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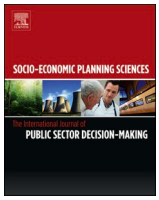

"NEET status duration and socio-economic background"

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ABSTRACT

NEET refers to young people who are not in employment, education or training. It can occur in a variety of situations and requires attention, especially if it tends to persist over time. Indeed, individuals who leave education and enter the labor market looking for a job are classified as NEET. While in the majority of cases they tend to move into employment status within a short period of time, in others they remain in this status for longer, with negative consequences for their future career or never enter the labor market. Although the scarring effect of longer spells outside the labor market (for unemployment or inactivity) is well known in the economic literature, empirical evidence on this topic are very limited due to the lack of adequate data needed for this analysis.

This article aims to fill this gap in the literature and is finalized to verify the influence exerted by the socio-economic background of individuals on the likelihood of becoming and remaining for a long time NEET, according to different levels of education. The analysis is based on AD-SILC dataset, obtained by matching the EU-SILC data with the administrative archives of the INPS, the National Institute for Social Security. Our results reveal that individuals with the same level of educational attainment, but from a higher socio-economic status, have a significantly shorter duration in the NEET condition and a higher probability of transitioning to employment. Conversely, individuals with the same level of education show no significant effects if they come from a low socio-economic background.

1. Introduction

Young people are one of the most vulnerable segments of the population in the labor market. The reasons for this specific youth disadvantage are well known. They depend on an education system that is not well connected to the labor market, unable to provide the skills that the labor market requires, and on the underdeveloped institutions that in the labor market should assist young people when they enter the labor market because of their lack of work experience [1]. And again, some types of vulnerable jobs, such as temporary or atypical jobs, are more likely to interest young people. However, in Europe, young people's condition is particularly tricky in some Eastern and Mediterranean countries, where the youth unemployment rate is very high and the gap between the youth and the adult unemployment rates is higher than in the other countries. In the appendix, we can see that the ratio between youth (15–24 years) and adult (25–74 years) unemployment rates in 2018 is maximum in Romania, with 4.88, followed by Norway, with 4.07, Poland, with 3.69, and Italy, with 3.50. Conversely, this ratio is minimum in Latvia, with 1.72, followed by Switzerland, Slovenia and Lithuania, where it is less than two (Figure A1 in the appendix).

Focusing on Italy, it has been for many years the country with the highest share of NEETs, that is the share of young people not in employment, education, or training. In 2018, the share of young people in the NEET condition in Italy was 23.5 % against an EU-27 average of 13.3 % (Figure A2). The NEET indicator is usually preferred to the youth unemployment rate to identify the level of young people's disengagement from the labor market, as it includes, besides the unemployed, people who are in inactivity status. A high proportion of NEET represents a gross economic loss at the national level, as these individuals are not involved in the economic process and do not contribute to national productivity. Moreover, in an era of consistent population aging, having a consistent share of young people who remain outside the labor market tends to jeopardize the current solidity of the pension system, as a result of the lower total amount of contributions paid [2]. At the individual level, the exclusion from any economic activity can lead to a deterioration of human capital, especially in the case of young people who have

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not yet acquired work experience, and can generate negative duration dependence [3,4]. This expression means that the longer the period of unemployment (or inactivity), the lower the probability of finding a job in the future.

When young people complete their studies and begin their transition to the labor market, they are in the NEET status. However, in most cases, this condition only corresponds to the time needed to choose the best job opportunity in the labor market. Recent studies on the characteristics of the School-To-Work Transition (STWT) in different EU countries have shown that this process takes the longest in Italy [5,6]. Focusing on the individual characteristics of young people, Pastore et al. [5] found that longer transitions were associated with those with lower levels of education, females, and those living in the most depressed areas of Italy, namely the South and the Islands. However, in this study, due to the lack of adequate data, they were not able to investigate the effects of a longer period spent in the NEET status at the beginning of their career on their future professional career.

Furthermore, in their analysis they found that a significant number of individuals never entered the labor market and remained NEET until the end of the observation period.

These large differences in STWTs are the result of very different situations, with family background certainly playing a relevant role.

Recent studies on the NEET phenomenon have highlighted the need for specific policy interventions to address this issue, tailored to young people with specific characteristics [7]. However, the lack of adequate data for analyzing career trajectories longitudinally has hindered this approach and the identification of the best policy responses.

This article aims to fill gaps in the literature by measuring the role that family of origin plays in NEET status for individuals with different levels of educational attainment. It also proposes to examine the persistence of NEET status over time to identify individuals who are more likely to leave NEET status by finding a job. Previous findings (summarized in Ref. [8] and in Ref. [9]) have highlighted the limited capacity of the Italian public education system to promote equal opportunities for social mobility. In fact, although education in Italy theoretically offers equal opportunities to all, rich and poor families alike, it is one of the countries where lower intergenerational mobility is observed in terms of educational attainment. In our study, we investigate whether this is also the case for NEET status. To the best of our knowledge, we examine for the first time in Italy, the individual characteristics related to education and family background observed in relation to different durations of NEET status.

