A great depression? Students' educational aspirations and choices in the aftermath of the Great Recession*

Eleonora Porreca† Lucia Rizzica‡ Marco Tonello§

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Abstract

We study the impact of economic downturns on human capital accumulation, focusing on the effects of peer exposure to higher unemployment. We investigate whether students' educational aspirations, as well as their subsequent educational decisions and effort, are influenced by the unemployment status of their peers' parents. Using data for 10^{th}-grade students in Italy, we combine individual-level aspirations about the intentions to complete high school and to enrol at university with administrative register data on high school completion and university enrolment. Our identification strategy relies on comparing adjacent cohorts of students within the same school, exploiting the quasi-random variation in the share of peers with at least one unemployed parent. We find that higher exposure to peers with unemployed parents remarkably depresses students' aspirations to complete both secondary and tertiary education. Importantly, it also leads to lower high school diploma grades and a reduced likelihood of university enrolment.

JEL Classification: I21, I23, J24, E32

Keywords: aspirations, higher education, business cycle, peer effects

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†Bank of Italy, DG for Economics and Statistics.

‡Bank of Italy, DG for Economics and Statistics.

§Bank of Italy, Regional Economic Analysis Division in Venice; GLO and CRILDA - Research Center on Labor and Industrial Policies *Carlo Dell'Aringa*, Catholic University Milan. Email: marco.tonello@bancaditalia.it. **Corresponding author.**

. . . there are many reasons why today we usually do not like studying any more, and it is disappearing from our lives. Nowadays, I would add another reason, a very recent one, a very creeping one, always on the edge of becoming an alibi: the economic crisis. We do not want to study any more because there are no jobs, thus, why should we study if studying does not help us to reach anything? Everywhere this rigmarole.

Paola Mastrocola, *The rebel passion [La passione ribelle]*, Laterza 2017 (p. 101).

1 Introduction

In the past two decades most advanced economies faced several periods of turbulent economic situations. One should first mention the Great Recession (2007-2009) and the following Sovereign Debt crisis (which hit several European countries in 2010-11), but also the world-wide economic crisis caused by the COVID-19 pandemic, and the recent inflationary shocks. While there is a well-established literature on how macroeconomic conditions affect labour market trajectories and careers (von Wachter, 2020), the evidence on how they might also affect contemporaneous decisions to invest in human capital is more scarce and concentrated on college students. For example, Long (2014) shows that during the Great Recession in the United States college attendance levels increased overall; however, only part-time enrolment increased, while full-time enrolment declined. Adamopoulou and Tanzi (2017) show that the Great Recession decreased the probability of drop-out during college. Other papers document changes in the college major choice during recession times, pointing to a shift from business to STEM majors, or to majors in fields related to the industrial sectors less affected by the recession (Liu et al., 2019; Weinstein, 2017; Ersoy, 2019).

In our work we want to shed light on another aspect, largely overseen by the literature so far, that is, economic downturns might affect an even larger set of individuals to the extent to which they might not only affect those who are called to take choices or entering the labour market in recession times, but also those who are forming their *aspirations* concerning their future educational choices. Notably, aspirations have recently been considered a key element in many economic processes and individuals' choices: Genicot and Ray (2017) define aspirations as *individuals' incentives to invest*, and build a model in which aspirations not only are determined but also influence some key macroeconomic dimensions, such as growth, wealth and inequality.

Two key ingredients of Genicot and Ray (2017) and Ray (2006) theoretical works, which we recall in our analysis, root on the notions of aspiration window and aspiration gap. Ray (2006) is the first who conceptualizes the role of social connections and proposes the idea of *aspiration window*, which is the set of experiences, places, and individuals used to make comparisons and form a view of what may be attainable in the future

(La Ferrara, 2019). The difference between what an individual aspires to and what she actually achieves is the *aspiration gap*. Ray (2006) postulates that it is this gap, and not the level of aspirations *per se*, that determines investment. In particular, individual investment will be low when the aspiration gap is either very small or very large. When the gap is small, the difference between their current status and potential future status is also small, so incentives to exert effort are low. On the other hand, when the gap is very large, individuals may anticipate that, even with high effort, they will not manage to achieve the target level to which they aspire, and decide to give up altogether. The latter effect captures the *frustration* from over aspiring (La Ferrara, 2019), i.e. the aspiration failure.

In this paper, we bring the concept of aspirations into the individuals' decisions of investments in the process of accumulation of human capital (what we label as *educational aspirations*, in line with La Ferrara (2019)), and study whether and in which way students' aspirations about their future education are affected by the perceptions about macroeconomic conditions assessed by observing their school peers. Focusing on young students is of paramount importance as they could be both particularly sensitive to aspirations failures, but also more malleable to corrective policy measures. Moreover, we focus on a crucial moment in each student's life, notably close to the end of the compulsory education. In that specific time, students are clearly asked to think about their future educational choices (whether they want to complete secondary education first, and then if to continue with tertiary education) and to form their personal educational aspirations. We also give a peculiar definition of economic downturns, in line with the idea of aspiration window proposed by Genicot and Ray (2017). That is, we look at the business cycle conditions which might affect the aspiration formation as those arguably relevant for each students, and, in particular, as the observed unemployed status of the school peers parents.[1]

Little is known on the determinants of aspirations in general, and in the education context in particular. Our work contributes to both the literature on the role of individuals' aspirations in the economic decision making process and to that on the consequences of macroeconomic conditions on human capital accumulation choices. First, while it has been shown that macroeconomic conditions affect *contemporaneous* educational choices (such as: university enrolment, choice of college majors, drop-out; Long (2014); Liu et al. (2019); Weinstein (2017); Ersoy (2019); Adamopoulou and Tanzi (2017)), to the best of

[1]Specifically, we use as proxy the share of school peers with at least on unemployed parent. Also the unemployed status of parents themselves might be relevant for students' aspirations. However, our framework allows us to correctly identify only the effect of unemployment status of peer parents, which in our work is estimated controlling also for parents' unemployment status. Comparing the effects of the two channels, i.e. unemployment status of peer parents and of parents themselves, suggests that both channels significantly shape students' aspirations and subsequent outcomes and both magnitudes are economically relevant, with the peer parents effect outweighing the parents effect in some specifications. For these reasons, we prefer to focus on the peers' parents effect.

our knowledge, there is no evidence on whether aspirations and, *via* aspirations, future educational choices are also affected. We thus fill this gap in the literature. By exploiting the estimation framework of a causal mediation analysis, we provide evidence of the direct effect of aspirations on medium-term students' educational choices and effort (Rizzica, 2020; Favara, 2017; Ross, 2019; Guyon and Huillery, 2020). In the meantime, we will be able to provide an estimate of the relative size of the effects on aspirations directly coming from the peers and mediated by the peers' aspirations. Second, we empirically estimate one potential determinant of aspirations (i.e., economic downturns), in the context of human capital investment decisions, thus contributing to the literature on the economic determinants of aspirations (Genicot and Ray, 2017; Rizzica, 2020). Third, we exploit a peculiar definition of economic downturns based on the exposure to school peers with unemployed parents. In doing so, we are both close to the literature on aspirations, which predicts that only behaviours observed within each network of family and peers might have the potential to affect aspirations, and to the literature on peer effects, which shows that several characteristics of the school peers might influence individual behaviour and decisions (Cattan et al., 2023; Salvestrini et al., 2024). Finally, while the literature has generally focused on college students, this research is the among the few that looks at high-school students.

Understanding what drives students' aspirations is also particularly relevant for policy making. Rizzica (2020) shows that policies aimed at increasing students self-confidence and improving aspirations on future education could be a powerful tool, though not the only one, to foster human capital accumulation. Moreover, Khattab (2015) provides evidence that students' aspirations are linked to their achievement. The knowledge of whether or not bad macroeconomic conditions tend to worsen students' aspirations would thus help to design early-intervention policies in order to counter balance such effects. If during economic downturns students tend to lower their educational aspirations, and if this is also linked to their achievement and to their future educational choices, the policy maker could intervene to break this negative loop by providing interventions of support.

We study whether students' aspirations are affected by the perceptions about macroeconomic conditions assessed by observing the share of school peers with at least on unemployed parent making use of individual-level data on educational aspirations stated by eight subsequent cohorts of 10^{th} grade students enrolled in Italian high schools.[2]. We code them so to derive two main variables of interest: aspiration for completing at least secondary education (vs. dropping out at the end of the compulsory path), labelled as *Aspiration Secondary*, and aspiration for starting tertiary education (vs. just finishing the secondary school), labelled as *Aspiration Tertiary*. Moreover, we link educational aspira-

[2]The data used in the analysis are unique as they merge census data provided by the Italian Education Authority (*Invalsi*), which cover the universe of 10^{th} grade students enrolled in Italian high schools, with administrative data from the National Students' Registries held by the Italian Education and University Ministries.

tions stated in grade 10 to the subsequent educational outcomes taken from the National Students' Registries, such as completing high school, the mark gained at the high school diploma, and the enrolment at university. Rooting on the literature on peer effects in the school pioneered by Hoxby (2000), identification is achieved by exploiting the within school cohort-to-cohort variation in the share of peers with unemployed parents, and by controlling for several individual, class and school level time-variant characteristics, and for school-specific time trends.

We find that increasing by 1 percentage point (p.p.) the exposure to peers with unemployed parents determines a decrease of about 0.03 p.p. in the probability of aspiring to completing secondary education and of about 0.05 p.p. in the probability of aspiring to starting tertiary education. The effects are sizable and economically meaningful, corresponding to about 1/10 of a SD for both outcomes. Back-of-the envelope calculations show that the largest raise in the share of peers with unemployed parents observed between 2011 and 2014 of 2.6 p.p. would have implied a decrease of about 0.8 and 2.6 p.p. in the aspiration for completing secondary and tertiary education, respectively. The depressive effects on students aspirations seem to be particularly pronounced when parents with lower levels of education experienced unemployment.

Importantly, the negative effects observed on the aspiration formation translate into subsequent educational choices and effort. We document that the exposure to peers of unemployed parents at the moment when the aspirations are stated (i.e., in grade 10) negatively affects the effort exerted to complete the high school and the probability to enrol at university. Indeed, the high school diploma mark decreases by about 2.1 points (corresponding to a 2.6 per cent decrease with respect to the average), while the probability of enrolling at university decreases by 0.05 p.p.. Indeed, through a causal mediation analysis we estimate that the part of the effect mediated for the aspirations stronger (about 50 per cent of the total effect) when it comes to consider student's choice to enrol at university, as compared to the measure of the effort exerted to complete high school (the diploma mark, about 15 per cent of the total effect) for which other factors included in the direct effect of the peers seem prevalent.

