAG score at age 11[3] (sweep 2) to study the impact of social maladjustment on adult employment dynamics. Adult employment status refers to sweeps 6th, 7th and 8th, when the cohort-member was, respectively, 41-42, 46-47 and 50-51 years old. State dependence is controlled for introducing lagged employment in the estimated equation. Since the time span between the 5th and 6th sweeps is 8-9 years, we use information from the employment histories 1974-2000 to reconstruct the employment status in 1995 and use this as lagged employment for the 1999-2000 employment status. It also represents the time period 1 in our dynamic analysis. The information from the employment histories 1974-2000 also has allowed us to reconstruct previous working experiences: cumulated working experiences (in month) during adolescence/youth (1974-1981) and cumulated working experiences (in month) during young adulthood (1982-1994). We use this information to control for past working histories. We also control for other sources of cohort-member heterogeneity. Some explanatory variables, including those possibly affecting the development of social maladjustment[4], have been drawn from NCDS sweeps 0 and 1. Specifically, among childhood control variables we include: dummy variables controlling for mother smoking during pregnancy, mother working before schooling age of the cohort-member, father social class at age 7, family difficulties (including financial difficulties, death of parents and family dissolution) at age 7, parents' interest in cohort-member education, unhappiness of the cohort-member at school at age 7, and results from maths and reading tests at age 7 to control for cognitive abilities of cohort-members. Adult control variables are drawn from 6th, 7th and 8th NCDS sweeps. They include, marital status of the cohort-member, presence of children aged 0-16, disability status, health status, educational level, partner employment status, local unemployment rate (measured at regional level) and wave dummies. Finally, since males and females usually show different patterns and performances in the labour market, we analyze them separately. Descriptive statistics are reported in table 1. We provide both information on full male and female sub-samples and split sub-samples according to the level of the BSAG score. This allows us to highlight some interesting difference, for example about educational attainments, between children with higher social maladjustment at age 11 and other cohort-members.

[3] NCDS provides BSAG score also when cohort-members are 7 years old. However, since at that age non-cognitive skills are likely to be less stable because of their malleability in early childhood, we just rely on maladaptive behavior measured at age 11.

[4] An increasing number of studies focus on the determinants of poor non-cognitive skills. See, for example, Peterson and Zill (1986), Gregg and Washbrook (2003), Dooley and Stewart (2007), Propper and Rigg (2007), Carneiro, Meghir and Parey (2007), Paxson and Schady (2007), Del Bono and Ermisch (2009).

The original NCDS dataset consists in about 17000 individuals, however cohort members interviewed in adulthood decline overtime to about 11400 in the 6th sweep and 9790 in the 8th sweep. Moreover, because of missing data and attrition, our econometric analysis is based on about 5300 cohort members, 2500 of which are males. Dearden, Machin and Read (1997) show that attrition in NCDS has taken place overall among individuals with lower ability and lower educational qualifications. However, we are confident that missing information does not greatly affect our estimation results. In this sense, Hawkes and Plewis's (2006) have found that attrition and non-response can be associated with only few significant predictors, supporting the view that the data are still reasonably representative of this population.

Table 1. Descriptive statistics

	Males		Females		Males				Females			
					First BSAG quartile		Fourth BSAG quartile		First BSAG quartile		Fourth BSAG quartile	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Employed time t	0.933	0.250	0.834	0.372	0.961	0.194	0.902	0.298	0.869	0.338	0.763	0.425
Lag employment	0.941	0.236	0.816	0.387	0.966	0.181	0.909	0.287	0.839	0.368	0.764	0.425
BSAG score	8.169	8.572	5.731	6.966	0.454	0.498	18.414	7.565	0.423	0.494	16.979	6.717
Working experience before 1982	69.274	27.613	60.987	27.462	62.952	29.712	73.988	24.843	59.021	27.560	62.623	27.068
Working experience 1982-1994	146.755	26.896	112.903	47.467	149.799	20.719	143.212	32.464	116.037	46.643	106.823	49.764
Number of unemployment spells	0.555	0.869	1.208	1.035	0.458	0.786	0.649	0.940	1.154	1.066	1.343	1.023
Married/Cohabitant	0.835	0.371	0.819	0.385	0.896	0.305	0.788	0.409	0.826	0.379	0.779	0.415
Children 0-16	0.673	0.469	0.696	0.460	0.727	0.446	0.631	0.483	0.714	0.452	0.636	0.481
Disabled	0.029	0.167	0.022	0.146	0.013	0.113	0.045	0.208	0.014	0.116	0.041	0.197
Poor health	0.076	0.265	0.097	0.296	0.049	0.217	0.099	0.299	0.078	0.269	0.137	0.344
No education	0.067	0.251	0.082	0.275	0.032	0.177	0.111	0.314	0.037	0.188	0.164	0.370
Education NVSQ 1-2	0.353	0.478	0.421	0.494	0.280	0.449	0.421	0.494	0.366	0.482	0.469	0.499
Education NVSQ 3	0.224	0.417	0.178	0.382	0.227	0.419	0.220	0.415	0.194	0.396	0.161	0.368
Education NVSQ 4	0.311	0.463	0.291	0.454	0.400	0.490	0.217	0.412	0.358	0.479	0.187	0.390
Education NVSQ 5-6	0.045	0.207	0.028	0.166	0.061	0.239	0.031	0.173	0.045	0.207	0.019	0.138
Partner employed	0.685	0.464	0.743	0.437	0.730	0.444	0.636	0.481	0.761	0.427	0.679	0.467
No partner	0.166	0.373	0.181	0.385	0.106	0.307	0.214	0.410	0.175	0.380	0.218	0.413
Regional unemployment rate	5.722	1.212	5.734	1.224	5.737	1.208	5.742	1.239	5.778	1.218	5.699	1.210
Unskilled-Semiskilled	0.204	0.403	0.216	0.411	0.176	0.381	0.242	0.428	0.181	0.385	0.274	0.446
High skilled	0.230	0.421	0.212	0.408	0.280	0.449	0.185	0.388	0.265	0.442	0.151	0.358
Economic difficulties	0.080	0.272	0.103	0.304	0.056	0.231	0.112	0.315	0.071	0.257	0.166	0.373
Disability difficulties	0.060	0.237	0.058	0.234	0.026	0.160	0.069	0.254	0.045	0.208	0.098	0.297
Death of parents	0.011	0.105	0.015	0.122	0.009	0.093	0.010	0.099	0.013	0.112	0.019	0.136
Household structure difficulties	0.052	0.223	0.050	0.217	0.030	0.170	0.076	0.265	0.035	0.184	0.086	0.280
Other family difficulties	0.031	0.174	0.031	0.172	0.018	0.132	0.040	0.195	0.021	0.144	0.045	0.206
Mother smoking during pregnancy	0.121	0.326	0.132	0.339	0.099	0.298	0.141	0.349	0.116	0.321	0.182	0.386
Mother working before child schooling	0.272	0.445	0.286	0.452	0.268	0.443	0.279	0.449	0.255	0.436	0.321	0.467
Little interest in child education	0.104	0.306	0.104	0.305	0.063	0.244	0.153	0.360	0.063	0.244	0.185	0.389
Unhappy at school	0.059	0.236	0.055	0.228	0.030	0.170	0.083	0.276	0.047	0.211	0.067	0.250
Reading test	23.873	6.503	25.505	5.620	26.199	4.837	21.545	7.199	26.798	4.589	22.940	6.909
Maths test	5.604	2.411	5.357	2.385	6.234	2.299	4.986	2.367	5.790	2.297	4.643	2.414