At this aim we used data from AD-SILC,[1] an ad hoc dataset, obtained by the match between the EU-SILC, that is the Survey on Income and Living Conditions, and the administrative archives of INPS, the National Institute for the Social Security. EU-SILC is the main European data source for comparable statistics on living conditions, income, and social exclusion, both at the household and individual level. It includes information on the professional status of each family component over the age of 16 and retrospective information able to reconstruct the educational and professional history of individuals, as well as information on the household and on the family's financial condition. The INPS archives collect all the individuals' job positions and their durations. We merged the INPS archives with the 2005 and the 2011 EU-SILC survey waves. The choice of these two specific years is due to the fact that both of them contain a specific *ad hoc* module finalized to investigate the intergenerational socio-economic transmission of the disadvantage and therefore include information about the parents' level of education and professional qualification and the economic condition of the household when the individual was 14 years old.

The analysis is based on survival functions, the most adequate approach in cases the interest is in the analysis of the duration of a certain phenomenon and its determinants. We used Cox's semi-parametric approach, the most flexible one, when no a-priori assumptions on the curve distribution can be made. In our case, due to the violation of the proportionality assumption over time of the empirical curve, we estimated a piecewise regression model, based on the Cox model. Both the approaches, for a conservative comparison, are reported and they show a similar result, resolving, *de facto*, the dilemma of the methodological choice of the most appropriate model. In our analysis we are able to control for important variables such as the presence of children prior to entering in NEET status without facing the problem of endogeneity, in the sense that the status assumed may depend on the time spent in NEET. Indeed, in this study, the possible presence of children is detected and reported if it occurs before NEET status, and as it is observed before, we can consider it as exogenous to the status adopted by the individuals. In order to control for the socio-economic status of the family of origin (henceforth SES), which is often summarized in the literature, we constructed a composite index that includes a simple combination of two variables: working conditions of the parents combined with their economic ability to make ends meet.

The paper is organized as follows: Section 2 provides an overview of the economic literature on the NEET condition in Italy in the years of analysis; Section 3 presents the data while Section 4 shows the methodology; Section 5 reports the main findings; and finally, Section 6 offers the conclusions.

2. Theoretical framework

Being NEET could be the result of different situations. According to Mascherini [10], the major distinction is between the unemployed and the inactive. They have in common the fact that they are not working, but they differ because the unemployed are looking for a job while the inactive are not. Among the unemployed, we distinguish between re-entrants, those who are only temporarily out of the labor market, and the short-term and long-term unemployed, with the threshold duration of unemployment for distinguishing these two categories usually being set at 12 months.

The category of inactive NEETs excludes those who are participating in education or training. In other words, it includes all persons who are neither employed nor looking for a job and who are not participating in education or training. According to the Labour Force Survey, which is the main European statistical source on the labor status of individuals, the main causes of inactivity are related to the need to take care of not self-sufficient individuals, such as elderly or children (caregivers), health problems, or discouragement, that is the condition that indicates that individuals are not looking for a job because they believe that no job is available for them [11]. As marginal situations, other motivations could consist of an expressed willingness not to work, which is very rare and obviously not the target of any policy intervention.

Each of these different causes of NEET requires specific interventions.

While for the unemployed the best support is to propose specific job opportunities or training courses to improve their employability, for the inactive other specific solutions need to be found. For caregivers specific social services are needed to enable them to reconcile their commitments with work; conversely, those who indicate health problems as the main reason for leaving the labor market need specific job solutions that are compatible with their precarious health [12].

Finally, for the discouraged, policies should be designed to reach them and propose the best solutions to help them activate their job search in the labor market.

The long-term unemployed and the inactive are the categories most at risk of never entering the labor market. This condition strongly predisposes them to social exclusion, exposes them to a higher risk of

[1] The database was created as a part of Mospi research project, sponsored by the European Commission, with the purpose to functioning the Treasury Dynamic Microsimulation Model (T-DYMM) owned by the Department of the Treasury of the Italian Ministry of Economy and Finance, within the suit of models of Directorate I -Economic and Financial Analysis.

deterioration of their physical and mental health [1,13] and may even induce their involvement in criminal activities [14]. It may even hide their involvement in informal work, that is the situation of working without a formal contract, exposing them to precarious conditions in the absence of social security and other recognized workers' rights [15]. Unfortunately, these situations are not captured by any available official statistics or administrative data.

Being NEET is usually the result of few economic opportunities. Indeed, the economic literature has demonstrated the significant association between being poor and being NEET [16]. Growing up in a disadvantaged socio-economic context and in a household with limited economic potential greatly reduces the opportunities available to individuals, first of all during their educational career, reducing the chances of achieving a high level of education and consequently creating the conditions for a higher probability of remaining in the NEET situation for a longer period of time [17]. Very interesting on this topic is the paper by Becker et al. [18]. They find that, even in a world with perfect capital markets and without differences in innate abilities, wealthy parents tend to invest, on average, more in their offspring than poorer parents. As a result, the persistence of economic status is higher at the top of the income distribution than in the middle. This is particularly true for countries like Italy, where the intergenerational transmission of disadvantage is high – due to the high costs associated with university education – and where socio-economic inequalities have actually increased in recent years [19,20].

The longer the period spent as NEET, the greater the negative impact on future career prospects.

In fact, the prolonged absence from the labor market of young people who have not yet acquired any kind of work experience leads to a deterioration of their human capital, the obsolescence of the skills acquired in school, and can be interpreted by employers as a sign of low motivation to work and low productivity (signaling effect), generating the so-called *scarring effect* [21].

The economic literature and empirical evidence on scarring effects focuses more on the unemployed than on NEETs. Manfredi et al [22] showed that unemployment tends to generate future unemployment or a lower income while Bell and Blanchflower [23] demonstrated in their empirical analysis that, when young people fail to land a first job or experience prolonged or repeated unemployment, the long-term consequences for his/her career prospects can be quite negative.

