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Being a NEET before and after the Great Recession: persistence by gender in Southern Europe

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Abstract

This article adds to the scant literature on the time persistence of being a young Not in Employment, Education or Training (NEET) by including four main novelties: we distinguish short- and long-term persistence; we use estimations before (2004–2007) and after the Great Recession (2013–2016); we analyse four Southern European countries that are relatively similar and were significantly affected by the Great Recession (Greece, Italy, Portugal and Spain); and all analyses are disaggregated by gender. The descriptive analysis shows a convergence in NEET rates by gender in the four countries due to a worsening of the male NEET rate and no improvement among young females. The econometric estimations show that long-term persistence is smaller than short-term persistence and that the latter increased after the Great Recession, especially for male NEETs. Policy implications for the design of the Youth Guarantee and lessons from the coronavirus pandemic are also discussed.

Key words: NEET, longitudinal analysis, persistence, Southern Europe

JEL classification: J21, J49, J64

1. Introduction

The transition from school to work has been revealed as especially problematic in Southern European countries (Eichhorst and Neder, 2014), and the Great Recession worsened this situation, pushing youth unemployment rates up to among the highest across world regions in 2017, with the only exceptions of Northern Africa and the Arab States (Escudero *et al.*, 2018). In this article, we focus on four Southern European countries—Greece, Italy,

Portugal and Spain—where the labour market integration of young people is relatively delayed compared with other European countries (Eichhorst and Neder, 2014). These four countries were also severely affected by adjustment policies implemented once the financial crisis mutated into a debt crisis in the Euro area. For instance, in Greece and Portugal these policies were part of the conditionality of the financial assistance programmes headed by the so-called 'Troika' (ILO 2013, 2014a,b). As a result, youth employment problems are now a key target of employment policies for the European Commission, with the Youth Guarantee being the most emblematic initiative to fight the labour market problems of European youngsters (Escudero *et al.*, 2018).

In the debate about the diagnosis of labour market integration problems faced by European young people and the policies to be implemented, the concept of the Not in Employment, Education or Training (NEET) has become increasingly popular (Eurofound, 2012; Serracant, 2013; ILO, 2015; Mussida and Sciulli, 2018). The interest of this concept consists in going beyond the conventional unemployment rate (Contini *et al.*, 2019), focusing on the vulnerabilities of young people in the school-to-work transition (ILO, 2015). This wider focus would allow a better design of policies allocating resources to those in the weakest position in terms of labour market integration (Eurofound, 2012, 2016).

In this article, we analyse the persistence in the NEET state in Greece, Italy, Portugal and Spain. The analysis of the evolution of the NEET condition across time is rare in the literature and focuses on just one or two countries. For example, Mussida and Sciulli (2018) and Contini *et al.* (2019) analysed Italy, while Kovrova and Lyon (2013) provide evidence for Indonesia and Brazil. The longitudinal approach of this previous literature has focused on labour market transitions, monthly trajectories and cohort analysis, respectively. The previous works focusing on Europe provide estimations of the effect of being a NEET in a given year on being a NEET in the following year (Mussida and Sciulli, 2018) and descriptive profiles of NEET individuals considering monthly trajectories of the labour market status of individuals (Contini *et al.*, 2019). Caroleo *et al.* (2020) do not perform a longitudinal analysis, but they estimate the probability of being a NEET in 2007 and 2016 for 21 European countries, showing the importance of structural and individual variables.

Here, we try to add to this literature by adopting a comparative perspective for four relatively similar European countries and taking a different longitudinal approach focusing on the persistence of the NEET condition across time. As a novelty with respect to the existing literature, we estimate the relative importance of remaining in the NEET state from one year to the next compared with its longer-term effect. The interest in this issue derives from the need to verify whether a sort of 'NEET trap' exists, that is, whether the degree of persistency in this state is high and increasing over time. We provide estimations for short- and long-term persistence by country and by gender, as gender continues to structure the early careers of young people in Europe (O'Reilly *et al.*, 2019) and the impact of individual and household characteristics on the risk of being a NEET may greatly differ by gender (Zuccotti and O'Reilly, 2019; Rodríguez-Modroño, 2019) .

For the definition of NEET, we use an age range of 15–29 years, wider than that used at the European level (15–24 years) for the definition of 'youth'. This has the advantage of including young people still in transition from school to work, which as mentioned above is postponed in the four countries investigated with respect to other European countries. This larger timespan has also been used by the previous literature on the persistence of the NEET status (Mussida and Sciulli, 2018; Contini *et al.*, 2019; Caroleo *et al.*, 2020).

In our empirical analysis, we use two types of data. First, we present an aggregate approach to the time evolution of the NEET rate by country and gender, using the Labour Force Survey (LFS) from 2000 to 2019. Secondly, we estimate short- and long-term persistence using the micro-data from the European Union Statistics on Income and Living Conditions (EU-SILC) survey covering two different time periods, namely, 2004−2007 and 2013−2016, which correspond to before and after the Great Recession. For the econometric estimations, we follow the Woodridge (2005) methodology to distinguish short- and long-term persistence.

The first approach shows that the aggregate NEET rate for women is higher than for men, but there is a sort of convergence by gender after the Great Recession because of a worsening of the evolution of the male NEET rate with no improvement for young females, although there are some country peculiarities. The econometric analysis shows that long-term persistence is rather lower than short-term persistence, and this has not changed after the Great Recession. On the other hand, short-term persistence has increased after the Great Recession, especially for male NEETs, although again, there are differences by country. The case of Greece seems especially worrying because of the extent of short- and long-term persistence. We also present the results for individual and household characteristics. We discuss the implications of these results for policies, such as the Youth Guarantee, including a brief reflection on what we can learn from our findings about the persistence of being a NEET in the current coronavirus crisis.

The remainder of this article is structured as follows. In the Section 2, we discuss the NEET concept and the brief literature using this concept with a longitudinal approach. In Section 3, we present the aggregate descriptive analysis. In Section 4, we describe the database, the estimation methodology and we discuss the results. In Section 5, we offer some final remarks, including broad policy implications. The Supplementary appendix contains the details of the econometric estimations.