The paper proceeds as follows: Section 2 reviews the existing literature and discusses the main contributions; Section 3 describes the institutional setting and the background; Section 4 describes the data used and provides descriptive evidence; Section 5 illustrates the empirical strategy and discusses the main identifying assumptions; Section 6 comments the main results and the heterogeneity; Section 7 illustrates the robustness and sensitivity checks. In Section 8 we perform a causal mediation analysis. Section 9 concludes and provides policy implications.

2 Related literature

Our work lies at the intersection of three main strands of the economic literature. First, our work is closely related to the burgeoning literature on aspirations and its application in the human capital investments decision process. Then, we contribute to a well-developed literature on how business cycle conditions affect early career paths and education choices. Finally, the paper clearly speaks to the literature on the effects of (high) school peers composition on later outcomes. In what follows we shortly review the more recent contributions in each of these fields, and outline the novelty brought by our work.

Genicot and Ray (2017) define aspirations as the individuals' incentives to invest. They build a theoretical model of socially determined aspirations, in which economy-wide outcomes determine individual aspirations, which in turn determine investment incentives and social outcomes, such as growth and inequality, so that aspirations, income, and the distribution of income jointly evolve. A central feature that drives their results is that aspirations that are moderately above an individual's current standard of living tend to encourage investments, while higher aspirations may lead to frustration, and discourage investments. Empirical attempts to estimates the relationships between aspirations formation and macroeconomic outcomes are still lacking. Rizzica (2020) specifically looks at aspirations in the human capital accumulation process, by studying a policy implemented in the UK aimed at raising the aspirations of pupils from low socioeconomic background to increase their participation in college education. The results show that the policy successfully raised the aspirations of the target students and their participation in post-compulsory education. In a similar vein, Bahrs and Siedler (2018) study whether higher education tuition fees influence the intention to acquire a university degree among high school students. The authors find a large negative effect of tuition fees on the intention of 17-years-olds to acquire a higher educational degree, especially for those from low-income households.

Concerning the specific relationship between aspirations formation and economic conditions, Lekfuangfu and Odermatt (2022), using the British 1958 NCDS cohort data that follow individuals nearly 60 years since birth, show that aspirations are largely influenced by parents' socioeconomic status and by parents' own aspirations for their children, and by achievements. However, the geographical correlation between local labor market conditions and aspirations is never statistically significant, pointing to a limited or no impact of large aspiration windows (such as the conditions of the local labor market) in shaping individual aspirations. Watson et al. (2022) use Canadian data collecting educational aspirations of youths and show that the incidence of poverty is associated with mothers reducing their aspirations that the youth will attend university, and the youth also reducing her/his own educational aspirations. On the other hand, economic insecurity (defined

as a negative family income shock) does not seem to influence educational aspirations.[3] While in both studies the link between economic conditions and aspirations' formation is mainly correlative in nature, we identify the causal impact of economic conditions which contribute to define the individuals' aspirations window. (Iwo et al., 2024) provide causal estimate of the economic and social deprivations experienced following the 2004 tsunami in Indonesia on students' aspirations finding that damage to the student's community depresses aspirations only the short term.

The literature on the effects of the business cycle on education and labour market outcomes has prevalently focused on the short- and long-run labour market effects of graduating during a recession (Altonji et al., 2016; Abel and Deitz, 2017; Oreopoulos et al., 2012; van den Berge, 2018; Kahn, 2010; Schwandt and von Wachter, 2018). These works find sizeable negative short- and long-run effects of business cycle conditions, as generally proxied by the unemployment rate, on earnings, wages and career prospects. Liu et al. (2016) and Summerfield and Theodossiou (2017) study skill mismatch and show that unfavourable economic conditions at graduation decrease the likelihood of a good job-worker match over a worker's subsequent career, thus increasing over-education. Fewer papers study the relationship between macro-economic conditions and educational choices, and prevalently focus on the higher educational tracks. Long (2014) provides evidence that the Great Recession increased university enrolment in the United States. Adamopoulou and Tanzi (2017) use data on three cohorts of university students in Italy and show that the Great Recession decreased their drop-out. Finally, a bunch of papers has focused on major choice during recession times (Liu et al., 2019; Weinstein, 2017; Ersoy, 2019), pointing to a shift from business to STEM majors, or to majors in fields related to the industrial sectors less affected by the recession. Somehow related to our main focus on the paper on school peers' parental unemployment, very recent contributions have studied the impact of parental job loss on children's educational outcomes. Drydakis (2023) found a substantial negative effects of parental unemployment on adolescents' academic performances in Greece, especially in the years of the Great Recession. Carneiro et al. (2022) examine if the effect of parental labour market shocks on child development depends on the age of the child at the time of the shock. By exploiting mass lay-offs and establishment closures as a source of exogenous variation in parental labour market shocks and Norwegian register data, they document that displacement episodes occurring in the children's teenage years have the largest effects on human capital accumulation. They also show that most of the effects operate through the intensive margin of schooling. Their evidence highlights two main key elements in our analysis: first, the focus on the years of adolescence as those powerfully shaping later-in-life outcomes; second, the attention to

[3]Poverty is defined according to OECD measures of normalized family income below a given threshold; economic insecurity is defined as a negative income shock which reduces family income by at least one quarter between two consecutive years (Watson et al., 2022).

high school completion and university enrolment, as potential outcomes.

Finally, our work is closely related especially - even though not exclusively - from a methodological point of view, to a well-established literature on the effects of school peers' composition on several educational, labour market, and family outcomes. This literature was pioneered by the seminal contribution by Hoxby (2000), whose study inspired outstanding insights in the subsequent 25 years of applied research in the economics of education, which demonstrated the fundamental importance of the peers' interactions based on gender and native status differences.[4] Recent contributions have also showed that other salient characteristics of the peers might influence students' outcomes. Salvestrini et al. (2024) show that the share of peers with self-employed parents is able to narrow gender gaps in entrepreneurship by encouraging girls' entry and tenure into this profession. Cattan et al. (2023) show that the exposure to school peers with elite educated parents increases peers' enrolment in elite programmes. Interestingly, and in line with our work, these two contributions have moved the attention from peers' to parents' peers' characteristics and still focus on high school as crucial turning point in shaping future outcomes.

3 Institutional setting and background

3.1 The Italian schooling system

Italian schooling system consists of three different levels of education: five years of primary school (grades 1 to 5, ISCED level 1), three years of junior-high school (grades 6 to 8, ISCED level 2), and five years of high school (grades 9 to 13, ISCED level 3), to be chosen among three main tracks: academic, technical, and vocational. The academic track is designed for students who aim to attend university. The technical track allows students to acquire skills that are both theoretical and practical, letting them continue with tertiary education or look for a job (e.g. accountant, surveyor, technician). The vocational track, instead, focuses on endowing students with vocational skills, which are essential to find a job right after high school.[5]

Compulsory education ends when the student reaches age 16, generally at the completion of grade 11 in high school. After this age students are free to drop-out from the schooling system, though they are obliged to attend either a professional course or to start

[4] Just to mention the more recent contributions, see the works by Carrell et al. (2018), Merlino et al. (2019), and Brenøe and Zölitz (2020).

[5] Children enroll in the first grade of primary school the year they turn six, start junior-high school when they turn eleven, and enroll in the first grade of high school the year they turn fourteen. See also the dedicated web portal of the Italian Ministry of Education (`https://www.miur.gov.it/web/guest/il-sistema-di-istruzione`). Notice that this is the regulation which applies in the years used in the analysis.

an apprenticeship contract, which should last until they reach age 18.[6] Those who decide to continue education, at the end of grade 13 (for all tracks) sit for a final examination to get their High School Diploma, which is mandatory to access university.

In order to study students' aspirations we make use of eight consecutive cohorts of tenth grade students (i.e., attending the second year of high school) from all tracks. This is a crucial turning point in individuals' life as students know that they will be asked to decide whether to continue formal education or drop-out from school in almost one year time and they are plausibly forming their aspiration concerning their future educational choices, notably based on family advice, and their own and peers' experience.

In the high school, students have several teachers, one for each subject, and are expected to gain knowledge on a wide range of skills. The subjects vary a lot depending on the path chosen, but always entail a core instruction in reading, Math and English (as the main foreign language). Students at all grades and tracks follow formal classes along the whole school year (lasting from mid-September to mid-June) but also participate to programs of training and on-site eduction in firms or Institutions. Grade retention is possible if, based on teachers' marks and evaluations, the student does not attain the minimum level of skills required for the completion of each grade.[7] Grade retention is usually very limited in the first grades of the education cycle (primary and junior-high schools), while it becomes more frequent in the high school grades.

3.2 The National Evaluation Program of Students' Achievement

The Italian Education Authority (*Invalsi*, from the Italian acronym)[8] started the National Evaluation Program of Students' Achievement (henceforth, NEPSA) in the school year 2009-10. The NEPSA has a yearly and census nature: every school year all students in grades 2 and 5 (primary school), grade 6 (junior-high school), and grade 10 (high school) sit typically in the months of April and May a reading and Math standardized test. In some grades and school years, students are also asked to fill in a *Student Questionnaire*, which provides additional information on students and families.

The Invalsi NEPSA is not a high-stakes test: the results of the evaluation have the purpose of assessing the school's performance from one year to another and are not part of a proper school accountability system granting schools additional funding or rewarding teachers. Moreover, the tests results are returned to the schools at an aggregate level (the class) so that neither the teachers nor the students have direct access to their

[6] Professional courses are organized on a regional level and are typically aimed to prepare for a low-skilled manual job (e.g., waiter, cook, hairdresser, beautician, etc.); with an apprenticeship contract the youth starts her working path.

[7] The standardized tests performed under the Italian National Evaluation Program cannot be used to determine this choice (see the following subsection). The results for each student are even unknown to the same students and teachers.

[8] *Istituto Nazionale per la VALutazione del SIstema educativo.*

individual-level scores or Questionnaire. The individual-level data are available for research purposes, correlated with basic individual level characteristics (such as: gender, age, non-native status, grade retention, class and school anonymous identifiers). The *Student Questionnaire* can be linked to the standardized tests by means of an anonymous individual-level identifier, while the school identifier makes it possible to follow schools along the years.

For the purpose of our study, we focus on the NEPSA of eight successive cohorts of 10^{th}-grade students, from school year 2010-11 to 2017-18, as in these years students were asked a question in the *Student Questionnaire* about their future educational aspirations (see Data section for details).

3.3 The Great Recession, the Sovereign Debt Crisis and the (slow) recovery

Our empirical analysis covers a period spanning from 2010 to 2018, a turbulent economic time in Italy, as in most Western countries, especially in Europe. Indeed, these were the years which followed the Great Recession (2007-2009),[9] and the Eurozone faced an additional period of severe economic downturn known as the Sovereign Debt crisis, which hit Italy in July 2011 (following Spain, Ireland, Portugal and Greece), when the Italian Public Bonds reached an interest rate of about 7%, and determined a huge increase in the cost of public financing. In Novemebr 2011 the spread with respect to the corresponding German bonds (the target of secure assest) reaced 570 points, from an average of about 200 in the previous months. The crisis called for huge interventions from the European Central Bank, and the slow recovery only started in the year 2014 (Grande et al., 2013).