Even worse are the effects highlighted by Gregg and Tominey [24], who affirmed that the consequences of unemployment could even last for the entire working lifetime.

Very limited contributions have been made in the literature to analyze the consequences of a prolonged persistence in the NEET condition along the career.

Among the limited contributions, Tanaka [25] revealed, in the case of Japan, the existence of negative duration dependence in unemployment, despite many NEETs tend to transitioning out of this status within a year. For Italy, a significant contribution comes from Contini et al. [26] who analyzed the consequences of prolonged in NEET status lasting at least 13 months, drawing a long-term NEET risk profile across various socio-demographic groups. However, their analysis is based on the EU-SILC panel spanning only four years.

In Italy, there is a lack of available evidence on NEET from a longitudinal perspective. This is mainly due to the lack of comprehensive data on longitudinal aspects, especially on individuals and their families, which poses a challenge for conducting in-depth analyses in this area. AD-SILC fills this gap by integrating the EU-SILC survey with the administrative archives of the INPS. However, the use of this dataset in scientific research remains relatively limited and the latest version is only updated until 2018.

Among the few studies based on AD-SILC, Fabrizi et al. [27] focused on the early years of individuals' careers, distinguishing them based on different potential work patterns. In a more recent study, Devillanova et al. [28] used AD-SILC data to explore the correlation between different employment trajectories and individuals' self-reported health status, providing additional insights to those provided by Pirani and Salvini [29], who relied exclusively on the EU-SILC short panel for their analysis.

Our study uses a longitudinal approach to analyze individuals' work histories to shed light on the persistence of inequality in labor market participation outcomes across SES while controlling for educational attainment. This research is particularly relevant for exploring the mechanisms underlying intergenerational inequality in Italy.

Although we address a well-studied issue related to the phenomenon of NEETs, our innovative longitudinal perspective allows us to conduct long-term assessments, thus bringing a fresh perspective to this area of research.

Methodologically, we based our analysis on logistic regression analysis and duration modeling. In this way, we have identified the influence of several factors that are correlated with the transition in NEET status and the persistence in NEET over time.

We focus on the family of origin in order to investigate whether individuals with the same educational attainment from a socioeconomically disadvantaged background have different characteristics that explain entry and persistence in NEET status.

The analysis focuses on the classification of individuals into NEET status using data from the 2005 and 2011 SILC waves, significant years marked by noteworthy shifts in the labor market, particularly affecting young people. The increasing prevalence of temporary contracts and the implementation of reforms, such as the Youth Guarantee, have significantly altered the career trajectories of individuals, prompting the need for further investigation.

3. Data and research questions

In our analysis we proceed as follows. First, we include all individuals who participated in the SILC questionnaire in the 2005 and 2011 waves. We classify them as NEET if they were not in education, employment or training. We then use data from the administrative register (INPS) to trace the actual entry into NEET status, which could have occurred at any time in the past. The duration of NEET is calculated as the number of days observed from the last available employment contract before the NEET classification and the exit from NEET status, which is recorded if the first contract after the NEET classification is observed; otherwise, if the new contract is not observed or occurs after the end of the follow-up (in 2018), we treat it as censored. If the person has never worked before, the time is calculated from the year in which the highest level of education is observed.

The temporal dimension is crucial to our analysis. We have excluded the self-employed, professionals and civil servants and instead focused on a more homogeneous segment of the population: those who have worked as employees for their entire career. For this group, the duration of the employment spell is closely related to the duration of the contract. By emphasizing the temporal dimension in our analysis, we can highlight the duration of the employment spells, which is closely related to contract duration and includes both the beginning and the end of the employment contract.

Our research aims to investigate how educational attainment translates into labor market participation among individuals characterized by different family backgrounds by addressing the following two key questions:

Do family background and educational attainment play a role in the individual likelihood.

- of being on NEET?
- of remaining for a long period of time in the NEET status?

To tackle these questions, we draw a sample from AD-SILC database consisting of respondents who belong to the cohorts from 1966 to 1981. We have classified them into the following classes: 1966–71 (used as

reference group), 1972–76 and 1977–81. In addition, we incorporate their level of education, which is classified as low (ISCED 0–2, reference category and refers only to the completion of compulsory education), medium (ISCED 3–4, which refers to upper secondary education), or high (including individuals with post-secondary education, tertiary degrees, or higher ISCED).

The macro-region of residence includes the North (as reference), along with categories for the Center and South regions. The analysis also takes into account the presence of offspring and the year of the interview. The year of birth is used to look at the individual's career path to see if they experienced parenthood before becoming NEET.

In order to achieve an objective classification of the family of origin (from SILC, we use the information related to respondents at the age of 14), a composite index was constructed by combining two variables: the first variable includes the skill level of the parents' occupations (following the ISCO classification), and the second variable incorporates the parents' difficulty experienced by the household in paying its usual expenses (difficulties in making ends meet). The first variable has three levels: low-skilled (elementary occupations), high-skilled (managers and professionals) and an intermediate category that includes skills between the first two. Regarding the second variable, we have used the EU-SILC question related to the reported difficulties in making ends meet concerning the family of origin of the respondent in the interview. This variable has been introduced by Eurostat with the aim of capturing the respondents' perception of their subjective poverty, manifested by difficulties experienced by the household in making ends meet.[2] From the original variable ability to make ends meet, with 6 response categories (with great difficulty; with difficulty; with some difficulty; fairly easy; easily; very easily), we combined the categories into 3 using the following classifications: high (very easily or easily), medium (fairly easy or with some difficulty) and low (with difficulty or great difficulty).