Source: our elaboration of NCDS data

2.2 The Bristol Social Adjustment Guide

The Bristol Social Adjustment Guide (BSAG, Scott 1974) is a standardized psychometric test of social maladjustment that helps to diagnose the extent and the nature of social maladjustment in children at school. It consists of 110 verbal items, covering a wide variety of disturbed child behavior, to be answered by teachers, counselors, and school psychologist. The resulting score allows us to evaluate

the level of the global or more specific aspects of social maladjustment. To reduce bias from subjective evaluation, the BSAG focuses on observable behavior and avoids descriptions of personality traits.

In the 1st and 2nd sweeps of the NCDS teachers were asked to complete the BSAG. It consists of 12 behavioral domains including: hostility towards children and adults, anxiety, withdrawal, writing-off adults, unforthcomingness, depression, restlessness, acceptance by adults, inconsequential behavior, miscellaneous of psychological and nervous symptoms (Stott, 1987). Summing scores from specific behavioral domains is possible to determine the BSAG total score, allowing us to measure the global level of social maladjustment of cohort-members.

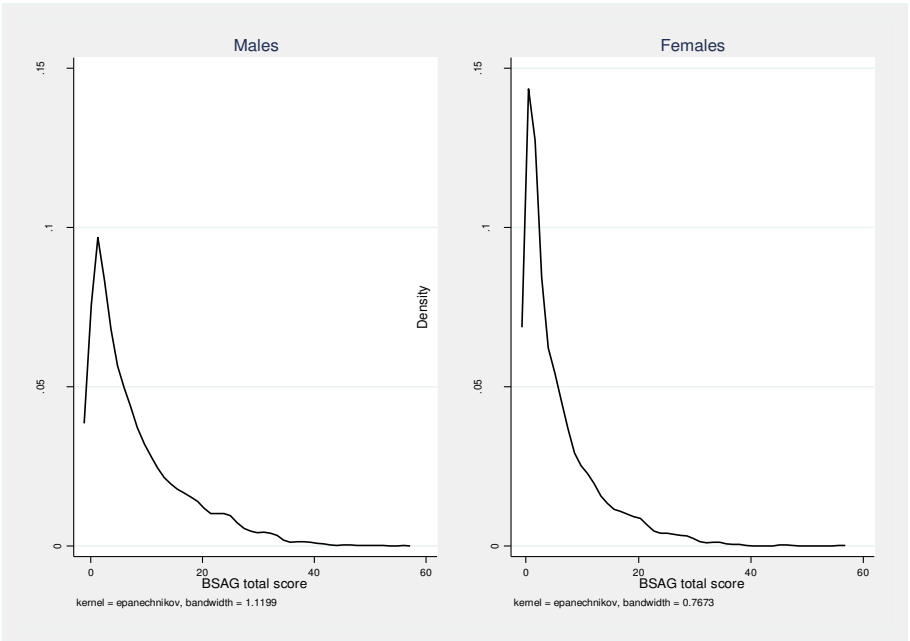
Our analysis uses BSAG total score from the 2nd NCDS sweep. According to the BSAG measure, the level of social maladjustment differs by gender, as it is higher for males rather than for females. Table 1and Figure 1 provide information about the distribution of the BSAG score.

Table 2. BSAG total score distribution

	1st quartile	Median	Mean	4th quartile
All	1	4	6.88	10
Male	2	5	8.17	12
Female	1	3	5.73	8

Source: our elaboration of NCDS data

Figure 1. Univariate Kernel density estimation of the BSAG total score

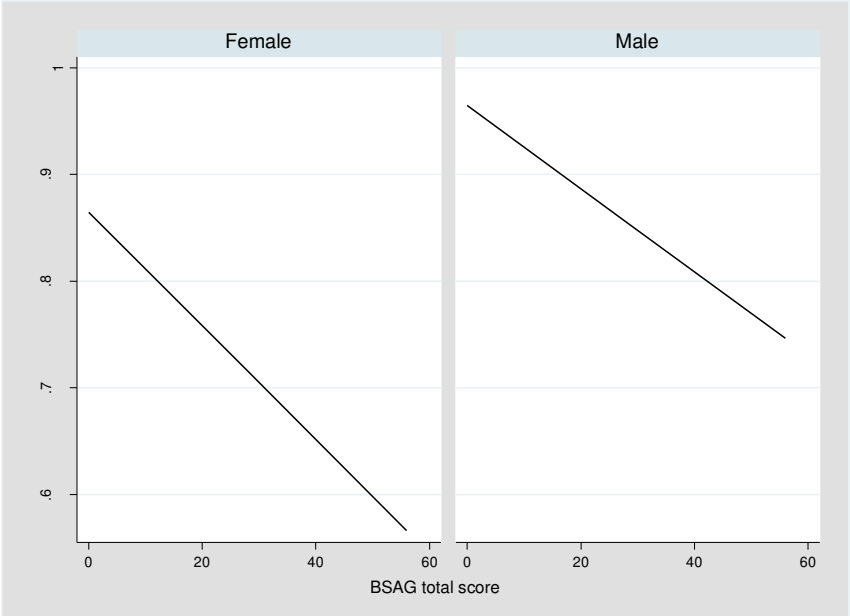


Source: our elaboration of NCDS data

2.3 Adult employment probability and the BSAG total score

The adult employment probability differs by BSAG total score. Figure 2 reports the predicted employment probability distinguishing between males and females. Given the BSAG, males show higher employment rates than females. Higher BSAG decreases the probability of employment: moving from the lower level to the higher one of the BSAG total score, the probability of employment decreases by about 20% among males and about 30% among females.