The crisis had severe consequences in the real economy too, and, ultimately, on the labor market (von Wachter, 2020). Italy experienced the sharpest relative increase in the unemployment rate among the EU economies mainly hit by the crisis (Appendix Figure B.1), which peaked in 2014; the Italian National Bureau of Statistics (Istat) recorded in those years the sharpest increase in the unemployment rate since the late '70 (Appendix Figure B.2).

4 Data, variables and descriptive statistics

We combine the individual-level census data of the Invalsi NEPSA on students in grade 10, containing information on students' educational aspirations, with individual-level administrative records on high school completion and university enrolment. In this Section

[9]The Great Recession refers to the economic downturn from 2007 to 2009, which followed the bursting of the U.S. housing bubble and the global financial crisis. It was the most severe economic recession in the United States since the Great Depression of the 1930s.

we present the main features of the data sources and provide some preliminary descriptive evidence.

4.1 Students' aspirations

The Invalsi NEPSA archives for 10^{th} grade students in the school years (s.y.) from 2010-11 to 2017-18 contain a question about educational aspirations. In details, in the *Students' Questionnaire*, undertaken by all students at the end of the formal assessment tests in Math and Italian language, the student is asked to state the highest level of education she would like to acquire in her nearest future. The question states: *Which is the highest educational title you would like to attain?: A. None (I study until the end of the compulsory education); B. Three-years vocational certificate; C. High school Diploma; D. College degree; E. Master or PhD after college.*[10] Notice that the tenth grade in the high school still belongs to the compulsory schooling path, so that all 15-years-olds must be attending some high school (either in an academic, technical or professional track), and sit the NEPSA assessment. Moreover, students are well aware of the fact that in about one year time they will be asked to take the choice of continuing formal education or exiting from the schooling system to look for job or enrol in a professional course (see Section 3.1)

From this question we create two dummy variables stating: (i) whether the student aspires to continue to attain at least the High School Diploma or not (*Aspiration Secondary, AS*); (ii) or whether the student aspires to enrol at university or not (*Aspiration Tertiary, AT*).[11] Formally, for each student i in school s and cohort c we obtain:

$$AspirationSecondary_{isc} = \begin{cases} 1 & \text{if the student aims to} \\ & \text{complete secondary education} \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

$$AspirationTertiary_{isc} = \begin{cases} 1 & \text{if the student aims to} \\ & \text{enroll in university} \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

The NEPSA archives also contain individual-level information on several students'

[10] We interpret this formulation as capturing students' educational aspirations rather than expectations, which would also embed students' considerations on possible constraints, and on the realistic attainability of the goal. For example, a similar question for students' *expectations* is included in the OECD PISA data and explicitly asks to the students which is the highest level of education they *expect* to gain. In any case, studies which focused on both aspirations and expectations find that the two are strongly correlated (Carlana et al., 2022); moreover, because expectations are likely to internalize constraints, relative to pure aspirations, we may see the measured level of expectation as a lower bound for the potential aspiration (La Ferrara, 2019).

[11] AS takes value 1 for options C, D and E in the NEPSA question and zero for options A and B; AT takes value 1 for options D and E and zero for options A, B and C.

and families' characteristics, such as gender, age, grade retention, native or non-native status, parental education and current employment, a synthetic indicator of the family socio-economic status (henceforth, SES indicator). These are obtained from the *Students' Questionnaire* and from school administrative records, and can be linked to the results of the standardized tests through an anonymous student identifier. Crucially for our analysis, from the *Students' Questionnaire* we can retrieve for each student information about the parents' occupational status (at the time of the assessment). From this variable, we retrieve each student's aspiration window (i.e., our main explanatory variable) as the share of schoolmates with at least one unemployed parent (excluding student i):

$$UP_{sc}^{(-i)} = \frac{\sum_{sc \neq i} ParentUnemployed_{sc}}{n_{sc} - 1} \tag{3}$$

which expresses share of school (s) peers in the same school-cohort (c) with at least one parent unemployed, excluding individual i. We will also use variations of this definition (e.g. differentiating by unemployed parent's gender, educational title, or using the class share instead of school share).[12]

Finally, the NEPSA archives also contain anonymous school identifiers, which make it possible to follow schools over time, and anonymous class identifiers, which make it possible to take into account class-level observed and unobserved characteristics. The data also allow to distinguish among the high school track attended (academic, technical or vocational).

4.2 High school completion and university enrolment

Thanks to a rich and original administrative data archive to which we gain access to, we managed to link the Invalsi NEPSA archives for 10^{th} grade students in the school years 2011-12 to 2017-18 to the National Students' Registries. The National Students' Registries are administrative archives managed by the statistical offices of the Ministry of Education and the Ministry of University, and covering all administrative information on students enrolled, respectively, in any Italian high school or university, on a census basis.[13] We merged the individual-level records in the Invalsi NEPSA archive of grade 10 to information on the high school completion and on the mark gained at the high school diploma in grade 13 (as contained in the National Students' Registry held by the Ministry of Education); then, we further track students who decided to enrol at any (public or private) university in Italy (as recorded in the National Students' Registry held

[12]Notice that here and in the rest of the paper we intend for school cohort (c) all tenth- grade students enrolled in a given school year.

[13]Notice that we cannot merge the first cohort of students who attended grade 10 in the school year 2010-11 because the longitudinal student identifier, which is necessary to perform such a link, was not yet available in the Invalsi NEPSA archives in that school year. In a later section, we will test the robustness of our main findings on aspirations to alterations of the baseline sample, e.g. the exclusion of the first cohort.

by the Ministry of University and Research). To allow for comparability across cohorts of high school graduates, we focus on students who enrol at university in the two academic years following their high school graduation.[14]

Overall, we are able to track in the National Students' Registries at end of high school (i.e., grade 13) and in the freshman year of university enrolment 87 per cent of the students observed in the Invalsi NEPSA archive containing the statements on aspirations in grade 10 (s.y. 2011-12 to 2017-18).

The Invalsi NEPSA archives for 10^{th} grade students are used in the first part of the analysis that estimates the effect of exposure to peers with unemployed parents on students' aspirations. Whereas, the linked data to the National Students' Registries are used in the second part estimating the direct effect of exposure to peers with unemployed parents on students' educational outcomes. To the best of our knowledge, this is the first time that students' aspirations appear in an administrative census data source with such a large cohort coverage, and that they are also mapped with the subsequent educational choices.

4.3 Descriptive evidence

We perform our empirical analysis on students' aspirations on about 2,850,000 10^{th} grade students from the eight cohorts of the school years from 2010-11 to 2017-18. In Table 1 we report the descriptive statistics of the variables used in the analysis.

[Table 1 and Figure 1 about here]

On average, 95 per cent of the students aspire to continue education at least up to the high school diploma (*Aspiration Secondary*), while about 65 per cent desires to achieve a college education (*Aspiration Tertiary*); the variability is also quite different in the two variables, as the latter displays a SD which more the doubles the one of the former. As an indirect way to check the consistency of the stated aspirations, Figure 1 tabulates them according to some salient individual and family characteristics. Aspirations to complete at least secondary education are sensibly higher for females and native students, those attending high school in the academic track, and those belonging to more affluent families (with parents with college education). Aspirations to achieve tertiary education display a higher variability within each subgroup: females' aspiration for tertiary education is 17 percentage points higher as compared to male peers; similarly, for native students as compared to non-natives and for students from more affluent families. Not surprisingly, students in non-academic tracks display considerable lower aspirations for tertiary educa-

[14] On average, in the ten years between the academic years 2011-12 and 2021-22, about 75 per cent of those who enrol at university for the first time did it exactly the two academic years following the high school graduation (ANVUR, 2023).

tion: while 91 per cent of the students in the academic track aspires to achieve a college education, this figure drops by about a half (42 per cent) in non-academic schools.

[Figure 2 about here]

In order to visually capture the nature of the row correlations under study, Figure 2 shows a bins scatter-plot of *Aspiration Secondary* (on the left) and *Aspiration Tertiary* (on the right) on the share of school peers with at least one unemployed parent (on the horizontal axis, UP in eq. 3). The row data display a negative correlation between the two measures, i.e., an increasing share of peers with at least one unemployed parent is associated with lower educational aspirations; the relation is also steeper for Tertiary versus Secondary. In the following paragraph we will describe the empirical setup that we exploit in order to pin down the proper casual estimates.

Concerning the subsequent educational outcomes as derived from the National Students' Registries, about 90 per cent of the students completed the high school, with an average mark at the high school diploma of 79.7 (over a maximum of 101) (see Table 1). About 58 per cent enrolled at university in the two academic years after the high school graduation. In our empirical analysis of the educational outcomes following aspirations stated in grade 10, we will thus consider the probability of completing the high school (*High school completion*) and the probability of enrolling at university (*University enrolment*). Then, as measures of the effort exerted, we consider the mark earned at the high school diploma (*High school diploma mark*).

5 Identification strategy

5.1 Baseline equation

Following the seminal paper by Hoxby (2000) and an established empirical literature, we exploit the (arguably) as-good-as random within school and across cohorts variability in the exposure to the share of one's school peers with at least one parent unemployed (UP), and estimate variations of the following baseline equation:

$$Y_{isc} = \alpha + \beta UP_{sc}^{(-i)} + \gamma X_{isc} + \theta S_{sc} + \lambda_s + \lambda_c + \lambda_{st} + \epsilon_{isc} \tag{4}$$

where: Y_{isc} is the outcome variable (i.e., aspiration secondary or tertiary; or one of the subsequent educational outcomes and measures of effort observed: high school completion and mark and enrolling at university) for student i of school-cohort c in school s; $UP_{sc}^{(-i)}$ is share of school peers with at least one unemployed parent (as defined in eq. 3); X_{isc} is a vector of student-level pre-determined characteristics (including dummies for: student gender, first and second generation non-native status, grade retention, parents' tertiary education, own UP_i); S_{sc} is a vector of class- and school-level time-varying characteristics

(such as: the shares of females, first and second generation non-natives, grade retained, students with parents with college education, class size, school size, cohort size).[15] λ_s and λ_c represent, respectively, school fixed effects (FE) and cohort FE.