To summarize the SES of the family of origin, we have obtained a polarized index based on a three-level classification to distinguish between 'advantaged' and 'disadvantaged' (or intermediate) family background. The high level includes families with high qualifications who report no difficulties in meeting their financial needs (high level). In contrast, the low tier includes families working in elementary occupations (low skills) with limited capacity to meet regular expenses. Finally, the middle level includes parents with skills and economic conditions that do not fall into the previous two categories. As a result, there are three levels of SES for the family of origin (low, middle and high as reference). As the primary focus of our analysis is on the influence of the family of origin according to different educational attainment, we include the interaction term between SES and educational attainment. This approach allows us to examine the complementary effects of the family of origin on the working lives of offspring. Tables 1 and 2 present the key characteristics of the sample, distinguishing between the NEET and non-NEET groups. Table 1 focuses on individual characteristics, while Table 2 examines the characteristics of the family of origin when the respondents were 14 years old.

In our analysis, we used intergenerational sample weights and then we have subsequently standardized these weights to resize the population to the dimension of the sample. This adjustment was made to ensure that our estimates have standard errors that are not influenced by population size and thus ensuring consistent p-values.

The final sample comprises 37,467 individuals and, at the time of the interview, 25.55 % of them were classified as NEET. The identification of NEETs is based on the EU-SILC variable PL031, corresponding to the request of indicating the current professional status. This variable, contained in the EU-SILC dataset, allowed us to identify as NEET all those respondents who answered one of the following statuses: unemployed, fulfilling domestic tasks and care responsibilities, other inactive (but not including permanently disabled or/and unfit to work). Conversely, non-NEET are identified as all those who answered to PL031 that they are working, are students or in further training or in unpaid work experience, in retirement or have given up business. A comparison to the NEET category with the non-NEET group reveals a clear predominance of females (72 % vs. 42 %), often facing familial conditions at risk of poverty (35.8 % versus 10.4 %). Additionally, the NEET category is less likely to live alone (9 % versus 15 %) and more likely to be in a relationship (63 % versus 59 %). Geographically, a significant proportion of NEET individuals are situated in southern regions (57 % versus 30 %), while they are under-represented in the north (27 % versus 50 %). Furthermore, the NEET group is characterized by lower educational attainment compared to the non-NEET group (54 % versus 32 %), with less than 10 % holding a tertiary degree (20 % among the non-NEET). From a descriptive perspective, an examination of the family of origin reveals that individuals in the NEET category often come from disadvantaged SES. This is evidenced by lower levels of parental education, economic hardship and a predominance of lower-skilled occupations among the parents of NEETs.

Table 2 indicates that NEETs have frequently parents with a lower

Table 1
Individual characteristics of NEET and non-NEET.

	non-NEET	NEET
Sex		
F	41.5	72.3
M	58.5	27.7
Age		
mean	35.7	35.6
std.dev	5.9	5.9
Never at work	6.4	21.5
Economic Condition		
Low	28.7	51.7
Medium	64.1	46.0
High	7.2	2.3
Family poverty (60 % median)	10.4	35.8
Living with:		
partner	59.0	63.5
parents	19.1	19.3
one parent	6.6	8.3
alone	15.3	8.9
Geographical area		
North	50.1	26.8
Center	19.9	16.2
South	30.0	57.0
Education		
lower secondary education	32.3	53.8
upper secondary education	47.9	36.9
tertiary education	19.8	9.3

Our elaboration on AD-SILC data.

Table 2
Characteristics of the family of origin.

	non-NEET	NEET
Higher education between the parents		
lower secondary education	71.5	82.1
upper secondary education	22.1	14.4
tertiary education	6.4	3.5
Ability make ends meet (parents)		
with difficulties	12.1	20.8
some difficulties	30.6	33.0
fairly easly	40.6	33.9
easily	16.7	12.3
Highest ISCO between the parents		
low	23.1	29.7
med low	33.3	37.0
medium	15.2	14.1
med high	10.7	7.4
high	17.7	11.8

Our elaboration on AD-SILC data.

[2] See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Subjective_poverty.

level of education (82.1 % vs 71.5 % for NEETs and non-NEETs respectively) and in lower professional positions. Additionally, 53.8 % of NEETs resided in households experiencing economic difficulties compared to 42.7 % of non-NEETs.

4. Methodology

The methodology used in this paper is based on two steps corresponding to the two research questions mentioned in the previous section.

We used a logistic regression to analyze the individual characteristics associated with the likelihood of being NEET. To have a more detailed explanation of the characteristics in NEET status, two separate regressions were run for males (M) and females (F). Due to the presence of an interaction term, the family variable illustrates the impact of the family of origin, holding education constant at baseline (lower education). At the same time, the effect of education refers to individuals with family of origin at baseline (high SES). The SES composite index was obtained, as explained above, by combining information on parents' occupational status and the family's economic ability to make ends meet when the respondent was 14 years old.