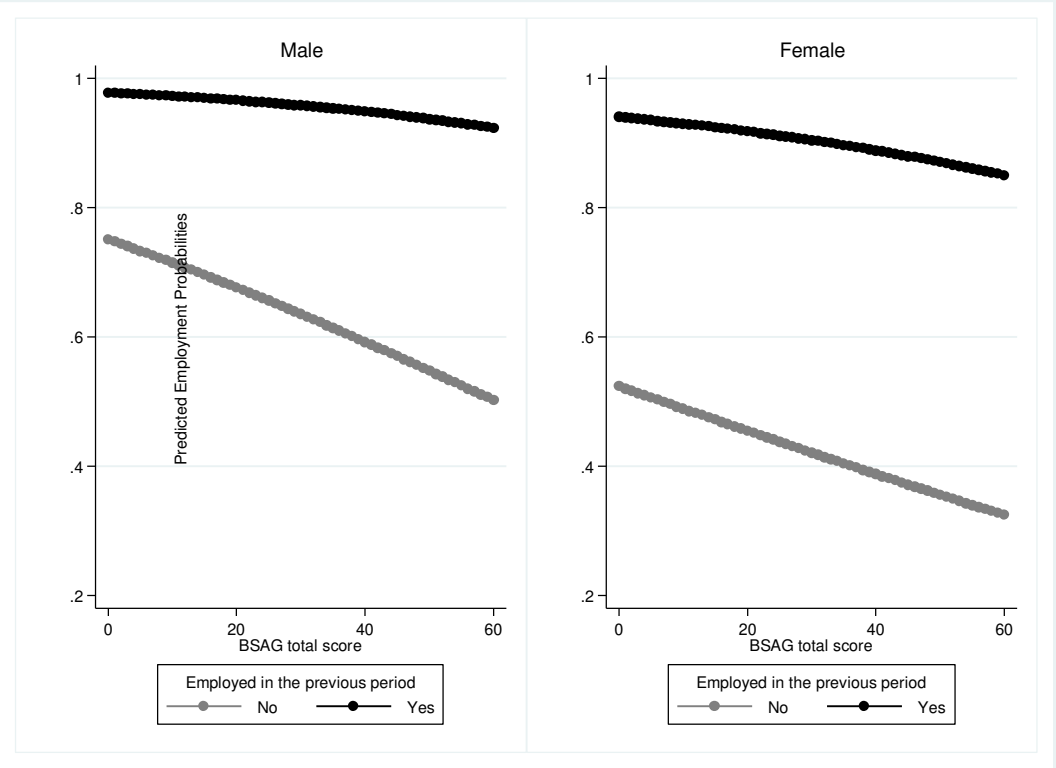
Figure 2. Employment probability by BSAG total score



Source: our elaboration of NCDS data

Figure 3 informs about the probability of employment at time t conditional on being, in turn, employed at time t-1 or non-employed at time t-1. Persistence in employment decreases (slowly) as the BSAG total score increases, and it seems to be higher for males than for females. On the contrary, the probability of being employed at time t, given that the cohort-member has been not employed at time t-1, quite strongly decrease as the BSAG total score increases. This suggests that cohort members that have experienced social maladjustment during childhood, are less likely to find a job if they start from a non-employment status.

Figure 3. Predicted employment probabilities by BSAG total score and previous employment status



Source: our elaboration of NCDS data

3. The econometric models

The adult employment dynamics is investigated by applying a dynamic probit model accounting for both unobserved heterogeneity and true state dependence[5]. The introduction of the lagged employment among the covariates allows us to identify the existence and the magnitude of the persistence phenomenon in employment status. The equation for the latent dependent variable is:

$$(1)\quad e_{it}^{*} = \gamma e_{it-1} + x_{it}^{'}\beta + \alpha_i + u_{it}$$

with $i = 1,\ldots,N$ indicating the cohort-member and $t = 2\ldots T$ the time periods[6]. x_{it} is a vector of explanatory variables, including the BSAG total score and past working experiences, β is a vector of unknown parameters to be estimated (including BSAG total score parameter), α_i is the individual

[5] We also consider specifications not accounting for state dependence (for comparison purposes), as well as a dynamic interaction model where the lagged employment is interacted with the BSAG total score.

[6] The time span between consequent periods is 4 or 5 years.

specific unobserved heterogeneity[7] and u_{it} is the idiosyncratic error term. We assume that both α_i and u_{it} are normally distributed and independent of x_{it} and that there is not serially correlation in u_{it}. Finally, e_{it}^* is the latent dependent variable and e_{it} is the observed binary outcome variable, e_{it-1} is the lagged employment status and γ is the state dependence parameter to be estimated. e_{it} may be defined as:

$$(2)\quad e_{it} = \begin{cases} 1 & \text{if } e_{it}^* \geq 0 \\ 0 & \text{else} \end{cases}$$

Specifically e takes value one if the cohort-member is employed at time t and value 0 if the cohort-member is non-employed (unemployed or out of the labour force).

It follows that the probability of employment for cohort member i at time t is specified as:

$$(3)\quad \Pr\left[e_{it} = 1 \mid e_{it-1}, x_{it}, \alpha_i\right] = \Phi\left(\gamma e_{it-1} + x_{it}'\beta + \alpha_i\right)$$

where Φ is the cumulative distribution function of a standard normal.

The assumption about the independence between α_i and x_{it} may be relaxed adopting the Mundlak's approach (Mundlak, 1978). This approach takes into account possible correlation between random effects and observable characteristics, simply allowing a relationship between α and either the time means of time-variant explanatory variables. This implies to decompose the unobserved heterogeneity term in two parts:

$$(4)\quad \alpha_i = x_i'\vartheta + \varsigma_i$$

where x_i represents the part of unobserved heterogeneity correlated with the explanatory variables and ς_i represents the part of unobserved heterogeneity uncorrelated with the explanatory variables.

It follows that the new equation for the latent dependent variable may be written as:

$$(5)\quad e_{it}^* = \gamma e_{it-1} + x_{it}'\beta + x_i'\vartheta + \varsigma_i + u_{it}$$

and the probability of employment for cohort member i at time t reads:

[7] Individual specific unobserved heterogeneity consists in random effects. Random effects specification is preferred to the fixed effect one, as the fixed effect specification drops out time-invariant effects, such as social maladjustment at age 11.