The parameter of interest (β) is identified thanks to the (arguably) exogenous variation in the share of peers with unemployed parents across cohorts within school. School fixed effects control for time invariant endogenous sorting into schools, while cohort fixed effects take into account year-to-year unobserved differences across cohorts. School and cohort fixed effects thus solve the identification issues related to time-invariant students' sorting into schools, while the strategy fails to control for school-specific time trends that may alter both peer composition and the outcomes of interest (Lavy and Schlosser, 2011; Schneeweis and Zweimuller, 2012; Brenøe and Zölitz, 2020). We thus include in all specifications school-specific (linear, quadratic or cubic) time trends (λ_{st}), which account for both time variant and school specific unobserved factors correlated with both variations in exposure to peers with unemployed parents and the educational outcomes of students in the same school.[16] The extensive set of control variables included allows us take into account observable time variant factors.

For the estimation of the effect on educational outcomes, we also control for the regional unemployment rate registered during the year of high school school completion (effective for those who completed high school and potential for those who drop-out) in order to rule out any possible short-run effect due to the business cycle.

For our parameter β to causally identify the effects of students' exposure to peers with unemployed parents on aspirations and other educational outcomes, we need that no omitted variable bias exists that satisfies the following requirements (Brenøe and Zölitz, 2020): (*i*) time variant and school specific; (*ii*) not captured by school-specific time trends; (*iii*) correlated with both the peer composition and the outcome of interest; and (*iv*) not included in the extensive set of individual- and peer-level control variables. While it is difficult to think to such variables, in the following subsection we will present an extensive set of evidence corroborating our main identifying assumption, i.e. that after controlling for the set of control variables, fixed effects and trends, the remaining variation in the variable $UP_{sc}^{(-i)}$ can be considered as-good-as random. On top of that, additional robustness and sensitivity checks, as well as alternative specifications will be discussed at length in a later section (Section 7).

[15] See Table1 for the complete list of the control variables. As for the cohort size, we follow Epple and Romano (2011) and add up to a third-degree polynomial, as peer composition may potentially be correlated with cohort size.

[16] Here, we intend for time trend the calendar year when each school year starts, i.e. from 2010 (or 2011 depending on the outcomes) to 2017.

5.2 Evidence corroborating the identification assumptions

A first-order concern before delving into the validity of our empirical strategy is whether we have sufficient variation in the share of peers with unemployed parents once we remove school and cohort fixed effects (Lavy and Schlosser, 2011). In Appendix Table B.1 we show that once we add school and cohort fixed effects, and school-specific (linear) time trends, we are still left with about 60 per cent of unexplained residual variability, in line with existing studies exploiting a similar empirical variability and identification strategy (Salvestrini et al., 2024; Olivetti et al., 2018).

The key identifying assumption in our strategy is that time variant and unobserved factors are not driving our results. In other words, we root on the assumption that, once we control for school and cohort FE, and school-specific trends, the remaining variation in UP within schools and across cohorts can be considered as-good-as random. We can test some main implications of this assumption (Lavy and Schlosser, 2011; Brenøe and Zölitz, 2020; Merlino et al., 2019).

First, as a sort of balancing test, we can test if variations in the proportion of students with an unemployed parent within a school is associated with observable individual level characteristics. In Appendix Table B.2 we show the results of several regressions in which each pre-determined student characteristic is regressed on UP, after controlling for school and cohort fixed effects, and school-specific linear trends. As a matter of fact, we do not detect any systematic correlation: a few coefficients are statistically significant, though not in a systematic way across the specifications tested; moreover, all estimates are extremely close to zero.

Second, we can graphically inspect the nature of the within cohort-to-cohort variation exploited for identification purposes. In the spirit of Brenøe and Zölitz (2020) and Salvestrini et al. (2024), Appendix Figure B.4 plots the share of peers with unemployed parents (after removing school and cohort fixed effects). The assumption that variation in our exposure measure is as good as random (once we condition on school and cohort fixed effects) is supported by these deviations in the share of peers with unemployed parents, which closely match a normal distribution.

Third, the identifying assumption would be violated if, for example, students with unemployed parents self select into some specific schools based on some expectation of higher or lower proportions of peers sharing the same characteristic. In Appendix Table B.3 we thus show the results of simple OLS regressions of own status of student with unemployed parent on the share of peers (excluding the student) with unemployed parents (i.e., our measure UP). However, as first noticed by Guryan et al. (2009), the simple correlation between each student status of having an unemployed parent with the share of school-cohort peers with unemployed parents would mechanically deliver a spurious negative correlation, as each student peer group necessarily excludes the student itself

(column 1 of Appendix Table B.3). We thus follow the correction procedure proposed by Guryan et al. (2009) and include in the regression the school-level leave-out mean of the proportion of peers with unemployed parents across cohorts within the school to account for the mechanical relationship between own status and peers' status. Our estimates of this relationship (Appendix Table B.3, columns 2-6) return correlations which are, albeit significant in statistical terms, extremely small in magnitude and very precisely estimated around zero. Given the large sample size that we use, covering the universe of eight cohorts of tenth grade students in Italy, we can be confident that these relations are small in and negligible in magnitude and not economically meaningful.

6 Results

6.1 Students' aspirations

6.1.1 Baseline results

We estimate Equation 4 making use of OLS regressions, with robust standard errors clustered at the school level. In Tables 2 and 3 we present the main results, for AS and AT, respectively, where we progressively saturate the model by adding all the FE, the control variables, and linear, quadratic or cubic school-specific trends. In column (1) we simply include year and cohort FE; in column (2) we add the set of individual and family characteristics (dummies for gender, non-native first- and second-generation student, grade retained, ahead of year, parents with college education, achievement measures in the previous semester);[17] in column (3) we further add the school and class time-variant characteristics (share of females, share of first- and second-generation non-native students, share of students grade retained, share of students ahead of year, school size, class size, dummies for the high school tracks); finally, in columns 4, 5 and 6 we add, respectively, linear, quadratic or cubic school-specific trends.

[Tables 2 and 3 about here]

As a preliminary step in our comment, we should observe that both the coefficient estimates for Aspiration Secondary (Table 2) and Aspiration Tertiary (Table 3) appear quite stable and always statistically significant across the various specifications. Concerning the magnitude of the estimated effects, we should notice that it decreases as long as we progressively saturate the model with all the fixed effects and the control variables, while the functional form of the school-specific trend does not alter substantially the point

[17] The complete list and description of all the control variables is in Table 1. Importantly, all the regressions include the dummy for student's own parent unemployment status.

estimates. In what follows, we will therefore concentrate our comments on the specification in columns 4, which makes use of linear trends, and which we will consider to as our baseline.

Focusing on the effect on Aspiration Secondary (Table 2, col. 3), we find that the exposure to peers with unemployed parents determines a decrease of the probability in aspiring to secondary school completion. In detail, 1 percentage point (p.p.) increase in the exposure determines a decrease in aspirations for secondary education of about -0.03 p.p. (approximately 1/10 of a SD), -0.84 per cent over the baseline average probability. The effect is both precisely estimated and economically significant; for example, the magnitude of the effect is about three times that of being a female, which is considered a strong determinant of higher educational aspirations (Lundberg, 2020) (as also noticed in our descriptive Figure 1). With a back-of-the envelope calculations, and assuming linearity in the main effects, we estimated that the largest raise in the share of peers with unemployed parents observed between 2011 and 2014 of 2.6 p.p. (from 0.040 to 0.066) would have implied a decrease of about 0.8 p.p. in the aspiration for completing secondary education.

Concerning Aspiration Tertiary (Table 3, col. 3), we still find a negative effect of the exposure to peers with unemployed parents on own aspiration for tertiary education, in line with Aspiration Secondary. Indeed, a 1 p.p. increase in exposure is associated to a decrease of -0.05 p.p. in aspirations for tertiary education (approximately 1/10 of SD), and -1.98 per cent over the baseline. The effect is also economically meaningful as similar to the effect on aspiration of being female. The back-of-the envelope calculation would deliver in this case an increase of about 1.3 p.p. in aspiration tertiary, face to an increase 2.6 p.p. in the exposure in the years 2011-2014.

In sum, our empirical estimates point to a negative effect of the exposure to peers with unemployed parents on students' aspirations for both secondary and tertiary education, thus confirming the theoretical predictions that the effects of an economic recession observed within one's cognitive window lower own aspirations (testable prediction (i), see Appendix A).

6.1.2 Heterogeneous effects

Following our theoretical background, we can explore two main lines of research in looking for heterogeneous effects. First, we can search for heterogeneous effects according to the students' characteristic (such as: gender, non-native status, type of school attended) and parents' characteristics (as the family socio-economic background proxied by parents' education and non-native status), type of school (academic vs. non-academic). Heterogeneous effects along indicators of students' characteristics and family socio-economic conditions are mainly motivated by existing theoretical works, which primarily link a higher economic vulnerability with a decrease in students' motivations, effort, and aspi-

rations (Dalton et al., 2016; Genicot and Ray, 2017). The relationship between family poverty and aspirations might be, however, non-necessarily linearly positive (La Ferrara, 2019). Families away from critical thresholds of economic vulnerability might not be affected by business fluctuations so that students' aspirations in those families might not be influenced. Second, motivated by our theoretical framework, we can look at the variations of our baseline effects once we consider different proxies for the students' relevant aspiration window. Larger aspiration windows, as those for example derived from less socially connected individuals, would in principle deliver milder effects on individuals' aspirations. Third, we can look at salient dimension of heterogeneity emerging from differences in the unemployed parents of the school peers. For example, one can imagine that the gender or the education level of the unemployed parent might determine different effects on students' aspirations.

Students' and family characteristics. Considering students' main observable characteristics, the negative effects we found in the baseline estimates are stronger and statistically different from zero for females, students attending academic tracks, and students with lower-educated parents (see Figures 3 and 4); the relevant dimensions of heterogeneity in the effects are also the same for both aspirations secondary and tertiary. Heterogeneous effects for non-native students deliver point estimates in line with those of the natives, though the effects are poorly identified mostly due to their considerably smaller share in the students' population.

[Figures 3 and 4 about here]

One peculiar aspect to focus on is gender. Indeed, recent works have pointed to aspirations as one potential driver of the well-documented gender differences in academic performance and in educational choices (Lundberg, 2020), but also in career paths, occupational patterns, and marital decisions (Molina and Usui, 2022; Inoue-Smith, 2014). As just noted, we find that females suffer a larger effect in both aspirations for secondary and tertiary education (Figures 3 and 4). Here we further split the sample according to the students' gender and the previously studied dimensions of heterogeneity: the results are depicted in Appendix Figures B.5 and B.6. Overall, we do not detect statistically significant differences across gender, within each heterogeneity feature studied. We should only notice that the negative effects in academic schools mainly comes from the male (rather than the female) component.

Aspiration window. We then focus our attention on different definitions of the aspiration window. We provide a narrower definition, i.e. based on the calculation of our measure $UP_{sc}^{(-i)}$ (eq. 3) on class rather than school peers, and a wider definition, i.e. based on the unemployment rate in the Local Labor Market (LLM) where the high school is located.[18] The results are reported in Table 4, which also reports in column 1

[18]Italian LLM are about 610, a smaller geographical entity as compared to the provinces (NUTS level

the baseline estimates from Tables 2 and 3.