2. NEET: from a static concept to a longitudinal perspective

According to the International Labour Organization (ILO), there is no international standard for the definition of NEETs. The most common definition presents this concept as a rate: the percentage of the population of a given age that is not employed and not involved in further education or training (ILO, 2015).[1] Usually, young people are those from 15 to 24 years of age; sometimes, the upper bound is extended to 29 depending on the country and the transition patterns to adulthood. In fact, the first use of the concept, in the UK in the 1990s, was restricted to young people aged 16–18 years, as Furlong (2006) remarks.

The NEET rate has increasingly been used to summarize the labour market integration of young people. For example, the NEET rate is the explicit indicator of target 8.6 of the Sustainable Development Goals (SDG) proposed in the 2030 Agenda of the United Nations (UN, 2015). Literally, target 8.8 of SDG-8 states: 'By 2020, substantially reduce the proportion of youth not in employment, education or training'.[2] The NEET concept entered into

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1 At an operational level, the ILO (2015) defines the numerator of this rate as a subtraction: the number of youths—number of youths in employment + number of youths not in employment who are in education or training. Sometimes it is defined in a more simplified version: unemployed non-students—inactive non-students.

the European policy agenda in 2010 'to better understand the multifaceted vulnerabilities of young people'. Decreasing the proportion of NEETs is an explicit target of many initiatives of the European institutions (Eurofound, 2016).

On the basis of static analysis, the profile of NEET individuals has become increasingly clear: low-income family background, low education, being female (primarily associated with family care responsibilities and/or early pregnancy), poor health and immigrant status (Bynner and Parsons, 2002; Robson, 2008; Eurofound, 2012; Vancea and Utzet, 2018).

Some authors have stressed various methodological shortcomings of the NEET concept, such as the implicit individualization of social exclusion and the significant heterogeneity of included situations (Furlong, 2006; Thompson, 2011; Serracant, 2014). These shortcomings would lead to policy design problems, such as ignoring general economic of institutional problems or leaving aside other close groups also deserving policy attention—unemployed youth in general, for example—and leading to policies focusing on changing the status from NEET to *any* type of employment, education or training.

Focusing on the heterogeneity issue, the definition of NEET is the summation of two different negative states: not in employment and not involved in further education or in training. This is problematic for analytical and political purposes. Analysing a very heterogeneous group entails difficulties for generalization and for defining well-specified patterns. As a result, policy recommendations will tend to be somewhat vague or tediously detailed for every possible subgroup. For example, facing the heterogeneity of NEET individuals, Eurofound (2012) proposed an alternative classification considering vulnerable and not vulnerable youths but including five different subgroups: conventionally unemployed, unavailable, disengaged, opportunity seekers and voluntary NEETs. Other authors have taken a different approach, proposing other closed concepts in an attempt to reduce ambiguities. Serracant (2014) is one of the most prominent examples, using a 'brute indicator' focusing on individuals who do not seem to have any objective impediment to study or work. Eurofound (2016), building on findings from previous research (Eurofound, 2012), proposed a revision of the categorization suggested by using the EU LFS. The new categorization is based on seven categories that allow ascertaining whether the respondents are searching for employment or not and whether they are able to start working within the next 2 weeks. For those searching for a job, the information on the duration of unemployment is used to disaggregate short- and long-term unemployed people. The seven subcategories are: re-entrants, short-term unemployed, long-term unemployed, unavailable due to illness or disability, unavailable due to family responsibilities, discouraged workers and other inactive. Furthermore, such a categorization is explored in many dimensions, such as gender.

Nevertheless, the NEET concept is still crucial in the policy agenda, in contrast to other related concepts such as the 'brute indicator' by Serracant (2014) or different conceptual frameworks, such as those proposed by Eurofound (2012, 2016). Indeed, the use of the NEET concept has increased since the Great Recession (Robson, 2008; Mussida and Sciulli, 2018; Contini *et al.*, 2019). In our opinion, the extensive use of this 'imperfect' concept is related to the fact that it fits well with the social and political debate about the integration of young people in the labour force. Thus, this concept summarizes well the vulnerability of a

2   https://sdg.tracking-progress.org/indicator/8-6-1-youth-not-in-education-employment-or-training-neet/ (last accessed August 9th, 2021).

portion of the population and provides insights into the sustainability of an economy's growth pattern.

From a longitudinal perspective, the NEET rate may respond to changes in the unemployment or inactivity states across time, or both. However, the evolution of the NEET rate across time and the dynamics into and from the NEET state may be highly informative. The main reason is that the NEET rate is a measure of youth marginalization from a broad perspective. As previously mentioned, the most important advantage of the NEET rate is that it goes beyond the problems of the conventional unemployment rate (Contini *et al.*, 2019). Some studies use unemployment duration analysis (Machin and Manning, 1999) and duration-sensitive unemployment indices, demonstrating the empirical relevance of considering spells' duration when assessing unemployment differences across countries or population groups (Gradín *et al.*, 2015). Nonetheless, measuring the unemployment rate requires a clear distinction between activity and inactivity in order to estimate the denominator of the rate—consisting only of the active population. However, extensive literature shows that the frontiers between inactivity and unemployment are somewhat blurry under a longitudinal approach. The seminal studies by Clark *et al.* (1979) and Jones and Ridell (1998) underline this issue. Therefore, a longitudinal approach is required if one aims to investigate unemployment deeply and shed light on the school-to-work transition, thus highlighting possible areas of vulnerability.

Some authors have practiced this longitudinal perspective to the analysis of the NEET rate, but it is still scarce. Mussida and Sciulli (2018) and Contini *et al.* (2019) focus on the Italian case, and Kovrova and Lyon (2013) compare Indonesia and Brazil.

Mussida and Sciulli (2018) use the longitudinal LFS data gathered by the Italian National Institute of Statistics to analyse annual gross flows of youths (from 15 to 29 years old) between the states of employed, student and NEET, as well as to estimate the determinants of NEET flows from 2008 through 2013. They estimate multinomial logit models pooled over time and accounting for state dependence, that is, for the impact of being in the NEET state in the year t–1 on the probability of being in the NEET state in year t. They find an important probability of persisting in the NEET state. They also find that heterogeneity in NEET persistence is mainly explained by a different propensity in educational inflows rather than transitions towards employment. Considering changes across time, they do not find relevant changes, with only a slight decrease in NEET state dependence in 2013—the latest observation year in their analysis.