(6) $\Pr[e_{it}=1 \mid e_{it-1}, x_{it}, \alpha_i] = \Phi(\gamma e_{it-1} + x_{it}'\beta + x_i'a + \varsigma_i)$

Finally, we consider the possibility of correlation between α_i and y_{it-1}, the so-called initial conditions problem (Heckman, 1981). We address the initial conditions problem following Wooldridge (2005) that has proposed an alternative Conditional Maximum Likelihood (CML) estimator that considers the distribution conditional on the initial period value. The idea is that the correlation between y_{i1-1} and α_i may be expressed by the following equation:

(7) $\alpha_i = \eta_0 + \eta_1 y_{i1} + z_i'\eta + \varepsilon_i$

where ε is another unobservable individual specific heterogeneity term that is uncorrelated with the initial employment status y_1. Wooldridge (2005) specifies that z_i corresponds to the x_i contained in the Mundlak specification, calculated for periods 2 to *T*.

It follows that the probability of employment for cohort member *i* at time *t* reads:

(8) $\Pr[e_{it}=1 \mid e_{it-1}, x_{it}, y_{i1}, \alpha_i] = \Phi(\gamma e_{it-1} + x_{it}'\beta + \eta_1 y_{i1} + z_i'\eta + \varepsilon_i)$

The contribution to the likelihood function for the cohort-member *i* is given by:

(9) $L_i = \int \left\{ \prod_{t=2}^{T} \Phi\left[(\gamma e_{it-1} + x_{it}'\beta + \eta_1 y_{i1} + z_i'\eta + \varepsilon_i)(2y_{it} - 1) \right] \right\} g(\eta_i) d\eta_i$

where $g(\eta)$ is the normal probability density function of the new unobservable individual specific heterogeneity.

4. Results

Estimation results are reported in tables 3-5[8]. Estimation results have been carried out from different specifications of the standard (dynamic) probit model and of the dynamic probit model accounting for initial conditions problem adopting the Wooldridge method. Tables 6a and 6b report predicted employment probabilities, calculated on the basis of specification 4, for simulated cohort members according to specific values of relevant characteristics.

[8] For brevity we omit estimation results of Mundlak specifications.

The probability of employment and social maladjustment at age 11

Specifically, table 3 reports four different specifications of the dynamic probit model, distinguishing by gender. The first columns (specification 1) contain estimation of a static version of a probit model accounting for unobserved heterogeneity. It controls for standard childhood and adulthood explanatory variables and shows the effect of social maladjustment at age 11 on the probability of being employed in the adulthood. We find that as the BSAG score increases the probability of employment decreases significantly: one point more in the BSAG total score decreases by 0.028% the probability of employment of males and by 0.108% the probability of employment of females. Obviously, as anticipated, this negative effect possibly depends both by a direct effect and an intermediate effect through, for example, educational level reached during youth. Specification 2 adds controls for previous working history of the cohort-member. Specifically, we introduce information about the working months cumulated both during youth (cohort-members aged 16-23) and during young adulthood (cohort-members aged 24-36), and finally a variable controlling for the number of unemployment spells cumulated in the period 1974-1994. We find that, after controlling for previous working history, the negative effect of social maladjustment at age 11 slightly decrease both for males and females. Now, one point more in the BSAG score decreases the probability of employment by 0.024% for males and by 0.103% for females. We also find that previous working history affect differently the probability of employment of males and females. In fact, while for males is just significant having cumulated working experiences during young adulthood (one month more increases by 0.014% the probability of employment in adulthood), for females is significant both cumulate working experiences during youth and young adulthood (respectively +0.038% and +0.073% for each month more employed). Moreover, we find a quite surprising positive effect from having experienced previous spells of unemployment (one spell more increases by 1.34% the probability of employment in adulthood). The positive effect is possibly explainable in terms of stronger search activities during youth/young adulthood of cohort-members experiencing periods of unemployment. This could decrease the probability of incurring in long-term unemployment and avoid the risk of skills obsolescence. Specifications 3 and 4 introduce the dynamic component in our model. Specifically, we add the lag-employment among covariates to take into account for true state dependence. Since, the unobserved heterogeneity term is possibly correlated with the lagged-employment, besides estimating a standard dynamic probit model (specification 3), we relax the hypothesis of exogenous initial conditions by estimating a specification accounting for endogenous initial conditions following the Wooldridge method (specification 4). According to the dynamic probit model results, we find that social maladjustment at age 11 decreases the probability of employment in adulthood and that the negative effect is stronger. Specifically one point more in the BSAG score decreases the probability of employment of males by 0.071% and 0.058%, according, respectively to specifications 3 and 4. The

negative effect is stronger for females, respectively 0.15% and 0.132%. The effects concerning previous working histories remain quite unchanged, while we find strong evidence of true state dependence. This means that the employment status in the previous period strongly affects the probability of employment. Specifically, among males, being employed at period t-1 increases the probability of employment by about 25% according to the standard specification and by about 17.4% according to the Wooldridge specification. The true state dependence is stronger for females. Being employed at period t-1 increases the probability of employment by about 36% according to the standard specification and by about 22.6% according to the Wooldridge specification. Finally, we estimate two further specifications where we introduce a variable controlling for the interaction between the BSAG score and the lag-employment. This should allow us to control if cohort members experiencing increasing levels of social maladjustment at age 11 also experience a different persistence in employment status. Even though, the descriptive analysis presented in paragraph 2.3 shows a decreasing persistence of cohort members with higher BSAG score, empirical findings do not support it. Estimation of other control variables does not show relevant changes with respect to previous specifications.

Our empirical findings support the hypothesis that experiencing social maladjustment at age 11 determines a negative long-term effect on employment perspective of cohort-members, consistently with evidence from previous studies. Previous working history and employment dynamics are relevant factors in determining adult employment probability and possibly reduce the risk of estimation bias when the effect of child social maladjustment on employment probability is investigated. In sum, our findings possibly contribute to make robust evidence on long lasting impact of social maladjustment on an important aspect of life development, such as employment.

Table 3. Dynamic probit model estimates (exogenous and endogenous initial conditions)