The analysis of NEET persistence was based on survival models. The Kaplan-Meier (KM) estimator, commonly used in survival analysis, is a statistical method employed to estimate the survival function from lifetime data. When applied to the study of transitions from NEET status to employment, the primary event of interest is the individual's exit from the NEET category. The Kaplan-Meier estimator calculates the likelihood of an individual remaining in the NEET status over time. As individuals progress out of the NEET category, the probability of survival (remaining NEET) decreases. The resulting curve visually represents the cumulative proportion of individuals still in the NEET category at any given point in time. Steeper Kaplan-Meier curves indicate a faster exit from NEET status. A steeper curve suggests a positive outcome, which here means that they start working.

Moving to a multivariate approach, we based our analysis on the Cox proportional hazard model. The hazard can be defined as the instantaneous failure rate, that is the probability of an event – leaving the NEET status – occurring at any given time point. It adopts a semi-parametric approach and represents a fairly standard model that is useful in cases where no prior assumptions are made about the shape of the baseline hazard curve. Indeed, the estimation without imposing any shape on the baseline hazard allows us to identify the type of duration dependence (positive or negative) or whether it tends to change over time. For previous applications of the method and other methodological details see among the others Pastore et al. [30] and Therneau & Grambsch [31]. The assumption of proportional hazards is a fundamental assumption in survival analysis, especially when using Cox proportional hazards models. This assumption states that the hazard functions of different groups being compared remain proportional over time. If the assumption is violated, i.e. the hazard functions are not proportional, this can lead to biased estimates.

In our case the hazard functions are not proportional. A common solution to address the problem of non-proportional hazards is to use piecewise regression based on the Cox model, as it is suggested in the literature (see Ref. [32]). In piecewise regression, the time variable is divided into distinct intervals, in this case 1 year (but as a sensitive analysis we also try 200 days and 1 year and a half, which give similar results), and separate Cox models are fitted to each interval. With this approach we allowed the hazard ratios to vary over different time periods, thus accounting for the non-proportional hazards.

Our findings corroborate the existence of a non-constant hazard over time. Nevertheless, we decided to include the basic Cox model in our results to facilitate a comparison between this conservative approach and the results obtained by piecewise regression. It is noteworthy that all the observed results exhibit a high degree of similarity, regardless of the methods employed, which leads us to focus on the nuanced interpretation of these results.

5. Results

In logistic regression analysis, the probability of being NEET is assessed by calculating the odds ratio. The odds ratio provides a measure of the likelihood of the event being NEET occurring, compared to the likelihood of it not occurring. This analytical approach allows the strength and direction of the relationship between the predictor variables and the probability of being in the NEET category to be identified.

Fig. 1 shows the results stratified by men and women in terms of the interaction term. Control variables adjust the results for: geographical area, the presence of offspring prior to the interview, and the fixed effects of cohort and year of survey (see Table A1 in the appendix).

The only coefficients that show significance are those relating to individuals with high SES and those with upper secondary and tertiary education. The results indicate that, holding the other covariates constant, there is a protective effect against the long duration of NEET status for individuals with upper secondary or tertiary education compared to those with lower secondary education. These results are stronger for men than for women. However, this effect is only observed for individuals with a high SES. Conversely, the results for individuals with low and medium SES are not statistically significant for either men or women.

Fig. 2a and b illustrate the evolution of Kaplan-Meier (KM) curves over time, representing the duration of NEET status. The results are stratified by gender, refers to SES and educational attainment. A noteworthy observation is the disparity between men and women. Women tend to remain in NEET status for a longer period of time, with a larger proportion of women than men remaining outside the labor market after 10 years. Upon examination of the effects of SES and education independently, it becomes evident that education exerts a more pronounced influence. To gain further insight into this phenomenon, a multivariate approach was employed to investigate the issue in greater depth.

A multivariate approach was employed to estimate hazard ratios for leaving the NEET status. Results refers to piecewice regression and to Cox regression as a benchmark. Values greater than 1 indicate a higher probability of leaving NEET, while values less than 1 indicate a longer duration in this status. The analysis included fixed effects for cohort and time of entry into the labor market, geographic area, pre-NEET status job experience (duration and contract), and the presence of offspring. Piecewise regressions also include the hazard in each interval (one year) showing a significant and non-monotone hazard over time, and thus confirming our methodological strategy. The results are shown in Fig. 3 (see Table A2 in the appendix for the complete results). A particularly significant effect is evident for both sexes among individuals with high SES and tertiary education. These individuals have a higher risk of leaving the NEET status, indicating a shorter duration in this status and a quick transition to employment.

In contrast, no significant effect is observed for individuals with low SES, illustrating a clear disadvantage in their case. This holds true even when other factors, such as educational attainment, are held constant, indicating a clear penalization.

Furthermore, our findings indicate that having a child restricts entry into employment, but this effect is only observed for women. No significant effect is observed for men. This may indicate a segregation of women, that are observed to face the challenges of child care and remain in the NEET status longer.

In summary, our findings indicate that individuals experiencing a NEET status encounter significant obstacles in transitioning out of it, particularly among those with low SES, regardless of their educational attainment. Conversely, individuals with high SES experience a more transient duration of NEET status. These results require further investigation and careful consideration.