[Table 4 about here]

The overall pattern of the results is in line with the predictions of the theoretical framework outlined in the Appendix (testable prediction (*ii*)), whereby definitions of larger aspiration window tend to deliver smaller effects, while narrower definitions deliver stronger effects. In detail, in our case it seems that estimations based on class rather school peers do not make a substantial difference on the effect, while the effects estimated using the local labor market conditions are sensibly smaller.

Peers' parents characteristics. Finally, we look at heterogeneous effects according to some salient characteristics of peers' parents. First, we focus on the possible differential effects caused by differences in the gender of the unemployed peers' parents. In the sample we observe that the average school share of unemployed fathers and mothers are, respectively, 2.2 and 3.6 per cent.[19]

[Tables 5 and 6 about here]

The depressive effect on aspirations (secondary or tertiary) is marginally higher when it comes to consider the peers' mother unemployed status, although differences are not statistically different. Interestingly, while the effect of the mother unemployed status is similar across the students' gender, the effect of the father unemployed status only passes through the lowering aspirations of the female students. All in all, the estimates seem to point to a more magnified effect for females. These results are in line with empirical findings which highlight the relative importance of the mother's employment or unemployment status on adolescents' labour market outcomes (Berloffa et al., 2017).

[Table 7 about here]

In Table 7 we focus instead on the peers' parents educational level. We distinguish parents with and without at least the high school diploma (in Panel A), and parents with and without some tertiary education (in Panel B). The pattern of results indicates that the negative effects on aspirations are larger and mainly due to the unemployed status of parents with lower educational levels.

6.2 Subsequent educational outcomes

In this section, we explore the effects on the subsequent educational outcomes, considering three main measures: (*i*) whether the student effectively completed high school; (*ii*) the

3), which broadly correspond to school districts.

[19]Notice that each share also include the case in which both parents are unemployed, whose figure amounts to a negligible share of about 0.25 per cent.

high school diploma mark; (*iii*) whether the student enrolled at university. The second and third variable are clearly available only for those who completed high school.

As in the analysis on students' aspirations, we estimate Equation 4 making use of OLS regressions, with robust standard errors clustered at the school level. In Table 8 we present the baseline results, where we progressively saturate the model by adding all the fixed effects, the control variables, and linear, quadratic or cubic school-specific trends, while in Table 9 we explore the most relevant dimensions of heterogeneity, making use of the baseline specification with linear trend (i.e., column 4 of Table 8).

[Tables 8 and 9 about here]

We do find a negative effect of the exposure to higher shares of school peers with unemployed parents in grade 10 with the subsequent educational outcomes, in accordance with the depressing effects on aspirations. More in detail, the effects on the probability of completing secondary education (Panels A of both Tables) are negative, but noisily estimated in the whole population of the students. The effect is negative and precisely estimated in the sub-population of students attending an academic track (see Table 9, panel A, col. 3), for whom an increase of 1 p.p. in the share of peers with unemployed parents would lead to a decrease of high school completion of about 0.05 p.p. (approximately 1/5 of a SD). The effect on the probability of enrolment at university (Panels C of both Tables) is again negative and statistically significant. In this case, an increase of 1 p.p. in the share of peers with unemployed parents would lead to a decrease of university enrolment of about 0.05 p.p. (approximately 1/10 of a SD). The effect is statistically significant for students with more educated parents. We also observe a decreasing effect on effort, as measured by the high school diploma mark, by about 2.1 points (corresponding to a decrease of about 2.6 per cent with respect to the average high school mark in the sample; see Panel B in Table 8). The effect for students with parents with tertiary education almost doubles that of those with parents with non-tertiary education.

Concerning the peers' parents characteristics, and in particular the gender, the effect on high school diploma mark is more pronounced when it is the peers' mother who experience the unemployment status (Table 10), especially for male students. Whereas, the effect on the probability of enrolling at university is slightly higher when it is the peers' father who experience unemployment and, in this case, it is statistically significant only for female students.

Focusing on the peers' parents educational level, as for the effects on aspirations, the negative effects on educational outcomes are larger and mainly due to the unemployed status of parents with lower educational levels (Table 11). The results show also a statistically significant negative effect of peers' parents with lower education on the probability of completing secondary education.

7 Sensitivity and robustness checks

We check the robustness of our results under two main dimensions. First, we provide a battery of sensitivity checks devoted to some possible variants of our baseline specification, mainly concerning the control variables used or the samples used. Second, we test for the plausible effects induced by measurement error in our main variable of interest ($UP_{sc}^{(-i)}$).

7.1 Specification checks

Consistency of the results on aspirations across samples. As explained in Section 4, the estimations on subsequent educational outcomes are performed on a smaller sample with respect to the ones for the results on aspirations. The difference in the sample size comes from two main reasons. First, with the linkage to the National Students' Registries we loose the first cohort of students for whom we have the question on aspirations in the Invalsi NEPSA archives (i.e., students enrolled in grade 10 in the school year 2010-11). Second, for about 13 per cent of students in the remaining cohorts, the data archives (either in the Invalsi NEPSA or in the National Registries) do not provide the correct individual-level anonymous code to allow for the match. As a check of consistency of the results on the educational outcomes with those on aspirations performed on a larger sample, we could however repeat the estimations on the aspirations on the same smaller sample of the educational outcomes. The results are reported in Appendix Table B.4 and are in line with the baseline reported in Tables 2 and 3.

Winsorized sample. We repeat our estimates on a sample in which the main variable of interest (UP) is winsorized at the first and ninety-ninth percentiles.[20] In so doing, we would like to check that our estimates are not driven by extreme values in the distribution of the variable UP. The results reported in Appendix Table B.5 do not seem to be significantly different from our baselines.

Student achievement measures. An important control variable in our empirical specification is given by the achievement level, as measured in the semester before the statement of the aspirations. Indeed, Lekfuangfu and Odermatt (2022) show that achievement is a strong correlate of students' aspirations, so that we arguably would like to clean-out our estimated effect from this possible omitted variable bias by including a good proxy for the students' competences.

In our baseline specification we use the average teachers' mark (in the two main subjects, i.e., Italian language and Math) at the end of the first semester of grade 10. Importantly, this measure embeds two desirable elements: first, it reflects a pre-determined level of achievement with respect to the moment when the aspirations are stated; second,

[20] Experimentations with trimmed samples or different percentiles for winsorization do not show remarkable differences

it is sufficiently close in time to the moment of the aspiration statement.[21] However, two caveats are in order. First, in the spirit of keeping as many observations as possible, when only one mark was available in the data (either the Italian language of the Math one) we simply take it. We account for this adding a dummy variable which indicates the students for whom we only have one of the two marks (0.3 per cent of observations in the sample).[22] Second, we also add an ordinal achievement measure, namely the percentile rank of the students in her class, to account for relative differences in students' perceived ability with respect to her own peers (Elsner and Isphording, 2017; Murphy and Weinhardt, 2020; Pagani et al., 2021).[23]

As a sensitivity check we use the Invalsi NEPSA standardized test scores in grade 10 (as opposed to teachers' mark) as alternative measure of students' achievement available in the data. The advantage in making use of tests scores mainly lies in their standardized nature, while the drawback is that they are contemporaneous to the statement of the aspirations. As for the teachers' mark, we take the average score in the tests for Italian language and Math; when one of the two is lacking, we simply take the other and add a dummy variable to control for this. The results are reported in column 2 of Appendix Table B.5 are in line with our baselines.

Year of birth fixed effects. In our baseline specification we control for year fixed effects and dummies for the student being grade retained, which taken together implicitly control for the student belonging to the cohort of those who had a regular progression across grades or for being of other cohorts. Alternatively, we could have also added cohort of birth fixed effects, as in our sample of eight subsequent school years we observe 13 different cohorts. The results reported column 3 of Appendix Table B.5 do not significantly detach from the baseline.

7.2 Measurement error

A peculiar case of measurement error (ME, henceforth) might arise in the case of estimation of peer effects, which derives from the simultaneous inclusion of both own and peers' average characteristic − i.e., the parent unemployment status in our case − in the estimated model, when these variables are measured with some error. Previous literature has shown that this peculiar type of ME would lead to attenuation bias in the estimated peer effects coefficient in case the variability exploited can be considered as-good-as random, while it would lead to overestimation of the peer effects parameter in case of non-random

[21] Teachers' grade at the end of the first semester are given to the students in the month of December, while aspirations are stated in the following month of May.

[22] Our results are largely unaffected when excluding these individuals.

[23] This is particularly important in our context given that teachers' mark are not standardized assessments, and thus they might also reflect both teachers' personal evaluations (also with reference to the other class peers), and students' non-observable traits (like diligence, class behaviour, general attitude, etc.).

assignment (Angrist, 2014; Merlino et al., 2019; Carrell et al., 2018).

We provide two tests for the plausible effects of ME in our estimates. One possible way is to add to the estimated regression variables which might be correlated with the ME and observe the changes in the estimated coefficient. We thus augment our baseline equations with a measure of unemployment rate at the regional (NUTS 2) and Local Labor Market (LLM) levels.[24] These are measured in the four quarters preceding the students' stating of aspirations (i.e., reasonably when the unemployment status of the parent disclosed in the Invalsi data should refer to) from the Labour Force Survey provided by the Italian Bureau of Statistics (Istat). Results reported in in columns 4 and 5 of Appendix Table B.5 are very similar to our baselines.

As a further robustness check, following Merlino et al. (2019) and Feld and Zölitz (2017), we gradually introduce measurement error into our explanatory variable of interest and analyse whether the relative estimated coefficient tends to zero as evidence of as-good-as random variation and that any potential ME would possibly downward biased our results rather than exacerbate them. We generate a dummy variable equal to one with probability equal to the predicted share of peers with unemployed parents estimated by a regression on unemployment status of parents, year and school FE. Then a new share of peers with unemployed parents is generated and it is equal to the observed one with a probability of 99 per cent and to a random value with a 1 per cent chance. This step is repeated for different levels of error. Aspirations are eventually regressed on the new generated share of peers with unemployed parents measured with different levels of error. The entire process is estimated 1000 times. Figures B.7 and B.8 show that the average coefficients tend to zero as more ME is introduced in the explanatory variable of interest, corroborating the exogenous variation hypothesis.

8 Mediation analysis

The empirical analysis conducted so far has established a negative relationship between school peers with unemployed parents and both students' educational aspirations (Section 6.1), and subsequent educational outcomes 6.2, such as the high school graduation mark and the decision to enrol at university. In this Section we aim to estimate the direct effect of the peers on the subsequent educational choices conditional on the individual's aspirations, or, in other words, we would like to estimate which part of the overall effect due to the peers' interaction passes through the effect on aspirations. We try to answer this question making use of a mediation analysis estimation framework, in which the students' aspirations play the role of the mediator factor (Celli, 2022).