Contini *et al.* (2019) use Italian data from a different source: the EU-SILC survey for the period of 2008–2011. They suggest a different approach, using the retrospective information provided by interviewees about their monthly labour market status in the previous year. Therefore, they build sequences of 48 monthly states, providing a detailed and insightful descriptive analysis and the estimations of multinomial logit models. In these models, the states are defined in terms of the months spent in the NEET state. Therefore, they are a sort of pooled estimation where time in the state is used to define the variable to be explained. A feature of this research is that they distinguish between unemployment and inactivity spells in their trajectories. They find that the NEET problem is mainly related to unemployment, except for older females with children, who report themselves mostly as inactive. In the study by Kovrova and Lyon (2013), we have a cohort analysis for two emerging countries, Indonesia and Brazil. These authors analyse the probability of being in the NEET state for young people between 15 and 24 years of age from different birth-year cohorts. They

estimate probit models, focusing on the cohort effects. Their analysis does not detect a worsening for more recent generations of young people in both countries in terms of being a NEET. They even find an improvement for female youths as a result of a secular trend of female youths being less absent from both education and the labour force. In general, the evolution of the NEET rate follows the business cycle, and especially labour market conditions, rather than youth-specific labour market barriers.

In a European perspective, Caroleo *et al.* (2020) show cross-sectional differences between states. Although they do not present a longitudinal analysis, they estimate the determinants of being a NEET before and after the Great Recession. They use data from the LFS for 21 European countries in 2 years, 2007 and 2016. They jointly consider individual characteristics and some macro-economic variables. Their findings show that a problematic school-to-work transition and long-term unemployment have a crucial role in explaining the probability of being a NEET, especially in countries where these problems are widespread. The first problem mainly affects young people between 19 and 24 years of age, while the second one affects those between the ages of 25 and 30 years. Finally, after the Great Recession the probability of being a NEET is mostly affected by the same variables for both subgroups of young people. In contrast, before the crisis, those between 25 and 30 were affected mainly by the labour market functioning and institutional characteristics of their national labour markets.

Finally, De Luca *et al.* (2019, 2020) have also analysed the evolution of the aggregate NEET rate, using the LFS data. They document the increase in the aggregate NEET rate in Italy and other European countries over the Great Recession, finding that there is a change after the implementation of the Youth Guarantee, but following a North–South regional divide in Italy, decreasing especially for female NEET in the South of the country (De Luca *et al.*, 2019). A comparison of Italy and Spain is presented in De Luca (2020), showing how early school leaving affects the NEET rates and finding that this relationship is clearer for Italy than for Spain.

3. Aggregate evolution of the NEET rate in Southern European countries

Figure 1 shows the evolution of the NEET rate by gender from 2000 to 2019 for the four countries considered in the analysis, using published data from the LFS. The NEET rate is defined as a percentage with respect to the total population from 15 to 29 years of age. In order to provide a more detailed analysis, we also present another rate excluding the unemployed and those who are not job seekers because of 'non-labour-market reasons', such as illness, disability or family care, in Figure 1: 'NEET Inactive'. Therefore, this restrictive concept of NEET focuses on those not in employment but 'not far' from the labour market. In other words, they are candidates for being in the grey boundaries between unemployment and inactivity.

Focusing on the rates for all, irrespective of gender, in the four countries, the evolution of the standard NEET rate is clearly driven by the unemployed, increasing and decreasing following the business cycle. When excluding the unemployed and those who are not job seekers because of 'non-labour-market reasons', the evolution of the NEET-inactive rate is much smoother and all countries have a slightly decreasing pattern, except Italy where there is an increasing trend along time. Therefore, the aggregate evolution shows an increase in
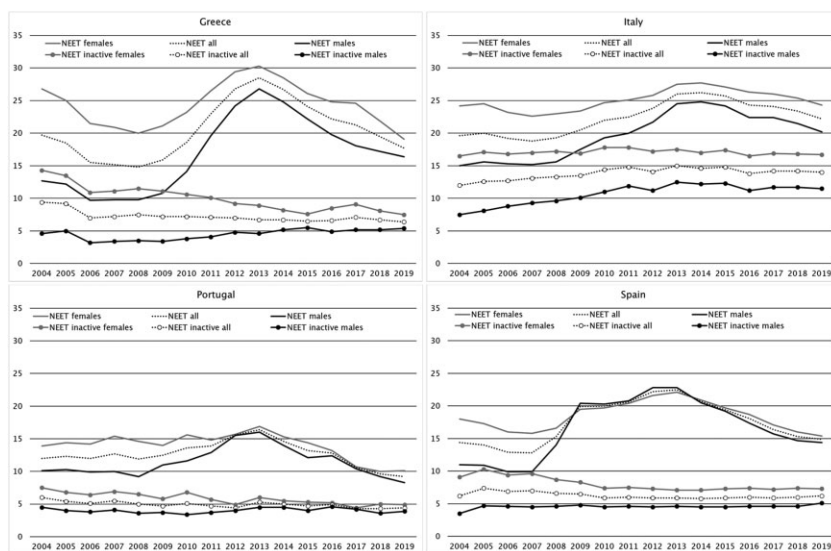
Figure 1 Evolution of the NEET rate, total and by gender, in Southern European countries. *Source:* LFS, Eurostat.

the standard NEET rates in all countries with the Great Recession, followed by a decrease along time, while the rate restricted to inactive youngsters is rather stable.

The general picture is similar for both genders, with females always exhibiting higher figures. Nevertheless, there is a sort of convergence between males and females from 2008, especially for Portugal and Spain, where the differences in the standard NEET rates are very small when they exist. There is also a similar pattern for both genders for the more restrictive NEET-inactive rates. There, the convergence is not driven by a composition effect of the NEET population, and presumably, there is a general pattern affecting the evolution of the NEET rate in the four countries. The evolution across time shows a smoother pattern for females than for males, or in other words, the NEET rates worsened for males with the arrival of the Great Recession. The exceptions are the evolution the NEET-inactive rates of males in Portugal and Spain, where the evolution of this rate restricted to males remained very stable and the convergence happened with an improvement (a sustained decrease) for the female rate.