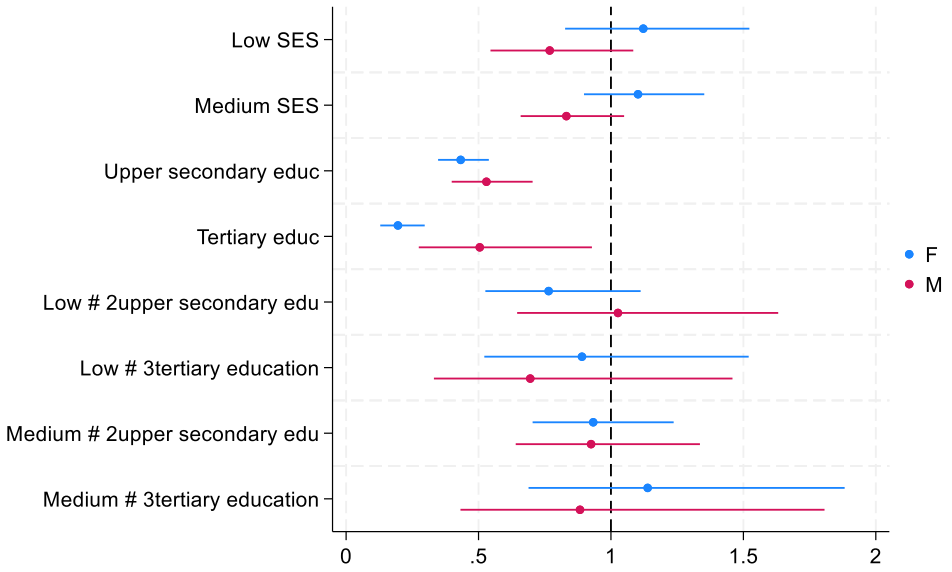

Fig. 1. Logistic regression analysis. Probability of being NEET. Odds ratio
Our elaboration on AD-SILC data.

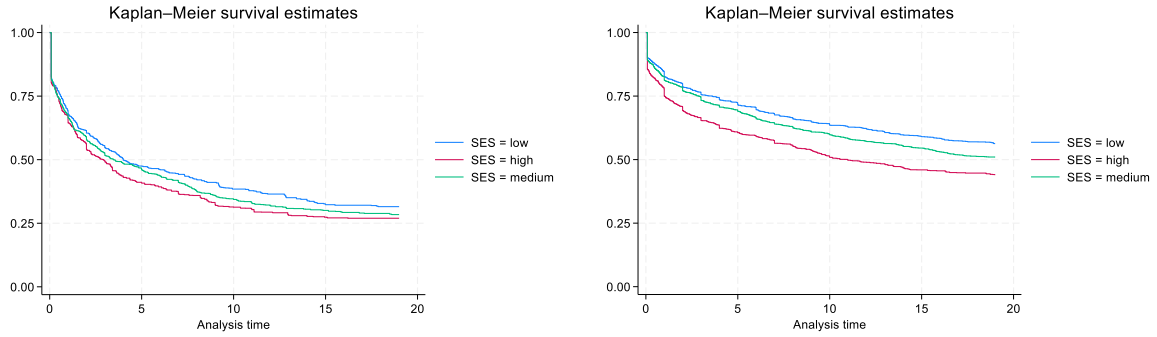

Fig. 2a. Duration of NEET status.
Kaplan Meier estimates for males (left) and females (right) with different levels of SES
Our elaboration on AD-SILC data.

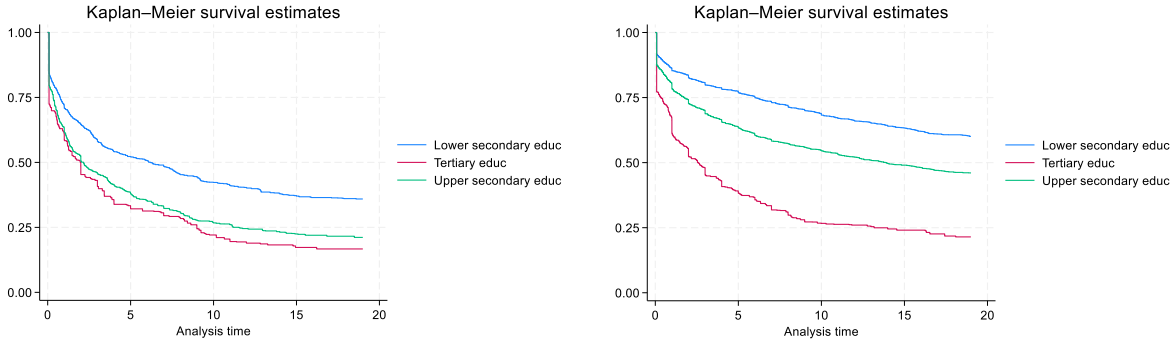

Fig. 2b. Duration of NEET status.
Kaplan Meier estimates for males (left) and females (right) with different level of education
Our elaboration on AD-SILC data.

6. Conclusion

This paper examines the impact of SES and educational level on the probability of becoming and remaining longer in the NEET status. The determination of the NEET status was based on SILC survey data, according to their self-defined economic status. The duration of the sojourn time in NEET status was obtained from administrative data, driven by the retrospective observation of the last employment contract before the survey and looking forward to the first contract after the NEET status.