We have shown that the observation of parents' peers unemployment state depresses students' educational aspirations. This result is in line with the theoretical framework

[24] In Italy there are 20 regions and about 600 LLM.

on aspirations and education as an individual investment (La Ferrara, 2019; Ray, 2006; Genicot and Ray, 2017; Dalton et al., 2016) (see also Appendix A). Indeed, when the business cycle worsens, the overall distribution of some salient aggregate variables (such as wealth and income) shifts on the left, and this in turn determines a reduction of individuals' aspirations on the same outcomes, and ultimately, on individuals' incentives to invest to achieve the same outcome. In our educational framework, the perception of a deterioration of the business cycle condition in each students' aspiration window (through the observation of the unemployment status of larger shares of school peers' parents) determines a lower incentive to invest in education.

One may actually think of several underlying channels though which this eventually happens. The student might reduce her educational aspirations because, pushed by a reduced-income effect, the overall societal distribution of the same outcomes is shifting on the left. The perception of this distributional shift is observed within the student aspiration window in the downgrading of her peers' aspirations and choices. In line with the underlying theory, this is what we intend for the effects of parents' peers *mediated* by aspirations. As recalled in the previous sections, in our data we have students' aspirations stated about one year before the critical moment when the student is asked to decide to continue with formal school education (to achieve the high school diploma and eventually enrol at university) or to drop-out from school. Moreover, a student in grade 10 is aged 15 or 16[25], being in the middle of her adolescence, when the parents' economic conditions have been shown to have important consequences on students' educational outcomes (Carneiro et al., 2022).

We can also think of some sort of *direct effects* of the parents' peers unemployment status on subsequent educational choices, i.e. which does not passes through the student's aspiration process described so far. For example, by observing negative employment shocks in her school peers' parents, the student simply imagines that a similar shock might happen to her parents too, and consequently revises her aspirations and future choices. This direct effect seems, for instance, the more plausible the more similar are the student's parents characteristics with the characteristics of peers' parents who experience unemployment.

8.1 The instrumental variable approach

We use a mediation analysis empirical framework to try to disentangle the relative size of the two effects. We thus need to estimate the following equation, which corresponds to our baseline equation 4, augmented to include student's aspirations in the set of explanatory variables:

[25]Notice that the school year spans in two calendar years, so that all students turn 15 by the end of December of the year when they start grade 10.

$$Y_{isc}^{edu} = \delta_1 UP_{sc}^{(-i)} + \delta_2 Asp_{isc} + \delta_3 X_{isc} + \delta_4 S_{isc} + \lambda_s + \lambda_c + \lambda_{st} + \epsilon_{isc} \quad (5)$$

where: Y_{isc}^{edu} are in this case the subsequent educational outcome variables (i.e., high school completion and mark; university enrolment) for student i of school-cohort c in school s; Asp_{isc} are the educational aspirations as defined so far (i.e., aspiration secondary or aspiration tertiary), and the other terms are defined according to eq. 4.[26] In a simple OLS estimation of the above equation we would incur in two main issues which hamper the causal identification of the parameters δ_1 and δ_2. First, Asp_{isc} is likely to be endogenous, as individual aspirations are correlated with unobserved individual factors influencing the educational outcomes. As a result OLS estimates of δ_2 would be biased. Second, also OLS estimates of δ_1 would be biased, given the correlation between Asp_{isc} and $UP_{sc}^{(-i)}$.

The strategy we seek to follow to overcome these endogeneity concerns is to find an instrumental variable (IV) for Asp_{isc}. Such an IV should provide an exogenous variation in such a way of being, in the same time, sufficiently predictive of the aspirations and uncorrelated with the subsequent educational outcomes. This empirical strategy corresponds to a causal mediation analysis, as discussed in Celli (2022) and Cattan et al. (2023).

As instrumental variable we exploit a randomization that occurs in every Invalsi NEPSA wave, for all grades and subject tested. Typically, during the Invalsi NEPSA tests the students are invigilated by the same school teachers, and the school staff is responsible for the correct implementation of all the procedures. However, in every NEPSA wave, Invalsi sends external inspectors to a random and representative sample of classes. The external inspectors have the duty to administer the tests and are responsible for controlling the correct procedures are followed. For the Invalsi purposes, this procedure is essential to provide a quick analysis on the data collected from the monitored representative sample of students in the first place. Then, when the data for the universe of the students are ready, the monitored sample is used as benchmark to control and ensure the quality and the representativeness of the data for the entire population.[27]

In the first waves of the Invalsi NEPSA, when the tests were performed on papers, and currently for students in the primary school (grades 2 and 5) for whom the test is still administrated in paper version, the external monitor also has the duty to proctor and mark the tests. In paper-provided tests, the external inspector represents a random and unexpected shock altering the monitoring technology: it increases monitoring by establishing a non-cheating environment, where the possibility of cheating on the part of both students and teachers, both during and after the test, is remarkably reduced (Lucifora and Tonello, 2020). This no longer happens in the high schools as all the

[26] Our framework here is close to the mediation analysis performed by Cattan et al. (2023).

[27] Additional details on this policy and on the randomization scheme can be found in Bertoni et al. (2013); Lucifora and Tonello (2015); Angrist et al. (2017). These works show that the presence of the external inspector reduces test scores, social interactions and teachers' shirking.

testing procedures are now computer-based. As a result, for the students in our sample the external inspector should have simply invigilated them during the testing procedure to control that everything was performed correctly. Nevertheless, the presence of this external person during the testing procedure might have influenced the students, in such a way that the students' statement of their educational aspirations could be also affected in the very short run. On the other hand, we might think of no direct links between the presence of an external inspector during the NEPSA test in grade 10 and the educational outcomes studied, which are realized three years later.[28]

The first stage equation in our estimation framework takes the following form:

$$Asp_{isc} = \eta_1 UP_{sc}^{(-i)} + \eta_2 Z_{ics} + \eta_3 X_{isc} + \eta_4 S_{isc} + \lambda_s + \lambda_c + \lambda_{st} + \epsilon_{isc} \tag{6}$$

where: Z_{isc} is the dummy indicating if a student performed the Invalsi NEPSA test under an external monitor scrutiny (0 otherwise), and the other variables are defined according to eq. 5. Following Cattan et al. (2023), we retrieve from δ_1 in eq. 5 the direct effect of the peers, conditional on student's aspirations, while the effect mediated by aspirations is given by multiplying β from eq. **??** (i.e., the so-called total effect) with δ_2 from eq. 5.

8.2 Mediation analysis results

Table 12 reports the results of the mediation analysis when Aspiration Secondary is used as mediator, while Table 13 shows the case in which Aspiration Tertiary is the mediator. In both tables column (1) reports the first stage regression (i.e., eq. 6) and column (4) the results of the IV regression; for comparison reasons, we also report the baseline OLS regression in column (2) and the endogenous OLS regression in column (3) (i.e., eq. 5 estimated using an OLS model and not the causal IV).[29] As it appears from the first stage regressions, the external monitoring has a statistically significant effect only on the Aspiration Tertiary variable, on which we will thus focus the rest of the comment.

[Tables 12 and 13 about here]

The aspiration for tertiary education are negatively affected by the presence of an external inspector: the external monitoring depresses the aspiration for tertiary education by 0.7 p.p., determining a reduction of about 1 per cent with respect to the average probability of aspiring for tertiary education. As reasonable, the altering effect on aspirations due to the presence of the external inspector is small in magnitude, but still statistically significant: the Cragg-Donald Wald F statistic lies between 39 and 45, depending on

[28] Bertoni et al. (2021) study the long-lasting effects of external monitoring on test scores and cheating behaviour finding that the effect of the exposure to an external monitoring vanishes after one year.

[29] We choose to report the baseline OLS regression corresponding to the estimation of eq. **??** and reported in the main results of the paper in Table **??** because the inclusion of the external monitoring dummy slightly alters the baseline sample, due to some missing values in the original data (0.5 per cent).

the educational outcome studied, well beyond the critical values for weak identification defined by Stock and Yogo (2005).

The results of the IV regressions show a strong positive effect of student's aspiration for tertiary education on the subsequent educational outcomes. In particular, aspiring for tertiary education more than doubles the probability of completing high school, and it increase by 83.3 p.p. the probability of effectively enrolling at university. Aspiring for tertiary education also has an effect on the effort exerted to complete high school, as the high school diploma mark increases by 11.8 points (14 per cent with respect to the sample average). These findings provide new important evidence by offering a causal estimate of the effect of aspirations on several educational measures in the medium term. To the best of our knowledge, only Rizzica (2020) estimates the causal effect of raising students' aspiration for college enrolment by exploiting a policy change in the U.K., but she finds negligible effects, while other works essentially provide robust residual correlational evidence on this relation (Favara, 2017; Ross, 2019; Guyon and Huillery, 2020).

Turning back to the mediation analysis, by multiplying β from eq. **??** (i.e., which we estimated in this sample in column (2)) by δ_2 from eq. 5 (i.e., the effect of aspiration on the outcome in column (4)) we obtain which part of the total effect should be considered as mediated by peers' aspirations. The mediated effect is negative (given the signs of the β and δ_2), as expected in this scenario (in which peers' reduction of aspirations should reduce individual's aspiration). Focusing on the high school diploma mark and on the probability to enrol at university, for which we estimated a statistically significant total effect of the peers, the part of the effect mediated for the aspirations accounts for about 15 and 50 per cent of the total effect, respectively. The mediating effect of aspirations is thus far stronger when it comes to consider student's choice to enrol at university, as compared to the measure of the effort exerted to complete high school (the diploma mark) for which other factors included in the direct effect of the peers seem prevalent.

9 Concluding remarks

Educational aspirations have recently proved to be an important determinant of individuals' subsequent educational choices and investments in human capital, in such a way that even aggregate measures, such as country inequality and poverty, are linked to them (Genicot and Ray, 2017; La Ferrara, 2019). It is thus became of paramount relevance to better investigate the determinants that influence them.

In this paper we focus on one peculiar channel potentially affecting educational aspirations of young students, namely the exposure to school peers with unemployed parents. First, focusing on the youngest is especially important from a policy intervention view point, as their aspirations (and subsequent choices) are more malleable by targeted policies. Moreover, choices taken in some important life's turning points (such as the one

under study of getting at lest a high school diploma or drop-out just after compulsory education) might have long-lasting consequences, so that their correction from external distortions might generate higher benefits. Second, the focus on peers' characteristics as potential determinant of educational aspirations is particularly important in the view of possibly breaking the negative vicious path which connects lower income, lower aspirations, and lower effort, as in a poverty trap (Dalton et al., 2016).