The stability of the more restrictive rates—capturing inactivity—with respect to the standard NEET rates including unemployment is not surprising. Even considering that for young people, distinguishing unemployment and inactivity is not always easy, the cyclicality of unemployment related to the impact of the Great Recession has been very important, as has the impact of the adjustment policies of financial programs—the 'bailouts'—for Greece and Portugal (ILO, 2013, 2014b, 2018) and the severe public adjustments for Italy and Spain (ILO, 2014a; Bozio *et al.*, 2015).

What is rather intriguing is the non-gendered pattern for the most restrictive NEET rate capturing inactivity. The differences in inactivity by gender are a well-known 'stylized fact' of labour markets (Addabbo *et al.*, 2015; Périvier and Verdugo, 2018). At the same time,

increasing similarities for younger male and female cohorts is also a known feature of southern labour markets, as younger females have a similar enrolment in the educational system and a similar evolution in their employment rates by educational level with respect to their corresponding males (Buchmann and DiPrete, 2006; OECD, 2012). In addition, although the gender convergence in the NEET-inactive rate seems correlated with the Great Recession, it looks like a long-lasting effect—except, perhaps, for Greece in the most recent years.

To sum up, this descriptive evidence shows two key features of the youth labour markets in southern countries:

- First, for all young people, the cyclicality of the standard NEET rate is mostly related to the evolution of unemployment, not inactivity. The NEET rate restricted to inactive youths shows a striking persistence before and after the Great Recession.
- Secondly, after the Great Recession, the NEET rate shows a convergence by gender, especially in Italy and Spain. This convergence by gender seems mainly driven by a worsening of the rate for males and an improvement of the rate for females.

Of course, the evidence shown in Figure 1 may be affected by changes in the characteristics of the population of youths considered each year. As we are selecting our target population considering the same age interval each year, we are not following the same people across time. Each year, we lose people moving beyond 29 years of age and we gain people reaching the age of 15 years. Therefore, while suggestive, we need to develop a longitudinal analysis following the same individuals across time to confirm or reject these persistence and gender convergence features. We present this empirical longitudinal analysis in the next section.

4. Data and model

4.1 Database and main variables

In order to analyse the evolution of the same population across time, we use microdata from the EU-SILC for our four countries. The EU-SILC is a cross-sectional and longitudinal sample survey coordinated by Eurostat and based on data from the European Union member states. This database contains information on individual and household income as well as different dimensions of living conditions, including labour market issues across the European Union.[3]

The longitudinal data cover periods of 4 years at most. Here, we use the periods of 2004–2007 and 2013–2016. We chose these two periods in order to compare what happened before and after the Great Recession, but not during the Great Recession itself. We compare two clearly different periods with markedly different trends in NEET rates, as shown in Figure 1. Additionally, the use of longitudinal data allows adopting the Wooldridge's (2005) approach (described in the next section) to account for both state dependence in the NEET status and the initial conditions.

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3   An exhaustive description of the EU-SILC survey can be obtained from Eurostat: https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions   (last accessed August 9th, 2021).

The definition of the NEET status is based on the following variables in the database:

- Period of 2004–2007. We use the self-defined current economic status (variable PL030): unemployed and inactive, excluding those who declare themselves to be students, retired, permanently disabled and/or unfit to work, or in compulsory military or community service, as they are supposedly not looking for a job temporarily (students and those in compulsory military or community service) or permanently (retired or permanently disabled and/or unfit to work).[4]
- Period of 2013–2016. The definition is the same, although the reference variable has a different name in the original database (PL031). Again, this variable is the self-defined economic status.[5]

As concerns sample selection, we have selected young people between the ages of 15 and 29 years in the first year of the period in which they are residents of Greece, Italy, Portugal or Spain. Thus, we estimate our model separately by gender.

The dependent variable in our estimations is a dummy variable that equals 1 if the youth is NEET (classified as above) and 0 otherwise. As we will see below, we also include the lagged NEET status, a dummy variable for being NEET 1 year ago, and a dummy variable for the initial NEET status, a dummy variable for being NEET 3 years before. Following the NEET definition in the EU-SILC survey, these dummies do not imply being in this status for a whole year or a period of 3 consecutive years; it simply means being NEET at the moment of the interview in that year. Therefore, the 3-year lagged variable does not necessarily imply being NEET for the whole lagged period.

We use the same set of covariates for all countries, with the partial exception of Portugal, for which we do not have information on the macro-region of residence.[6] We check for robustness by considering as a dependent variable the stricter version of NEET (following the shaded lines of Figure 1); thus, the NEET-inactive status is not possible because of small relative sample sizes by country and gender. The explanatory variables can be classified into two main categories: individual and household characteristics on the one hand and economic factors on the other. Individual characteristics include gender, age (split between 15–24 and 25–29 year brackets), education (up to secondary and tertiary or higher), macro-region of residence (with the partial exception of Portugal) and degree of urbanization.

Educational dummy indicators refer to the highest and successfully completed educational attainment of the individual. The educational classification used to build these indicators is the ISCED 97. We consider three categories: no education (none or elementary educational level and primary education, which is our base category), lower and upper secondary educational level and tertiary education (post-secondary, tertiary or higher

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4 Using the variable names and codes of the original database, we define as NEET those answering PL030 equal to 3 (unemployed), or PL030 equal to 8 (fulfilling domestic tasks and care responsibilities), or PL030 equal to 9 (other inactive person).

5 Here we define as a NEET those answering PL031 equal to 5 (unemployed), or PL031 equal to 10 (fulfilling domestic tasks and care responsibilities), or PL031 equal to 11 (other inactive person). Therefore, the definition is exactly the same, even considering the changes in variable names and categories in the original database.

6 Variable DB040 in the EU-SILC code.

educational level). As for the area of residence, we exploit the information on the Nomenclature of Territorial Units for Statistics (NUTS). Specifically, we refer to the first level of disaggregation, NUTS1, corresponding to the macro-region. There are three NUTS1 for Greece, Italy and Spain: North, Centre and South, while the information is not available for Portugal. As for urbanization, we included a dummy that equals 1 if the individual lives in a densely populated area defined by the EU-SILC survey as 'contiguous grid cells of $1\,km^2$ with a density of at least 1500 inhabitants per km^2 and a minimum population of 50 000'. The variable is 0 for the intermediate area (clusters of contiguous grid cells of $1\,km^2$ with a density of at least 300 inhabitants per km^2 and a minimum population of 5000) and thinly populated areas, that is, grid cells outside urban clusters.