MALES	Standard [1]				Standard [2]				Standard [3]				Wooldridge [4]				Standard [5]				Wooldridge [6]			
Dependent variable: Employed at time t	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx
BSAG total score	-0.023	0.005	***	-0.028%	-0.019	0.005	***	-0.024%	-0.011	0.003	***	-0.071%	-0.011	0.004	***	-0.058%	-0.014	0.007	**	-0.091%	-0.015	0.007	**	-0.082%
Work experience 1974-1981					-0.001	0.002		-0.001%	0.000	0.001		0.000%	0.000	0.001		-0.001%	0.000	0.001		0.000%	0.000	0.001		-0.001%
Work Experience 1982-1994					0.011	0.002	***	0.014%	0.002	0.001	*	0.014%	0.002	0.001	*	0.012%	0.002	0.001	*	0.014%	0.002	0.001	*	0.012%
Number unemployment spells 1974-1994					-0.034	0.056		-0.044%	-0.016	0.035		-0.104%	-0.020	0.038		-0.107%	-0.016	0.035		-0.108%	-0.020	0.038		-0.111%
Lag employment									1.375	0.100	***	25.010%	1.200	0.145	***	17.427%	1.331	0.132	***	23.620%	1.136	0.174	***	15.688%
Lag employment × BSAG																	0.004	0.007		0.026%	0.005	0.008		0.029%
Employed at period 1													0.050	0.169		0.284%					0.055	0.169		0.315%
FEMALES	Standard [1]				Standard [2]				Standard [3]				Wooldridge [4]				Standard [5]				Wooldridge [6]			
Dependent variable: Employed at time t	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx
BSAG total score	-0.019	0.006	***	-0.109%	-0.017	0.006	***	-0.103%	-0.009	0.003	***	-0.150%	-0.010	0.004	**	-0.132%	-0.010	0.006	*	-0.162%	-0.009	0.007		-0.126%
Work experience 1974-1981					0.006	0.002	***	0.038%	0.004	0.001	***	0.061%	0.004	0.001	***	0.056%	0.004	0.001	***	0.061%	0.004	0.001	***	0.056%
Work Experience 1982-1994					0.012	0.001	***	0.073%	0.003	0.001	***	0.047%	0.002	0.001	***	0.029%	0.003	0.001	***	0.047%	0.002	0.001	***	0.029%
Number unemployment spells 1974-1994					0.220	0.045	***	1.341%	0.104	0.025	***	1.686%	0.117	0.029	***	1.570%	0.103	0.025	***	1.686%	0.117	0.029	***	1.570%
Lag employment									1.380	0.057	***	36.041%	1.070	0.084	***	22.622%	1.373	0.070	***	35.819%	1.074	0.095	***	22.736%
Lag employment × BSAG																	0.001	0.006		0.018%	-0.001	0.007		-0.008%
Employed at period 1													0.443	0.109	***	7.140%					0.443	0.109	***	7.134%

Source: our elaboration of NCDS data. Note: Childhood and Adulthood covariates are controlled for.

The probability of employment and BSAG score distribution.

Tables 4 and 5 report estimation results from the dynamic probit model accounting for endogenous initial conditions and splitting male and female samples according to the value of the BSAG score. This allows us to compare the effect of some relevant variables of the probability of employment according to the seriousness of social maladjustment at age 11. In other words, given a specific level of social maladjustment (low or high) at age 11, we study the role of some variables on the probability of adult employment. The level of social maladjustment is defined according to the distribution of the BSAG score. For robustness purposes, we refer to two different cut-off points to obtain two different partitions of male and female samples. In the first case we compare cohort members belonging to the first quartile of the BSAG score (low social maladjustment) with cohort members belonging to the fourth quartile of the BSAG score distribution (high social maladjustment). In the second case cohort members have been split with reference to the median of the BSAG distribution. It follows that for both males and females we compare cohort members for which the BSAG score is below the median (low social maladjustment) with cohort members for which the BSAG score is above the median (high social maladjustment). Differently from previous estimations, now we also focus on the role of educational attainments on the probability of employment, in addition to the role of previous working history and true state dependence. The BSAG distribution refers to the whole sample (males and females), then the cut-off points of the distribution are determined on the basis of the whole distribution (see Table 1). This allows us to compare the effect of social maladjustment on males and females.

Evidence from Tables 4 and 5 are quite consistent then, for brevity, we just focus on results reported in Table 4 according to the Wooldridge specification where we compare, both for males and females, individuals belonging to the first quartile of the BSAG score distribution with those belonging to the fourth quartile of the BSAG score distribution. Looking at the male sample emerges that the probability of adult employment of cohort-members characterized by a low BSAG score (0 or 1) at age 11 is just affected by the previous employment status (true state dependence). Being employed at period t-1 increases the probability of employment at period *t* by 12.6%, while other variables considered here do not affect significantly the probability of employment. This is possibly due to the high employment rates of male cohort-members without social maladjustment problems. In other words, whatever is the educational level or the previous working history, the probability of adult employment is very high and just recent employment status affect the actual employment status, indicating the existence of a persistence phenomenon. Obviously, our analysis does not bring evidence about the quality of employment (wage, qualification and so on) that is likely to be affected both from education and previous working history, besides the recent employment status. The probability of

employment of male cohort-members with severe social maladjustment (at least 10 points in the BSAG score) act differently when compared with cohort-members with low BSAG score. First, the persistence phenomenon is now slightly more relevant than the previous case. Being employed at period t-1 increase the actual employment status by 17.7%. Even though this difference is likely to be not significant, it is consistent with the graphical analysis (Figure 3), and possibly reveals a higher immobility in employment status. This result is supported by evidence that we do not show for brevity, of a stronger negative effect on the probability of employment at period t from being non-employed at time t-1 for cohort-members with high BSAG score.

Other variables play a role in determining the probability of adult employment for cohort members with social maladjustment at age 11. Cumulating working experience in young adulthood (aged 24-36) significantly increases the probability of adult employment. On the contrary, cumulating youth working experiences appear to be not significant. Finally, obtaining higher educational attainments quite strongly increase the probability of adult employment. The strongest effect has been found for the 4^{th} level of NVQ, and having a 3^{rd} or a 5^{th}-6^{th} level is also important to increase significantly the probability of adult employment. These results suggest that males with a high BSAG score are more segmented in terms of adult employment perspective by life experiences than males with a low BSAG score. Moreover, these findings are potentially interesting in terms of policy. They suggests that investment in education could be preferable to early entry in the labour market for males with social maladjustment at age 11 to increase the probability of employment in adulthood.

Results from the female sample show some differences with respect to the male results. The probability of employment of females with low BSAG score is affected by many sources. First, we find evidence of true state dependence. The effect is stronger when compared with males with a low BSAG score: being employed at period *t*-1 increases by about 25% the probability of employment at period *t*. This indicates stronger employment persistence among females possibly leading to a stronger duality between employed and non-employed. However, differently from males, the probability of adult employment of females with low BSAG score is affected by other factors. Specifically, both cumulating early work experiences and higher education increases the probability of adult employment. This finding possibly suggests that employment status in adulthood is affected by early life experiences according to two different entry-channels in the labour market. On the one hand, the early-entry in the labour market possibly helps to build a working-pattern along the cohort-members life, even though we cannot exclude the possibility of being employed in low-qualified positions. On the other hand, higher educated females are very likely to be employed in adulthood as a consequence of their investment in education and human capital accumulation. Finally, an unexpected positive effect is found with respect to the number of cumulated unemployment spells over the period 1974-

1994. As suggested above, this is possibly indicative of an association between number of unemployment spells and job-search effort and lower risk of incurring in skills obsolescence.