Specifically, we look at how exogenous variations in the exposure to share of peers with unemployed parents might affect students' aspirations formation and subsequent educational outcomes. We look at aspirations for completing secondary education (versus dropping out after the completion of the compulsory schooling grades), and for starting tertiary education (versus stopping after the secondary school diploma). Moreover, we also map the subsequent educational choices, such as completing the high school, the mark obtained at the final exam, and the effective enrolment at university. Identification is achieved by exploiting the within school cohort-to-cohort variations in the share of peers with unemployed parents, and by controlling for several individual, class and school level time-variant characteristics, and for school-specific time trends.

We find that increasing the exposure to peers with unemployed parents determines a decrease in the aspirations for secondary education and for tertiary education. The effects are sizeable and economically meaningful (about 1/10 of a SD for both outcomes). The depressive effects on students aspirations seem to particularly pronounced when parents with higher level of education experienced unemployment. This seems to sustain a negative role model, whereby experiencing unemployment for highly educated parents determines under-statement of educational aspirations. The negative effects observed on the aspiration formation translate into subsequent educational choices and effort. First, we document that the exposure to peers of unemployed parents at the moment when the aspirations are stated (i.e., in grade 10) negatively affect the effort exerted to complete the high school and the probability to enrol at university. Then, in a mediation analysis empirical framework, we calculate that part of the overall effect of the school peers is indeed mediated by their aspirations, ranging between 15 and 50 per cent of the overall effect, depending on whether we look at student effort to complete high school or student propensity to enrol at university.

Some policy implications might be derived from our findings. First, policies aimed at increasing human capital accumulation in the economy should also consider to support students' aspirations about their future, as these clearly translate in future choices. This is particularity important during economic downturns. Second, these policies should be particularly focused on students in peculiar focal points of their educational career, such as close to the end of compulsory education - as in the present work - but also, for example, close to the completion of the high school to foster enrolment in tertiary education. Third, some individuals seem to posses more malleable aspirations as compared to others. The

effects on both aspirations and subsequent outcomes are generally stronger for students in academic tracks and for females. This seems in line with the key mechanism of aspiration formation outlined in the theoretical works by Dalton et al. (2016); Genicot and Ray (2017); Ray (2006), whereby individuals decrease effort following a reduction in their aspirations, and this mechanism is stronger the higher are the stated aspirations. From a policy perspective, the mediation analysis exercise also suggests that by implementing interventions which leverage on raising students' aspirations we should expect more an overall increase in future educational investments, than an increase in students' effort to complete the ongoing educational path.

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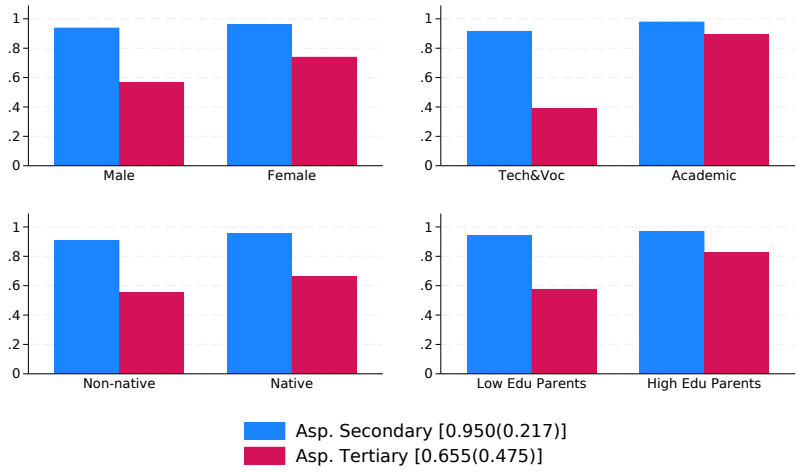
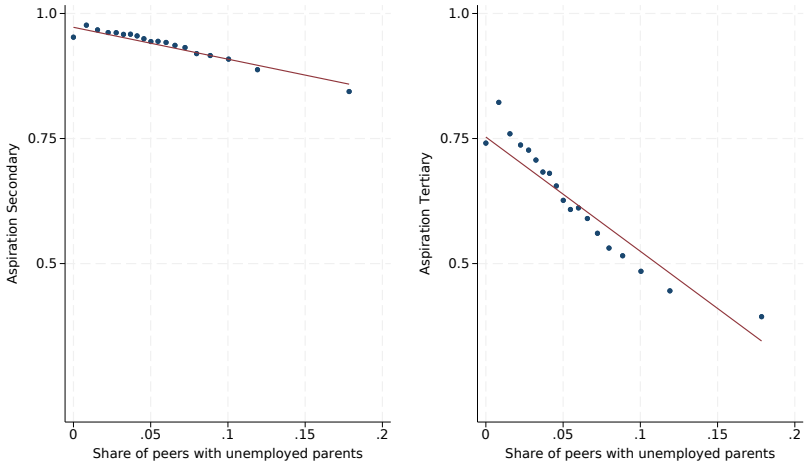
Figures

Figure 1
Students' aspirations by: gender, school type, native and non-native status, parents' education



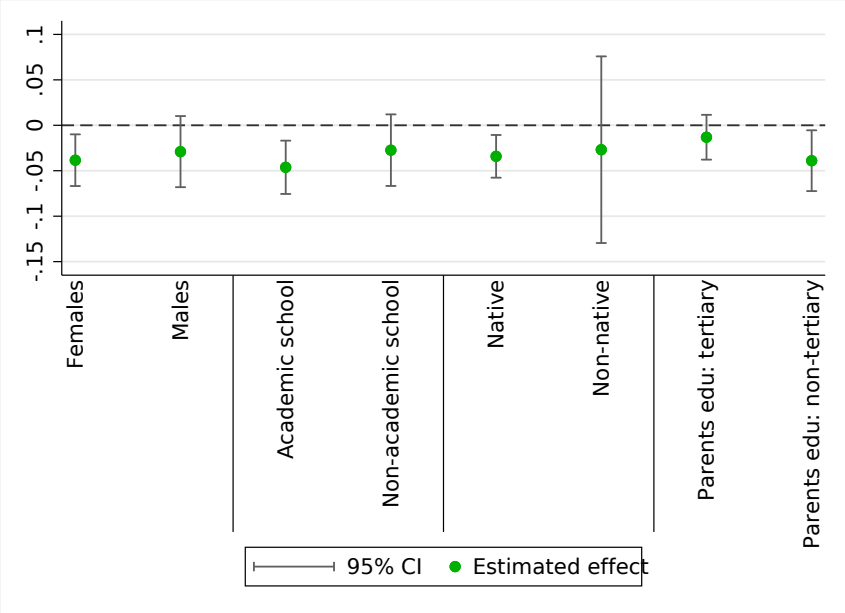
Notes: the bars show the average of the variables Aspiration Secondary and Aspiration Tertiary by gender, school type (academic and non-academic schools), native and non-native status, parents' education (at least one parent with tertiary education or not). **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Figure 2
Students' aspirations and school share of peers with at least one unemployed parent



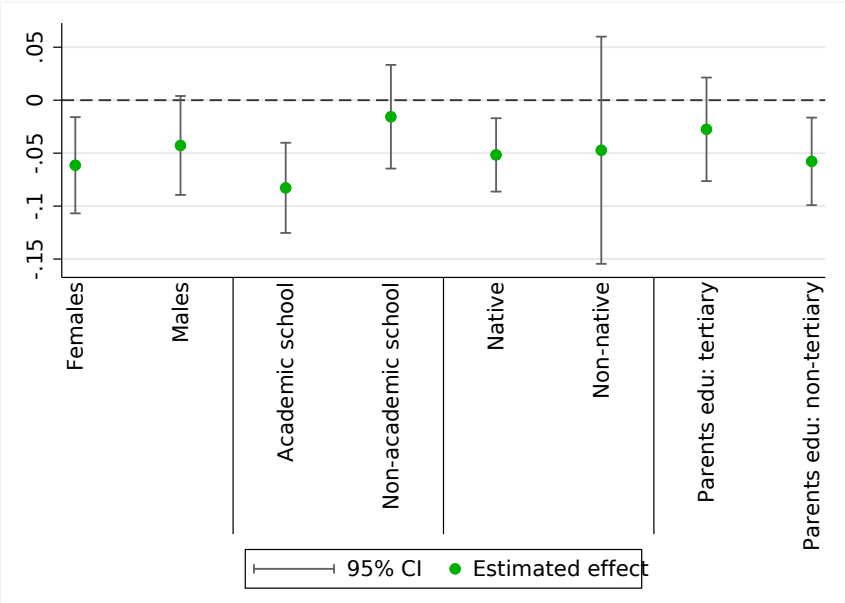
Notes: the graphs show binscatters (net of school and cohort fixed effects)of the relation between the school share of peers with at least one unemployed parent (UP) and Aspiration Secondary (on the left) and Aspiration Tertiary (on the right). **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Figure 3
Heterogeneous effects: aspiration secondary



Notes: the figure shows the effect of the variations in the school share of peers with at least one unemployed parent on aspiration secondary, by sub-groups of the population. **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Figure 4
Heterogeneous effects: aspiration tertiary



Notes: the figure shows the effect of the variations in the school share of peers with at least one unemployed parent on aspiration tertiary, by sub-groups of the population. **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Tables

Table 1
Descriptive statistics: students' aspirations and subsequent educational outcomes

Sample:				
	Aspirations stated in G10		Subsequent educational outcomes	
Variable	Mean	SD	Mean	SD
Aspiration Secondary	0.950	0.217	0.958	0.200
Aspiration Tertiary	0.655	0.475	0.668	0.471
Completed high school			0.896	0.306
High school diploma mark (†)			79.757	12.497
Enrolled at university (†)			0.651	0.477
School share of unemployed parents (-i)	0.053	0.034	0.054	0.033
School share of unemployed fathers (-i)	0.022	0.020	0.023	0.020
School share of unemployed mothers (-i)	0.036	0.026	0.036	0.026
Class share of unemployed parents (-i)	0.053	0.066	0.054	0.069
Female	0.505	0.500	0.511	0.500
Non-native: 1st gen.	0.045	0.208	0.040	0.196
Non-native: 2nd gen.	0.047	0.211	0.046	0.209
Ahead of year	0.017	0.131	0.014	0.116
Repeating year	0.163	0.369	0.129	0.335
Teachers' mark in the first term	6.077	1138	6.125	1.123
Missing teachers' mark in the first term (dummy)	0.003	0.058	0.003	0.058
Percentile class rank	0.505	0.297	0.504	0.300
At least one parent with tertiary education (dummy)	0.311	0.463	0.325	0.468
At least one parent unemployed (dummy)	0.052	0.223	0.054	0.225
Unemployed mother (dummy)	0.035	0.185	0.023	0.151
Unemployed father (dummy)	0.023	0.149	0.036	0.186
Monitored school (dummy)	0.099	0.298		
Female class share	0.501	0.286	0.508	0.286
Ahead of year class share	0.017	0.048	0.014	0.041
Repeating year class share	0.171	0.170	0.133	0.150
Non-native 2nd gen. class share	0.051	0.078	0.044	0.071
Non-native 1st gen. class share	0.047	0.063	0.047	0.066
Class size (No. of students)	20.171	4.677	18.789	4.865
Academic schools	0.529	0.499	0.494	0.500
Technical schools	0.311	0.463	0.309	0.462
Vocational schools	0.161	0.367	0.197	0.398
Female school share	0.500	0.212	0.507	0.209
Ahead of year school share	0.017	0.039	0.014	0.032
Repeating year school share	0.174	0.134	0.135	0.112
Non-native 2nd gen. school share	0.052	0.055	0.045	0.047
Non-native 1st gen. school share	0.048	0.038	0.048	0.039
School size (No. of students)	169.833	77.218	161.143	72.962
Average class size in the school	19.243	3.665	17.740	3.793
Cohort size (No. of students)	177,739.1	108,520.2	154,913.6	96,189.448
N	2,557,714		1,966,146	