Household and economic characteristics include household size, number of employed in the household, number of disabled and quantiles of the equivalized household income distribution. We include control variables for the number of household members, the number of employed individuals in the household and the number of people with disability, as defined in the EU-SILC survey. Finally, we calculate the quantiles of the equivalized household income. This measure is defined as the total disposable household income (after taxes and social transfers) divided by an equivalized household size calculated according to the modified OECD-scale.[7]

4.2 Econometric specification[8]

The most direct approach to estimating the determinants of being NEET in a given year consists of estimating an econometric model in which different variables are used to explain the probability of being NEET at a given point in time. This approach has a number of problems, including the well-known one of stock bias. At a given point in time, individuals who have a greater probability of being detected as NEET in a given year are those who have been in the NEET state the longest. This means that the analysis will tend towards the probability of being permanently NEET and will take very little account of those who spend relatively short periods in the NEET state.[9]

Therefore, a cross-sectional estimation does not allow a proper analysis of persistence in the NEET state because being NEET at a given point in time can be largely determined by having been NEET on occasions in the past. Nor, of course, does it allow one to know whether this persistence is due to unobserved heterogeneity—different individuals are in the NEET state in different periods—or true state dependence, meaning that it is strictly the fact of having been in the NEET state at a prior moment in time that leads to being NEET in the current moment.

One of the strategies for dealing with this kind of problem is to undertake dynamic analyses using longitudinal data. Mussida and Sciulli (2018), for instance, estimate a

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7 This is a standard equivalence scale to calculate the number of 'equivalent adults' in a household. Such a scale assigns weight 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 years and over; 0.3 to each child under 14.

8 In this section, we mainly follow Hernández-Quevedo *et al.* (2008) and Dávila Quintana and Malo (2012).

9 The same problem appears in other social and economic contexts, such as in the analysis of the probability of being in poverty using cross-sectional data, which lead to an analysis centered above all on long-term poverty and underestimating the number of people under the poverty threshold for shorter periods of time, for example, for only 1 year (Bane and Ellwood, 1985).

multinomial logit model pooled over time accounting for state dependence. In other words, they estimate the determinants of the labour market status of young people including past labour market status as another potential determinant of the current labour market status. Other approaches consist in estimating models of different time moments (as in Caroleo *et al.*, 2020) or creating a dependent variable summarizing different trajectories (as in Contini *et al.*, 2019), and we will compare our results with those obtained using these methods.

Although the above analyses are useful and informative, a persistence analysis must also deal with the problem of initial conditions. In our context, initial conditions mean that the probability of being a NEET at time *t* will not only be affected by the fact of being a NEET or not at time *t*–1 but also by the fact of being a NEET or not at the beginning of the time period. In other words, persistence may respond to a short-term impact of being a NEET just 1 year ago but also of being a NEET in the very first moment we can observe the individual.

The impact of initial conditions is not a significant problem for long-term panel data with many waves (Skrondal and Rabe-Hesketh, 2014). However, in the case of short panels—as in our case—not considering initial conditions may severely bias the estimations. Systematic comparisons of the performance of different methods of including initial conditions favour the use of the methodology proposed by Wooldridge (2005) in the case of panels with at least three observation periods. In our case, we have 4 years, which means an initial moment plus three observation time moments. Therefore, we deal with initial conditions using Wooldridge (2005), modelling the distribution of the conditional unobserved effect at the initial value along with any exogenous explanatory variable. For certain non-linear models—among them the dynamic probit model with random effects we use—this type of econometric specification permits a simple estimation by means of the most commonly used statistical software.[10]

In our database, we have four points in time for each time period considered, from 2004 to 2007 and from 2013 to 2016 (see Section 4.1). We assume that the observations at the first point in time correspond to the initial conditions of our model, and we call this moment 0. Hence, the model covers the periods 1–3, which correspond to the second to fourth waves of each time period. Each individual may or may not be in the NEET state at the moment in question. If the individual is not a NEET, this variable will have the value of 0, and if the individual is, the variable will take the value of 1 and will be the variable whose probability of occurring we seek to explain.

Hence, for any individual *I*, the conditional probability of being a NEET will be

$$P(y_{it} = 1 | y_{it-1}, z_i, x_{it-1}, c_i), \tag{1}$$

where y_{it} is the dummy variable for individual i being in the NEET state (or not) at moment t, y_{it-1} is the value of the dependent variable one period earlier and is included in order to take into account the effect of state dependence, z_i includes the variables that can change from one individual to another but do not change over time (such as gender), x_{it-1} includes

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10 This methodology proposed by Wooldridge (2005) has been widely applied to other social problems with the same longitudinal structure, for example, by Poggi (2007) to the persistence of social exclusion and by Dávila Quintana and Malo (2012) to the persistence of the impact of disability on poverty.

the variables that affect the probability of being a NEET and that can change from one individual to another over time, and c_i stands for the specific individual effect. The variables that vary across individuals and over time are referred to in the moment $t–1$ in order to avoid endogeneity problems.

Persistence in the NEET state may be partly due to individual observed and unobserved heterogeneity rather than to genuine state dependence. Neglecting these factors makes the relationship between NEET at time t and NEET at time $t−1$ spurious since the coefficient of the lagged dependent variable can also implicitly capture other drivers of the likelihood of being NEET. The adopted model controls for unobserved heterogeneity by introducing an individual-specific random effect that is assumed to be normally distributed and independent of other covariates. The independence assumption has been relaxed by adopting Mundlak's (1978) approach, wherein an unobserved heterogeneity term is decomposed into two parts: one correlated with (time-varying) explanatory variables and one uncorrelated.

Following Hernández-Quevedo et al. (2008) and Dávila Quintana and Malo (2012), we parametrize the individual effect as follows:

$$c_i = \pi x_{i0} + \delta y_{i0} + \mu_i. \tag{2}$$

What we are assuming by this is that the individual effect is related to the initial condition of being a NEET or not and the explanatory variables, with the addition of an unobserved individual effect μ_i, which, since it is a probit of random effects, will be distributed normally in the manner $N(0,\sigma^2)$.