Our results make a significant contribution to the knowledge of the scarring effect associated with the persistence of the NEET status. Indeed, many studies have identified the determinants of a longer duration in the NEET status, mainly related to being female, having low

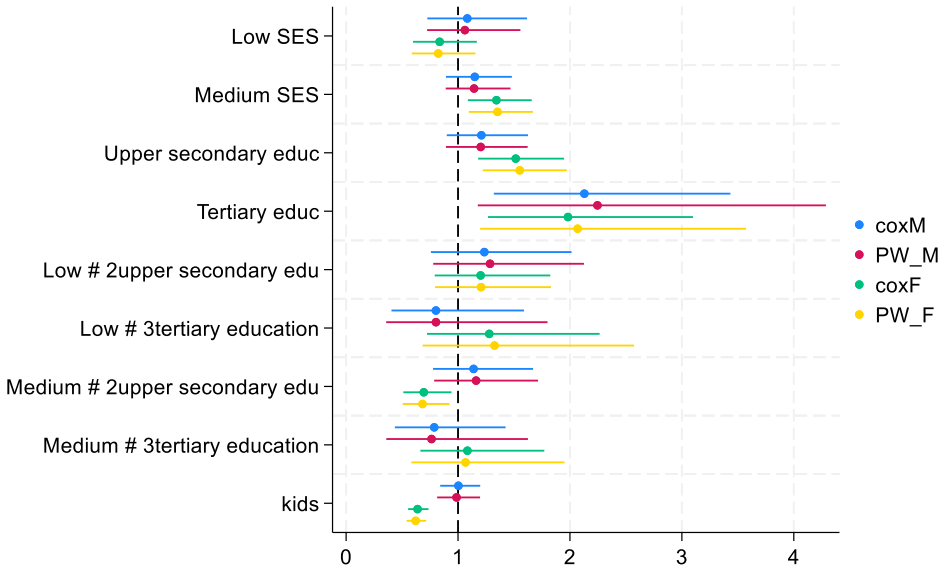

Fig. 3. Duration of NEET status. Cox regression and Piecewice Regression (PW) for men and women. Our elaboration on AD-SILC data.

education, living in the South of Italy and having a low SES [5,30]. In this paper, however, we assess for the first time the joint effect of SES and educational level on the duration of NEET, controlling for the geographical area of residence, the presence of offspring before the interview, fixed effects of cohort and year of the survey.

We used logistic regression to determine the probability of being NEET conditional on individual characteristics. Survival models were used to estimate the duration of NEET. Non-parametric Kaplan-Meier (KM) curves were used to identify the effect of gender, SES and educational attainment on differences in NEET duration. Following a multivariate approach, and given the violation of the proportional hazards assumption, piecewise regression was used and compared with the results obtained with the traditional classical semi-parametric Cox approach. Since the results were very similar among the different methods, we move directly to reading the results regarding the interaction term between the level of education and the SES, holding constant the other covariates.

We found that, while holding other covariates constant, there exists a protective effect against the probability of falling into NEET status for individuals with upper secondary or tertiary education compared to those with lower education, but this effect is observed exclusively among individuals with high SES. In other words, individuals with the same level of education but with a higher SES are significantly less likely to become NEET, and this result is even stronger for males than for females.

Moving to the permanence in NEET status, adopting a piecewise regression approach, we observe a notable impact for both genders among individuals with elevated SES and with a tertiary education. These individuals face an increased likelihood of exiting the NEET status, signifying a shorter duration in this state and a rapid shift to employment. Conversely, no noteworthy effect is detected for individuals with low SES, demonstrating a distinct disadvantage in their circumstances. This remains consistent even when controlling for other variables, suggesting a pronounced penalization.

These findings contribute to shed light on the Italian strong intergenerational transmission of the disadvantage. Individual educational attainment is important, but its effect is amplified by the status of the family of origin. If, on the one hand, parents' educational attainment strongly influences their children's educational outcomes [33,34], then once their children complete their education, the protective role of the family of origin tends to persist in the labor market, protecting them from being trapped in the NEET status.

These findings suggest relevant policy implications. First, it is important to promote equal opportunities at school, increasing accessibility and promoting participation, especially in tertiary education. Second, it is important to support young people in their transition from school to work, especially the most vulnerable, by providing them with adequate services to facilitate their entry into the labor market.

From a practical point of view, this can be achieved by reducing the cost of access to tertiary education and by strengthening the Public Employment Service, which represents the institution that should facilitate the matching of labor supply and demand and provide information on training and other opportunities to improve individual chances of finding a job.

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CRediT authorship contribution statement

Elena Fabrizi: Writing – review & editing, Writing – original draft, Software, Methodology. **Antonella Rocca:** Writing – review & editing, Writing – original draft.

Data availability

The data that has been used is confidential.

Appendix

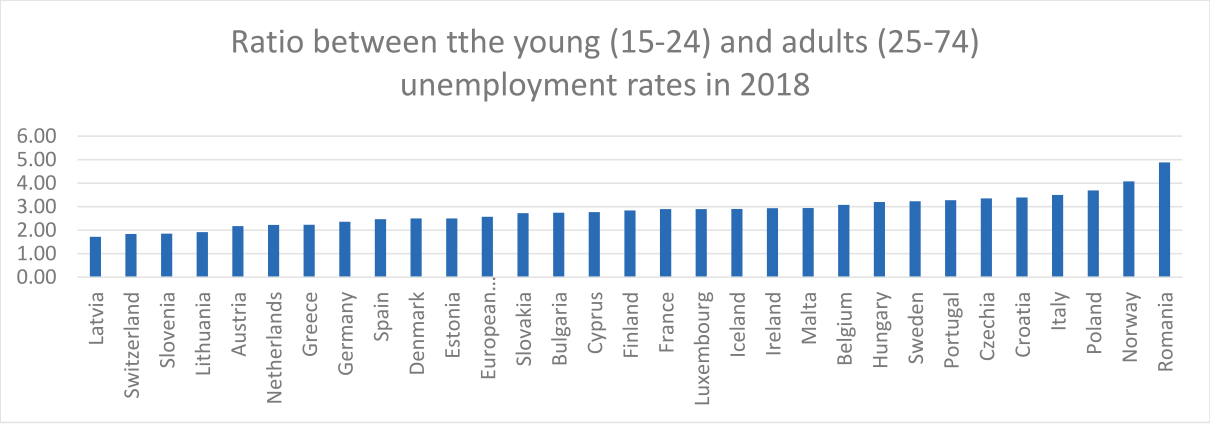

Fig. A1. Ration between the youth and the adult unemployment rates in the European countries in 2018.
Source: Our elaboration on Eurostat data.