Looking at females with a high BSAG score, we find similarities with females characterized by a low BSAG score. In both cases, we find evidence of true state dependence and relevant effects from cumulating working experience and higher education, but not from cumulating unemployment spells. Importantly, the effects from significant variables are stronger, possibly indicating a stronger adult duality of females with socially maladjusted at age 11, according to their life experiences. First, for females with a high BSAG score is much more important than for females with a low BSAG score the employment persistence component. In this case being employed at period t-1 increases the adult employment probability by about 35%. Second, the effect of cumulating both early and young-adulthood working experiences is stronger than for females with a low BSAG score. Third, the positive effect from higher education is stronger for females with a high BSAG score. This suggests, quite similarly to the male case, that the adult employment perspective of females with a high BSAG score are more affected by previous (early) life experiences than females with a low BSAG score. It follows that among socially maladjusted females at age 11, both differences in working history and in education patterns determine a stronger duality in terms of later employment than for other females. Given this higher responsiveness, life experiences of females socially maladjusted at age 11 is a possible target in terms of economic policy. Finally, differently from the male case, no clear difference emerges in terms of adult employment probability from investing in early working experiences and education, even though is very likely that these different patterns lead to different quality of adult employment.

Table 4. Dynamic probit model estimates: results by BSAG distribution – first and fourth quartile

	BSAG score: first quartile								BSAG score: fourth quartile							
MALES	Standard [7]				Wooldridge [8]				Standard [9]				Wooldridge [10]			
Dependent variable: Employed at time t	b	s.e.			b	s.e.			b	s.e.			b	s.e.		
Working experience 1974-1981	0.002	0.003		0.010%	0.003	0.003		0.009%	0.000	0.002		-0.003%	-0.001	0.002		-0.005%
Working experience 1982-1994	0.004	0.003		0.014%	0.000	0.004		0.013%	0.002	0.002	*	0.023%	0.003	0.002	*	0.018%
Number of unemployment spells 1974-1994	0.037	0.089		0.149%	0.047	0.095		0.169%	-0.062	0.052		-0.567%	-0.078	0.056		-0.596%
Lag employment	1.192	0.231	***	14.587%	0.833	0.401	**	12.663%	1.281	0.130	***	25.812%	1.175	0.228	***	17.668%
NVQ 1-2 level	0.342	0.356		1.182%	0.246	0.401		0.856%	0.358	0.133	***	3.172%	0.326	0.146	**	2.402%
NVQ 3 level	0.080	0.358		0.305%	-0.020	0.408		-0.112%	0.497	0.158	***	3.663%	0.507	0.179	***	3.069%
NVQ 4 level	0.205	0.349		0.791%	0.122	0.402		0.377%	0.670	0.176	***	4.587%	0.658	0.196	***	3.702%
NVQ 5-6 level	0.312	0.452		0.937%	0.248	0.529		0.746%	0.626	0.354	*	3.502%	0.589	0.351	*	2.753%
Employed at period 1					0.790	0.488	*	0.709%					-0.129	0.245		0.132%
	BSAG score: first quartile								BSAG score: fourth quartile							
FEMALES	Standard [7]				Wooldridge [8]				Standard [9]				Wooldridge [10]			
Dependent variable: Employed at time t	b	s.e.			b	s.e.			b	s.e.			b	s.e.		
Working experience 1974-1981	0.006	0.002	***	0.068%	0.007	0.002	***	0.065%	0.005	0.002	**	0.119%	0.006	0.003	**	0.102%
Working experience 1982-1994	0.004	0.001	***	0.041%	0.002	0.001		0.040%	0.003	0.001	**	0.078%	0.003	0.002	*	0.091%
Number of unemployment spells 1974-1994	0.167	0.049	***	1.893%	0.186	0.057	***	1.878%	0.092	0.055	*	2.099%	0.095	0.068		1.865%
Lag employment	1.271	0.109	***	26.503%	0.964	0.144	***	25.557%	1.374	0.118	***	41.252%	0.998	0.170	***	34.837%
NVQ 1-2 level	0.295	0.217		3.165%	0.314	0.253		2.937%	0.091	0.150		2.057%	0.025	0.185		0.757%
NVQ 3 level	0.323	0.228		3.147%	0.361	0.267		2.910%	0.385	0.194	**	7.571%	0.413	0.234	*	6.902%
NVQ 4 level	0.705	0.234	***	7.049%	0.771	0.276	***	6.594%	0.420	0.192	**	8.255%	0.510	0.237	**	8.090%
NVQ 5-6 level	1.060	0.345	***	5.731%	1.143	0.399	***	5.534%	1.128	0.513	**	13.424%	1.389	0.624	**	12.595%
Employed at period 1					0.549	0.199	***	1.412%					0.487	0.237	**	-4.591%

Source: our elaboration of NCDS data. Note. The BSAG score variable is controlled for. Childhood and Adulthood covariates are also controlled for.

Table 5. Dynamic probit model estimates: results by BSAG distribution – above and below the median

	BSAG score: below median								BSAG score: above median							
MALES	Standard [11]				Wooldridge [12]				Standard [13]				Wooldridge [14]			
Dependent variable: Employed at time t	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx
Working experience 1974-1981	0.000	0.002		-0.001%	0.000	0.002		-0.002%	0.000	0.002		-0.001%	0.000	0.002		-0.002%
Working experience 1982-1994	0.002	0.002		0.010%	0.000	0.002		0.009%	0.002	0.001	*	0.018%	0.003	0.002	*	0.015%
Number of unemployment spells 1974-1994	-0.004	0.057		-0.019%	-0.011	0.059		-0.049%	-0.020	0.044		-0.161%	-0.025	0.048		-0.164%
Lag employment	1.495	0.143	***	26.590%	1.269	0.246	***	25.065%	1.364	0.122	***	27.305%	1.204	0.182	***	17.452%
NVQ 1-2 level	0.058	0.211		0.305%	0.029	0.223		0.146%	0.339	0.118	***	2.666%	0.289	0.131	**	1.766%
NVQ 3 level	-0.064	0.216		-0.358%	-0.115	0.229		-0.649%	0.556	0.143	***	3.536%	0.569	0.161	***	2.753%
NVQ 4 level	0.110	0.217		0.581%	0.067	0.232		0.288%	0.434	0.143	***	2.969%	0.396	0.157	**	2.105%
NVQ 5-6 level	-0.022	0.278		-0.121%	-0.072	0.294		-0.343%	0.514	0.271	*	2.773%	0.443	0.291		1.908%
Employed at period 1					0.436	0.303		0.570%					-0.092	0.205		0.421%
	BSAG score: below median								BSAG score: above median							
FEMALES	Standard [11]				Wooldridge [12]				Standard [13]				Wooldridge [14]			
Dependent variable: Employed at time t	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx	b	s.e.		mfx
Working experience 1974-1981	0.005	0.001	***	0.070%	0.006	0.002	***	0.063%	0.003	0.001	*	0.051%	0.003	0.002	*	0.043%
Working experience 1982-1994	0.003	0.001	***	0.043%	0.002	0.001	*	0.042%	0.003	0.001	***	0.056%	0.003	0.001	**	0.061%
Number of unemployment spells 1974-1994	0.117	0.035	***	1.548%	0.132	0.042	***	1.541%	0.086	0.036	**	1.756%	0.092	0.041	**	1.669%
Lag employment	1.351	0.080	***	31.755%	0.996	0.115	***	31.033%	1.397	0.083	***	40.457%	1.152	0.122	***	36.267%
NVQ 1-2 level	0.341	0.137	**	4.300%	0.340	0.166	***	3.897%	0.248	0.106	**	5.032%	0.226	0.121	*	4.390%
NVQ 3 level	0.340	0.148	**	3.848%	0.325	0.178	*	3.398%	0.429	0.132	***	7.399%	0.447	0.150	***	6.973%
NVQ 4 level	0.648	0.152	***	7.550%	0.675	0.184	***	6.829%	0.430	0.130	***	7.603%	0.460	0.150	***	7.234%
NVQ 5-6 level	1.006	0.257	***	6.658%	1.034	0.300	***	6.373%	0.521	0.277	*	7.817%	0.567	0.313	*	7.343%
Employed at period 1					0.581	0.156	***	0.815%					0.271	0.154	*	-2.444%