So, the final specification of the probit model of random effects would be as follows:

$$P(y_{it} = 1 | y_{it−1}, z_i, x_{it−1}, x_{i0}, y_{i0}) = \alpha y_{it−1} + \gamma z_i + \beta x_{it−1} + \pi x_{i0} + \delta y_{i0} + \mu_i + \varepsilon_{it}, \tag{3}$$

where the parameters being estimated are α, γ, β, π and δ. The estimated coefficients α and δ, if they are positive, will pick up the different effects of being a NEET in the past on the current NEET status. Specifically, the coefficient α, if it is strictly positive, picks up the effects of the so-called 'true state dependence' or, in our context, the short-term persistence of being a NEET. On the other hand, the coefficient δ shows the influence of the relations between the unobserved individual traits and the NEET state at the initial moment which corresponds to the long-term persistence of being a NEET.

Finally, individual heterogeneity that does not vary over time is picked up by the coefficient μ_i. In a random effects probit estimation, this effect is measured by an intra-class correlation coefficient, usually denoted as ρ and included in the detailed tables of our estimations. This coefficient gives us the proportion of the total unexplained variance attributed to the individual effect—conditional on the observed variables included in the estimation. The corresponding variance of this coefficient, usually denoted as σ^2, can be understood as the dispersion of unobserved heterogeneity and is also included in our detailed tables of estimations. The final term of expression (3), ε_{it}, is the typical random variability included in all regressions, and it varies across individuals (i) and time (t).

For a better understanding of the magnitudes of the estimated effects, we present the outcomes of the models in terms of the average marginal effects, following Wooldridge (2005). The interpretation of these partial effects is how many percentage points (pp) the considered variable (e.g. being a NEET the previous year) will increase or decrease the probability of being a NEET the current year. We report the full sets of estimates in the Supplementary

appendix (Tables A1–A4). For example, the average marginal effect of short-term persistence for females in Italy after the Great Recession is 0.255, which means that for this group in this time period, being a NEET in the previous year increases the probability of being a NEET in the current year by 25.5 pp.

We would like to remark that we control for possible differences in sample composition because—by construction of the dataset—we do not follow the same individuals in both periods, although the samples are representative of the population in both time periods. The descriptive statistics (by country, gender and time period)[11] are reassuring in terms of the comparability of the samples, as we do not find substantial differences in the independent variables across periods. Moreover, we are also encouraged by the fact that our samples are collected in the same way by the same survey, the EU-SILC survey, and they have the same structure, as well as the same variable definitions.

We have separated estimations by gender in each country to check the differences in short- and long-term persistence between males and females.
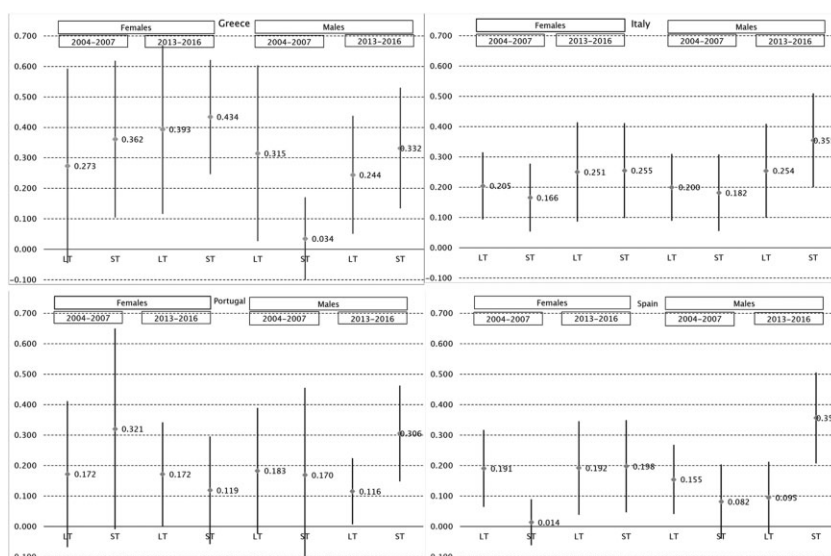
4.3 Short- and long-term persistence of being a NEET

Now we focus on the estimations of the dynamic probit models with random effects, which allow us to distinguish short- and long-term persistence. Here, short-term means the effect of being a NEET in the previous year on the probability of being a NEET in the current year, while long-term means the effect of being a NEET 1–4 years before on the probability of being a NEET in the current year. In the econometric estimations, short-term persistence corresponds to the impact of the lagged dependent variable, and long-term persistence to the initial condition variable, that is, the NEET variable in the very first year of the sample. Figure 2 provides a visual inspection of such effects by country, gender and time period (before and after the Great Recession). The details of the econometric estimations are available in the Supplementary appendix.

The general picture that arises indicates greater short-term persistence after the Great Recession in all countries and for both genders. In other words, the marginal effects for the lagged NEET status are larger after compared with before the Great Recession. In addition, looking at the error bars of these estimations, we have more statistically significant cases after the Great Recession—that is, the error bars do not reach zero. Therefore, although the total size of the problem (the aggregate NEET rates) is smaller after the Great Recession, the individual problem of being a NEET has, in general, become more severe after this recession because once an individual is NEET, the likelihood of being NEET in the following year increases.

In more detail, from Figure 2 we note that the magnitude of short-term persistence after the Great Recession is higher for males than females in Italy (35.5 and 25.5 pp, respectively) and Spain (35.7 and 19.8 pp). In these two countries, the greatest short-term persistence is for males after the Great Recession. This is in line with the gendered pattern we found in the aggregate analysis, where the convergence was mainly due to a worsening of the male NEET rate, because in both countries short-term persistence for females is slightly greater after the Great Recession. There is also more short-term persistence after the Great Recession for males and females in Greece and Portugal, with the only exception of female NEETs in

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11 For the sake of brevity, we do not include tables of descriptive statistics. These are available upon request.

Figure 2 Long-term (LT) and short-term (ST) persistence of being a NEET (average marginal effects).
Source: EU-SILC and own estimations.

Portugal. However, the short-term persistence is larger for females than for males in Greece, especially after the Greater Recession when the marginal effect reaches 43.4 pp while for males it is 33.2 pp. Regarding the exception of females in Portugal, the estimated effects are 32.1 and 11.9 pp before and after the recession, respectively, but both estimations are statistically not significant—the corresponding error bars clearly reach below 0.