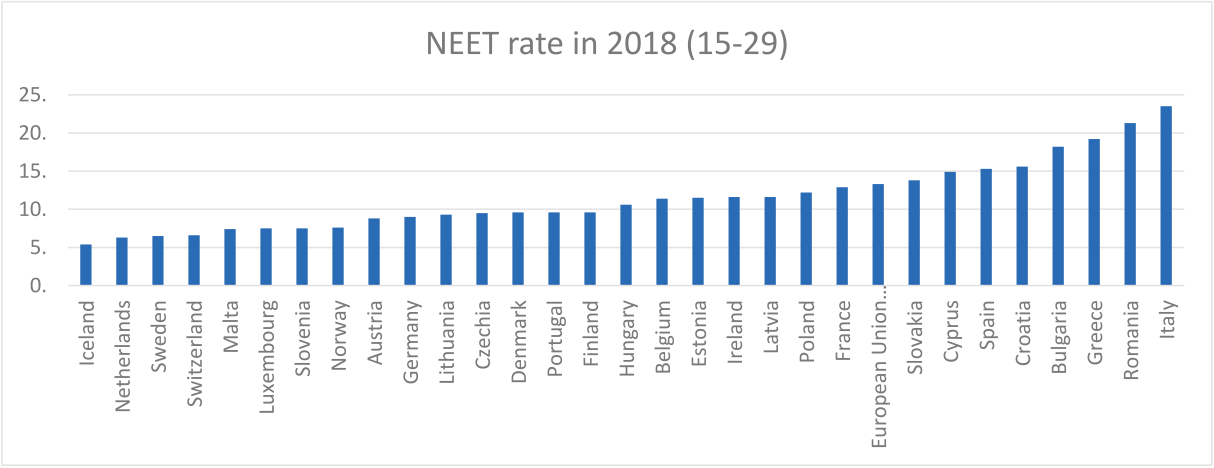

Fig. A2. NEET rates in 2018 in the European countries in 2018.

Table A1
Logistic regression analysis. Probability of being NEET. Odds ratio

	F		M	
Family x Education				
Family				
Low	1.122		0.769	
Medium	1.102		0.832	
Education				
upper secondary	0.433	***	0.530	***
tertiary	0.196	***	0.505	**
Low x upper secondary	0.765		1.026	
Low x tertiary	0.891		0.695	
Medium x upper secondary	0.933		0.925	
Medium x tertiary	1.139		0.883	
Kids	1.798	***	0.365	***
Geographical area (ref.:North)				
Center	1.786	***	1.718	***
South	4.567	***	3.911	***
Cohort (ref.: 1966–71)				
1972–76	1.217	***	1.040	
1977–81	1.085		1.159	
Year (ref.: 2011)	0.976	**	0.992	
chi2	994.6		452.3	
aic	14624.6		72.4	
N	9191		8946	

Legend: *p < 0.1; **p < 0.05; ***p < 0.01.
Our elaboration on AD-SILC data.

Table A2
Duration Models (time to employment after being NEET). Cox Regression Model and Piecewise Regression Model.

	Men				Women			
	Cox		Piecewise		Cox		Piecewise	
Family x Education								
Family								
Low	1.083		1.061		0.836		0.824	
Medium	1.150		1.143		1.343	***	1.353	***
Education								
upper secondary	1.209		1.203		1.516	***	1.552	***
tertiary	2.129	***	2.246	**	1.982	***	2.069	***
famiglia#								
ed2011								
Low #								
Low x upper secondary	1.235		1.286		1.202		1.206	
Low x tertiary	0.802		0.803		1.279		1.326	
Medium x upper secondary	1.139		1.161		0.694	**	0.683	**
Medium x tertiary	0.787		0.764		1.084		1.067	
Kids	1.003		0.987		0.638	***	0.622	***
Geographical area (ref.:North)								
Center	1.165		1.183		0.963		0.960	
South	1.057		1.072		0.818	***	0.824	**
Cohort (ref.: 1966–71)								
1972–76	1.285	**	1.307	***	1.616	***	1.670	***
1977–81	1.596	***	1.628	***	1.699	***	1.744	***
experience	1.000	***	1.000	***	1.000	***	1.000	***
empl. Contract before (ref.: no contract)								
fixed term	1.113		1.092		0.873		0.808	
open ended	1.066		1.044		0.851		0.801	*
year at entrance	X		X		X		X	
effect over time (intervals of one year)			X				X	
			significant and non monotone				significant and non monotone	
chi2	175		169800		21630		164900	
aic	17310		22080		32060		42020	
N	1036		5497		2189		19772	

Legend: *p < 0.1; **p < 0.05; ***p < 0.01.
Our elaboration on AD-SILC data.

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