Source: our elaboration of NCDS data. Note. The BSAG score variable is controlled for. Childhood and Adulthood covariates are also controlled for.

Tables 6a and 6b report the predicted employment rates for simulated cohort-members. Specifically, we use estimates from the specification 4 (the dynamic probit model accounting for true state dependence and initial conditions) to predict the probability of adult employment of individuals characterized by specific level of some variables, as level of social maladjustment at age 11, lagged employment, working experience and education. Other control variables are evaluated at the average values. Table 6a focuses on the role of state dependence (employment status at period t-1) and working experience cumulated in young adulthood, for simulated individuals characterized by different levels of social maladjustment at age 11 (BSAG score equal to 1, 10, 25, 50). First, we note that increasing values of the BSAG score decreases monotonically the employment probability, given other variables, while cumulating working experience in young adulthood monotonically increases the employment rates. For brevity, we just focus on extreme vales of the BSAG score and cumulated working experience. Among males employed in the previous period (employed at period t-1), the predicted employment rates of cohort-members characterized by a very low BSAG score (BSAG = 1), but never employed in the period 1982-1994, is 96.6%. The employment rate for an identical cohort-member characterized by a very high BSAG score decreases to 90.4%, then the effect of being socially maladjusted at age 11 decreases, given other characteristics, the probability of adult employment by 6.2%. Considering a cohort-member identical to the previous one, but always employed in the period 1982-1994, the predicted employment rate decreases from 98.5% to 94.4% for cohort-members characterized, respectively, by a BSAG score equal to 1 and 50. This has two implications. First, a cohort-member, given other characteristics, and given a relevant social maladjustment problem at age 11 (BSAG = 50) would have 4% more of employment probability if he/she was always employed in young adulthood (1982-1994) rather he/she was never employed. Second, the employment rate differential between cohort-members characterized by very low and very high BSAG score is smaller if cohort-members have cumulated working experiences in young adulthood. This suggests that socially maladjusted at age 11 cohort-members benefit from life experiences and that cumulating work experiences during young adulthood contributes to reduce the gap with socially adjusted at age 11cohort members. Similar considerations may be done for females, even though employment rates and employment rate differentials slightly differ from male cohort-members.

The employed status at period t-1 determines great differences in predicted employment rates. Being non-employed at period t-1 reduces the probability of employment at period t by about 25%. Overall, differences in predicted employment rates between cohort-members characterized, respectively, by low or high BSAG score and no working experience in young adulthood, is much stronger (-19%) if the cohort-member is non-employed at period t-1 rather than employed at period t-1. This difference is slightly smaller if cohort-members have been ever employed in the period 1982-1994, indicating that

cumulating working experiences contribute to reduce the gap in employment rates due to social maladjustment at age 11. Similar considerations emerge for females.

Table 6a. Predicted employment rates for simulated cohort-members: lag-employment status and work experiences in young adulthood

		Employed t-1			Non-employed t-1		
		Work experience 1982-1994			Work experience 1982-1994		
		0	78	156	0	78	156
MALES	BSAG= 1	96.62%	97.69%	98.46%	73.49%	78.63%	83.14%
	BSAG= 10	95.83%	97.11%	98.05%	70.27%	75.75%	80.63%
	BSAG= 25	94.21%	95.89%	97.16%	64.53%	70.50%	75.95%
	BSAG= 50	90.43%	92.96%	94.43%	54.26%	60.76%	66.97%
		Employed t-1			Non-employed t-1		
		Work experience 1982-1994			Work experience 1982-1994		
		0	78	156	0	78	156
FEMALES	BSAG= 1	93.00%	94.99%	96.49%	65.77%	71.69%	77.08%
	BSAG= 10	91.74%	94.01%	95.75%	62.47%	68.63%	74.31%
	BSAG= 25	89.26%	92.04%	94.25%	56.78%	63.24%	69.36%
	BSAG= 50	84.02%	87.76%	90.83%	47.03%	53.71%	60.29%

Source: our elaboration of NCDS data. Note. The BSAG score variable is controlled for. Childhood and Adulthood covariates are also controlled for.

Finally, Table 6b focuses on early experiences of cohort-members. Specifically, we predict employment rates of cohort-members according to average levels of and specific values of previous employment status, BSAG score, early working experiences (1974-1981) and educational level. Differently from the previous case, we simulate predicted employment rates of cohort-members without any education and without early working experiences, without any education and always employed in youth (aged 16-23) and, finally, high educated but without any early working experiences. In all case we distinguish according to the previous employment status and, obviously, between cohort-members with a very low or a very high BSAG score. First evidence confirms that cohort-members with higher BSAG score are less likely to be employed in adulthood. Moreover, previous employment status determines great differences in current employment probability. Among males, early-life experiences determine less variability than among females. For example, there is a negligible difference according to cumulated working experiences during youth, whatever is the previous employment status and the BSAG score. This is possibly due to very high employment rates among males, whatever their own characteristics. Being higher educated, instead, increases between 1.3% and 3.6% the employment probability in case the cohort-member has been employed in previous period and between 7.2% and 10.4% in case the cohort-member has been non-employed in previous period. In any case, evidence from the male sample clarifies that high education is preferable to be no-educated and having cumulated early working experiences. This is particularly true for cohort-members with social maladjustment problems at age 11: for them, being higher educated contribute to

reduce the gap in adult employment rates with cohort-members without social maladjustment problems at age 11. It follows that investment in education may be an important factor to reduce the long-term negative impact of being socially maladjusted on employment perspective.