Therefore, we find general support for a gendered pattern, with a worsening situation for male NEETs after the Great Recession in terms of the short-term persistence of being a NEET, except for Greece. In addition, the estimated sizes of short-term persistence are in line with the only previous research with comparable estimations. Mussida and Sciulli (2018) estimated that being a NEET in time *t*–1 increases the probability of being a NEET in the current year by 21.2 pp.[12]

For long-term persistence, we do not find one clear pattern. We have an increase in long-term persistence after the Great Recession for females in Greece and for males and females in Italy. In the rest of the cases, we have a decrease or the same effect. In fact, the differences are rather small: some effects are not statistically different from 0, and even when they are statistically different from 0, the dispersion around the estimation is rather large—as in the case of Greece. In any case, the largest long-term persistence effect is found for Greek females after the Great Recession, with an increase of 39.3 pp. Therefore, Greek females are the group with the largest short- and long-term NEET persistence (43.4 and 39.3 pp, respectively).

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12   Mussida and Sciulli (2018) use longitudinal data from the Italian LFS for the period of 2007–2013 and estimate a multinomial logit model pooled over time, accounting for state dependence. The estimation of short-term persistence shown in the text is for the whole population, not by gender.

In general, we see that the average marginal effect of long-term persistence is an increase of between 10 and 25 pp, except for Greece where this ranges from 22.4 (males after the recession) to 39.3 pp (females after the recession). These figures are usually lower than the marginal effects of short-term persistence. Considering these 4-year periods, there is a non-negligible long-term persistence, as being a NEET in the initial year increases the probability of being a NEET in the current year from 10 to 25 pp. However, as long-term persistence is lower than the short-term persistence, being a NEET for 2 consecutive years does not mean that young people will be trapped in the state of NEET in the long-term in these countries. In terms of policies, these results call for determined action to stop short-term persistence, in order to break the link between being a NEET in one time period and being a NEET in the next one. The short-term interventions must be complemented with measures to recover those in the NEET state for long periods. As the first set of measures focusing on the short-term will have the expected effects, the second set will focus on specific groups with deep and long-term problems. In our opinion, this strategy could be an additional dimension of the national Youth Guarantee programmes in our four Southern European countries and is in line with the combination of short- and long-term interventions suggested by Eurofound (2016). It is worth underlining that De Luca et al. (2019) suggest that labour market reforms in Italy reduced the share of NEETs, although its crucial link with education and the school to work transition plays the most relevant role (Pastore et al, 2021a,b).

The larger size of short-term persistence may be linked to the importance of unemployment, which is behind the oscillations of the time evolution of the NEET rate, as shown in Figure 1. In this vein, the persistence analysis of Contini et al. (2019) based on the analysis of trajectories found that the NEET phenomenon is mainly related to unemployment and not inactivity, at least in Italy. A similar result is obtained by Caroleo et al. (2020), who analysed cross-sectional data before and after the Great Recession and found a crucial role of long-term unemployment for being in the NEET state for a selection of European countries.

Focusing on especially problematic groups from a persistence perspective, Contini et al. (2019) found a greater risk of being a long-term NEET in Italy for women from 24 to 29 years of age. They defined this long-term risk as being always NEET throughout the time period of 2008–2011. This period is right in the middle of our two time periods. However, it is important to note their definition of trajectory, which is based on the monthly information on labour market status in the year before the survey, instead of the labour market status at the date of the survey, which is the definition we use. Therefore, their trajectories include information over a shorter term than ours. In our results, the most comparable group would be female Italian NEETs in the period of 2013–2016. For this group, the long-term persistence is 25.1 pp, which is practically the same in the short-term (25.5 pp). Therefore, for these women being a NEET in the previous year increases the probability of being a NEET in the current year by 25 pp, and this increase does not change when we consider the effect of being a NEET 1–4 years ago. Both effects are clearly different from 0, that is, the corresponding error bars do not reach 0. This is the only case with this peculiarity, which shows a crude problem of persistence for this group. Although the results are not strictly comparable [our results are *ceteris paribus* whereas Contini et al. (2019) describe the profiles of people with specific trajectories], we believe that they are not contradictory. In any case, our results unveil the relatively worse situation of male Italian NEETs in terms of short-term persistence after the Great Recession, which is a novelty with respect to the previous literature.

The case of Greece shows a worrying landscape for the young people in this country. The previous general advice is applicable as short-term persistence is greater than long-term persistence (except for males before the recession), but in general, these effects are among the largest ones. The dislocation of the Greek labour market with the Great Recession and the conditionality related to financial assistance programmes is not comparable with the other three countries, especially for young people (ILO, 2014b; Cholezas, 2018). The case of young male NEETs in the other three countries is rather similar to male Greek NEETs when considering short-term persistence. Therefore, specific measures by gender focusing on young males in the four countries are needed, but especially in Italy and Spain where the marginal effect of short-term persistence for this group is a 35 pp increase in the probability of being a NEET.

4.4 Impact of individual and household variables before and after the Great Recession

In this section, we consider the impact of the rest of the variables, which are individual and household characteristics. Again, we split the analysis into pre- and post-Great Recession periods. For this reason, we perform a *t*-test for the equality of the coefficients in the two subsamples. Such a test enables us to ascertain which factors significantly changed their association with the probability of being NEET with the economic crisis. All of the results are in line with previous evidence.

The estimates for each country are reported in Tables A1–A4 in the Supplementary appendix. In general, in all countries (and both genders) we do not find dramatic changes in the impact of the individual and household characteristics when comparing the results before and after the Great Recession. However, we can identify some interesting stylized facts across countries and gender.

As concerns individual characteristics, we note an increase in the probability of being NEET for youths aged from 25 to 29 years of age compared with their younger counterparts after the crisis. The exception is Portugal. Furthermore, the coefficients for both males and females are significantly different between the two periods in Greece, Italy and Spain. This finding is in line with the existing literature (Caroleo *et al.*, 2020) and thus confirms an increasing frustration for youngsters due to the increased discouragement effect (see Salvà-Mut *et al.*, 2018 for Spain and Contini *et al.*, 2019 for Italy).

However, personal and household characteristics may mitigate and reduce such a negative effect. Higher levels of education are typically associated with a lower risk of becoming NEET. Secondary and especially tertiary educational attainment levels reduce the NEET risk for females in Italy and Greece. This pattern is operational for males in Spain, and it is coherent with previous literature for this country (Serracant, 2013; Salvà-Mut *et al.*, 2018). Other authors find the same effect in Italy (Mussida and Sciulli, 2018; Contini *et al.* 2019). In fact, previous literature highlights the profile of NEETs as young people with relatively lower educational levels across the European Union, since those with a low educational level have a probability of being a NEET three times larger than youngsters with tertiary education (Eurofound, 2012).

This fact is also related to the so-called early school leavers issue, in that poor social and economic conditions may encourage early school dropouts, thereby increasing the share of NEETS. This phenomenon is particularly relevant in countries like Spain and Italy, as documented by De Luca *et al.* (2020).

Regarding household and economic characteristics, we find that the number of employed persons in a household is crucial for reducing the probability of being a NEET, and the relevance of this increases with the Great Recession in all countries (statistically significant differences; see Tables A1–A4 in Supplementary appendix). The presence of one or more employed persons represents a source of network information and at the same time motivates those searching for job opportunities to do so more intensively.

Our findings also suggest that household size is positively associated with the probability of being a NEET in all countries, both before and after the crisis (with the partial exception of Spanish males). However, the effect changes significantly with the recession for females in Italy, Portugal and Spain. These results for household characteristics reinforce previous evidence suggesting that a low social background and social exclusion are factors linked to the NEET status (Bynner and Parsons, 2002; Robson, 2008; Eurofound, 2012; Quintano et al., 2018). Contini et al. (2019) also remark that Italian females with children are prevalent among those who are always NEET. Drakaki et al. (2014) find that young unmarried women without children and living with their parents are more prevalent among Greek NEETs but note that remaining in parents' homes also means that the households where NEETs live will usually be larger than the households of non-NEET youths living independently.

5. Conclusions and policy implications

Often, the school-to-work transition is problematic for young people. The concept of NEET was created to overcome some of the limitations of the usual classifications of labour market status incorporated in the LFSs and many other socio-economic surveys. For young people, the distinction between unemployment and inactivity is especially blurry. Therefore, although the NEET concept has received criticism, it remains part of the diagnostics for the labour market integration problems of young people and is considered in the design of strategies for labour market policies, including the Youth Guarantee launched in 2013 in the European Union as a key element to improve labour market integration particularly in countries with high youth unemployment rates.

In this research, we have focused on the analysis of the persistence of being a NEET in four Southern European countries (Greece, Italy, Portugal and Spain), where the Great Recession has been deeper and the impact on youth employment has been dramatic. Previous literature on persistence is rather scarce and shows that being a NEET in the previous year will increase the probability of being a NEET in the current year by 21 pp in Italy (Mussida and Sciulli, 2018). We have added to this literature by distinguishing relatively short-term and longer persistence—in other words, the effect of being a NEET the previous year on the probability of currently being a NEET and the risk of being trapped into the NEET condition. In addition, we present estimations by gender and by country. Our findings show that relatively short-term persistence is greater than the risk of being trapped, and it is usually larger in the short-term after the Great Recession for males as compared with females. The only exception is Portugal. Greece shows especially large effects of short-term persistence. These results are in line with the observed evolution of the aggregate NEET rate in these countries, showing a sort of convergence by gender because of a worsening of the male NEET rate instead of an improvement for females. Finally, long-term persistence does not show any clear pattern before and after the Great Recession or by gender.

The larger size of relatively short-term persistence may be linked with the importance of unemployment, which is behind the oscillation of the time evolution of the NEET rate. Additionally, unemployment is an important phenomenon in all the countries explored.

These results are potentially useful to qualify the current policies aimed at young people, especially the Youth Guarantee. Until now, the priorities regarding NEETs have been established, focusing on the profile characteristics of the main subgroups of NEETs (see, e.g. Eurofound, 2012). However, it is crucial to place more importance on the severity of the problems suffered by NEETs. One way to detect those who are suffering the most severe problems is to learn more about the time persistence of being a NEET. Although the prevention of chronification in the NEET state is included in the employment strategies of the Youth Guarantee (Eurofound, 2012), our results call for additional attention for the risk of being trapped in the NEET condition in Southern European countries. This emphasis should be differentiated by gender: we have seen that the convergence in the aggregate NEET rates is more related to a worse time evolution of young males, jointly with the persistence of the trends for young females, especially when focusing on inactive NEETs.

In terms of policies, our findings call for determined actions to stop the relatively short-term persistence, in order to break the link between being a NEET in one period and being a NEET in the next one. Short-term interventions must be complemented with measures to recover those youths trapped in the NEET state. Moreover, the association between youth unemployment and the NEET evolution calls for interventions to alleviate the incidence of long-term unemployment among youth. Long-term unemployed and NEET are indeed discouraged labour market categories at risk of poverty and, more in general, social exclusion.

The main lesson of our findings is that the Great Recession significantly increased short-term persistence in the NEET rate, with no clear changes in long-term persistence. Therefore, we should expect an evolution of the NEET rate and persistence similar to the period after the Great Recession, that is, no great or systematic changes in long-term persistence but a risk of increasing short-term persistence. Regarding a deepening of the gendered pattern, this is difficult to determine because the starting point is rather different now, with very similar aggregate NEET rates by gender. In any case, we consider it advisable to include the above-mentioned policy strategy focusing on the short-term in the Youth Guarantee programmes of these Southern European countries. In the current social debate, other authors have also called for a prompt response to the economic downturn and a changing of the priorities of the Youth Guarantee (Rodríguez-Modroño, 2019; Tamesberger and Bacher, 2020). The issue of proper funding is also at stake because the amount of resources devoted to such a programme determines its ability to tackle a historically deep and rapid downturn. Finally, the results presented in this research also confirm the need for additional policies supporting household income to avoid the social and economic exclusion that may exacerbate the discouragement effect in people already outside the labour force and the long-term unemployed. Indeed, the discouragement effect should be tackled quickly as participation in the labour market is a key driver—together with productivity—of the economy's growth rate. The importance of education in reducing the number of early leavers from education and training, for both genders, is also supported by our findings, which is also coherent with others results, especially for Italy (De Luca *et al.*, 2020; Pastore et al, 2021b).

Supplementary material

Acknowledgements

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