Among females stronger differences emerge. First, the employment rates are lower than for males. Second, among not educated women, having cumulated early working experiences rather than not, increases between 6.9% and 15.5% the employment probability. Importantly this effect is stronger among females with high BSAG score. Being higher educated provides the better adult employment opportunities. Differences with males having identical characteristics become negligible. For example, if we compare high educated females with not educated females and having always worked in the period 1974-1981, the employment probability for high educated is higher by 4% if the BSAG score is very low, and by 8% if the BSAG score is very high. A similar pattern is found in case females were non-employed in previous period. According to previous considerations, investment in higher education could be recommended to reduce adult employment gap of socially maladjusted with socially adjusted at age 11 females.

Table 6b. Predicted employment rates for simulated cohort-members: lag-employment status, education and early work experiences

		Employed t-1			Non-employed t-1		
		Work experience 1974-1981			Work experience 1974-1981		
		0	96	0	0	96	0
MALES	Education:	None	None	High	None	None	High
	BSAG= 1	97.08%	96.95%	98.41%	75.59%	74.98%	82.80%
	BSAG= 50	91.49%	91.19%	94.79%	56.84%	56.08%	66.47%
		Employed t-1			Non-employed t-1		
		Work experience 1974-1981			Work experience 1974-1981		
		0	96	0	0	96	0
FEMALES	Education:	None	None	High	None	None	High
	BSAG= 1	86.52%	93.41%	97.38%	51.35%	66.89%	80.81%
	BSAG= 50	73.34%	84.77%	92.79%	32.76%	48.26%	65.18%

Source: our elaboration of NCDS data. Note. The BSAG score variable is controlled for. Childhood and Adulthood covariates are also controlled for.

Conclusions

The interest of economists on the effect of cognitive and non-cognitive skills on socioeconomic outcomes has increased strongly in the last decade. It has been argued that their deepening is important both to understand the origins of inequality and excellence among people and to design effective policies for child development. However, the role of non-cognitive skills has remained less

investigated when compared with cognitive skills and only very recently it has became a target in economic research. This paper focuses on an aspect of non-cognitive skills, namely child social maladjustment, concerning a wide variety of disturbed child behavior, including hostility, anxiety, depression, inconsequential behavior, and psychological and nervous symptoms. Social maladjustment is measured through the British Social Adjustment Guide (BSAG), a standardized psychometric test answered to teachers, counselors, and school psychologist. The resulting test score measures the seriousness of social maladjustment (higher values correspond to stronger maladjustment).

This paper investigates the long-term effect of experiencing child social maladjustment at age 11, on adult employment dynamics, using data from the National Child Development Study, that provide information about the BSAG test score during childhood, as well as child and adult information about a wide range of characteristics. Focusing on employment dynamics and accounting for previous working history innovates with respect to previous literature, that has mainly concentrated on static long-term effects, at least for three reasons. First, employment dynamics take into account for state dependence, and this allows us to understand if child social maladjustment determines different employment persistence. Second, even though employment probability very much depends on personal characteristics, state dependence is likely to play a relevant role in determining employment probability and failing to control it possibly biases estimation results, including the estimate of long-term effect of social maladjustment. Third, controlling for past working history, besides controlling for a potential source of heterogeneity, allows us to understand if early working experiences may be preferable to investment in education for socially maladjusted children and how working experiences contribute to their adult employment probability.

Estimation results have been carried out applying a dynamic probit model controlling for unobserved heterogeneity, true state dependence and initial conditions using the Wooldridge method. First, we find that social maladjustment at age 11 decreases the probability of adult employment, whatever econometric specification is used. This is consistent with the existing literature and possibly makes more robust, given specific controls on past working history and dynamics, evidence about the relevance of non-cognitive skills developed during childhood on later socioeconomic outcomes. Second, we do not find statistical evidence about different employment persistence across different BSAG score. However, graph analysis suggests that the probability of employment starting from a non-employment position, is less likely for cohort-members experiencing social maladjustment at age 11. Third, when we compare cohort-members characterized, in turn, by low BSAG score and high BSAG score we find some interesting results in terms of policy suggestions. Among males, while for socially adjusted at age 11 we just find evidence of true state dependence, among socially maladjusted we find that is also relevant being medium-high educated and having cumulated working experiences

in young adulthood, while early working experiences seem to be not relevant. Among females, we find a significant effect both from cumulating working experiences (both in youth and young adulthood) and previous employment status. However, while having cumulated working experiences in young adulthood is not strictly preferable to cumulate early working experiences in terms of adult employment probability, being medium-high educated determines a stronger increase in adult employment probability.

Predicted employment probabilities for simulated cohort-members remark the relevant role of the previous employment status. Being non-employed in the previous period strongly decreases the current employment probability and, overall, determines a stronger gap for cohort-members with social maladjustment at age 11 when compared with socially adjusted at age 11. Interestingly, while cohort-members with social maladjustment at age 11 always show lower adult employment probabilities when compared with socially adjusted at age11, we also find that they gain more than socially adjusted in terms of adult employment probabilities from life experiences considered here. In fact, for cohort-members with social-maladjustment at age 11, being higher educated, being always employed in young adulthood, being employed in the previous period and, for females, also experiencing early work, contribute to reduce the employment rate gap with socially adjusted.

In sum, our results suggest that adult employment probability of children with social maladjustment at age 11 is exposed to greater variability according to life events experienced during life development. This is possibly also due to the greater malleability of non-cognitive skills, overall during childhood and adolescence. In other terms, cohort-members experiencing social maladjustment at age 11 possibly may recover part of the disadvantage through specific life experiences. This paper has highlighted that, working experiences, as well as, education, may be relevant factors to help socially maladjusted children to reduce inequalities in adult outcomes, employment probability in our case.

In terms of policy suggestions, interventions aimed to help their entry in the labour market could be considered. According to our estimation results, investment in education should be preferable, as it determines greater returns in terms of adult employment probabilities. Obviously, the role of education for socially maladjusted children may act on different channels; on the one hand it allows to accumulate human capital to be spent on the labour market; on the other hand it could be a factor to reduce social maladjustment and to favor integration. However, this topic possibly deserves a specific investigation and remains a target for future research.

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