Notes: Variable definitions: Aspiration secondary (1 if aims to complete secondary education), Aspiration tertiary (1 if aims to enroll in university), Completed high school (1 if successfully completed high school); High school diploma mark† (mark at the high school diploma, integer $\in [60-101]$); Enrolled at university† (1 if enrolled at university the year following high school completion); † indicates that the two variables are available only for the subsample of those who completed high school (N=1,761,286); Female (1 if female), Non-native: 1st gen. (1 if first generation immigrant), Non-native: 2nd gen. (1 if second generation immigrant), Ahead of year (1 if school year ahead), Repeating year (1 if repeating student), Academic schools (1 if attending academic school), Technical schools (1 if attending technical school), Vocational school (1 if attending vocational school), No. students per school (number of students in each school), Sampled school (1 if school or class monitored by external teachers during the assessment), SES Class Index (average SES index in the class), Class share of females (share of females in the class), Class share of students ahead of year (share of school year ahead students in the class), Class share of students repeating year (share of repeating students in the class), Class share of 1st gen. Non-natives (share of first generation immigrants in the class), Class share of 2nd gen. Non-natives (share of second generation immigrants in the class), No. students per class (number of students in the class), SES Family Index (SES index of the family), First term teachers' mark (avg.) (average teachers' mark in Italian language and Math at the end of the first semester), Missing in one teachers' mark (dummy) (1 if teachers' mark is missing in Italian language or Math). **Source**: own elaborations from Invalsi NEPSA (G10, s.y. from 2010-11 to 2017-18) and National Students' Registries (s.y. from 2013-14 to 2020-21).

Table 2
Baseline results on Aspiration Secondary

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep. Variable: Aspiration Secondary					
Share of unemployed parents	-0.0633***	-0.0590***	-0.0412***	-0.0315**	-0.0295**	-0.0292**
	(0.0123)	(0.0122)	(0.0120)	(0.0137)	(0.0136)	(0.0134)
R2	0.08	0.10	0.11	0.11	0.11	0.11
N.Obs.	2557714	2557714	2557714	2557714	2557714	2557714
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls		Yes	Yes	Yes	Yes	Yes
School-level controls			Yes	Yes	Yes	Yes
Linear trends				Yes		
Quadratic trends					Yes	
Cubic trends						Yes

Notes: OLS regressions with robust SE clustered at school level (6,262 clusters); mean (SD) of dep. variable: 0.9505 (0.2170). The complete list and description of all the control variables is in Table 1. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18.

Table 3
Baseline results on Aspiration Tertiary

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep. Variable: Aspiration Tertiary					
Parents' unemployment rate of peers	-0.1065***	-0.0898***	-0.0667***	-0.0519***	-0.0518***	-0.0525***
	(0.0191)	(0.0184)	(0.0166)	(0.0178)	(0.0178)	(0.0178)
R2	0.28	0.32	0.36	0.36	0.36	0.36
N.Obs.	2557714	2557714	2557714	2557714	2557714	2557714
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls		Yes	Yes	Yes	Yes	Yes
School-level controls			Yes	Yes	Yes	Yes
Linear trends				Yes		
Quadratic trends					Yes	
Cubic trends						Yes

Notes: OLS regressions with robust SE clustered at school level (6,262 clusters); mean (SD) of dep. variable: 0.6550 (0.5754). The complete list and description of all the control variables is in Table 1. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18.

Table 4
Alterations of the aspiration window

	(1)	(2)	(3)
	Aspiration window:		
	baseline	narrower	wider
Panel A: Aspiration Secondary			
Parents' unemployment rate of school peers	-0.0315**		
	(0.0137)		
Parents' unemployment rate of class peers		-0.0391***	
		(0.0056)	
LLM unemployment rate			-0.0288***
			(0.0073)
R2	0.11	0.11	0.13
N.Obs.	2557714	2557714	2586931
Panel B: Aspiration Tertiary			
Parents' unemployment rate of school peers	-0.0519***		
	(0.0178)		
Parents' unemployment rate of class peers		-0.0407***	
		(0.0063)	
LLM unemployment rate			-0.0052
			(0.0121)
R2	0.36	0.36	0.37
N.Obs.	2557714	2557714	2586931
Controls, school and cohort FE and linear trends	Yes	Yes	Yes
Mean(SD) of UP	0.0528(0.0337)	0.0527(0.0662)	0.1148(0.0652)

Notes: OLS regressions with robust SE clustered at school level (6,262 clusters) for columns 1 and 2; at the LLM level (610 clusters) in column 3. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18, and Istat, Labor Force Survey (2010-2018).

Table 5
Heterogeneous effects Aspiration Secondary: mothers vs. fathers unemployment status

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep. Variable: Aspiration Secondary					
	All	Males	Females	All	Males	Females
Share of unemployed fathers	-0.0430*	-0.0403	-0.0507**			
	(0.0225)	(0.0312)	(0.0244)			
Share of unemployed mothers				-0.0570***	-0.0500**	-0.0658***
				(0.0175)	(0.0244)	(0.0192)
R2	0.11	0.11	0.12	0.11	0.11	0.12
N.Obs.	2502738	1238730	1263875	2550704	1262009	1288565
Mean (SD) of dep. variable:	0.9505 (0.2170)	0.9394 (0.2387)	0.9614 (0.1927)	0.9505 (0.2170)	0.9394 (0.2387)	0.9614 (0.1927)
FE, controls and linear trends	Yes	Yes	Yes	Yes	Yes	Yes

Notes: robust SE clustered at school level (6,262 clusters). The regressions include the full set of controls, fixed effects, and linear trend as in specifications of column 3 of Tables 2 and 3. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.
Source: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18.

Table 6
Heterogeneous effects Aspiration Tertiary: mothers vs. fathers unemployment status

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep. Variable: Aspiration Tertiary					
	All	Males	Females	All	Males	Females
Share of unemployed fathers	-0.0620**	-0.0400	-0.0895***			
	(0.0276)	(0.0376)	(0.0340)			
Share of unemployed mothers				-0.0717***	-0.0666**	-0.0694**
				(0.0212)	(0.0284)	(0.0280)
R2	0.36	0.35	0.33	0.36	0.35	0.33
N.Obs.	2502738	1238730	1263875	2550704	1262009	1288565
Mean (SD) of dep. variable:	0.6550 (0.4754)	0.5678 (0.4954)	0.7405 (0.4384)	0.6550 (0.4754)	0.5678 (0.4954)	0.7405 (0.4384)
FE, controls and linear trends	Yes	Yes	Yes	Yes	Yes	Yes

Notes: robust SE clustered at school level (6,262 clusters). The regressions include the full set of controls, fixed effects, and linear trend as in specifications of column 3 of Tables 2 and 3. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.
Source: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18.

Table 7
Heterogeneous effects: peers' unemployed parents education

	(1)	(2)	(3)	(4)	(5)	(6)
	Asp. Secondary			Asp. Tertiary		
Panel A: parents with or w/o secondary education						
Share of unemployed peers with at least HS Diploma	-0.0026		0.0008	-0.0405*		-0.0341
	(0.0129)		(0.0130)	(0.0244)		(0.0245)
Share of unemployed peers w/o HS Diploma		-0.0534**	-0.0535**		-0.0999***	-0.0978***
		(0.0222)	(0.0223)		(0.0264)	(0.0265)
R. squared	0.11	0.11	0.11	0.36	0.36	0.36
Panel B: parents with or w/o tertiary education						
Share of unemployed peers with tertiary education	-0.0390		-0.0367	0.0155		0.0225
	(0.0256)		(0.0257)	(0.0471)		(0.0471)
Share of unemployed peers w/o tertiary education		-0.0277*	-0.0273*		-0.0821***	-0.0824***
		(0.0150)	(0.0151)		(0.0201)	(0.0201)
R. squared	0.11	0.11	0.11	0.36	0.36	0.36
N.Obs.	2557839	2557839	2557839	2557839	2557839	2557839
Fixed effects, controls and linear trends	Yes	Yes	Yes	Yes	Yes	Yes

Notes: OLS regressions with robust SE clustered at school level (6,262 clusters). The regressions include the full set of controls, fixed effects, and linear trend as in specifications of column 3 of Tables 2 and 3. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA, G10, s.y. from 2010-11 to 2017-18.

Table 8
Subsequent educational outcomes: baseline results

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Completed high school						
Share of unemployed parents	-0.0198	-0.0088	0.0011	-0.0069	-0.0153	-0.0222
	(0.0180)	(0.0178)	(0.0178)	(0.0189)	(0.0191)	(0.0193)
R2	0.09	0.20	0.20	0.20	0.20	0.20
N.Obs.	1966146	1966146	1963881	1963881	1963881	1963881
Panel B. High school diploma mark						
Share of unemployed parents	-1.7008***	-1.7712***	-1.5954***	-2.0685***	-2.1433***	-2.1958***
	(0.5695)	(0.6123)	(0.6003)	(0.6445)	(0.6503)	(0.6574)
R2	0.12	0.43	0.44	0.44	0.44	0.44
N.Obs.	1761279	1761279	1760960	1760960	1760960	1760960
Panel C. Enrolled at university						
Share of unemployed parents	-0.0727***	-0.0625***	-0.0226	-0.0499**	-0.0482**	-0.0471**
	(0.0202)	(0.0203)	(0.0198)	(0.0215)	(0.0213)	(0.0211)
R2	0.25	0.29	0.32	0.33	0.33	0.33
N.Obs.	1761279	1761279	1760960	1760960	1760960	1760960
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls		Yes	Yes	Yes	Yes	Yes
School-level and regional unempl. rate controls			Yes	Yes	Yes	Yes
Linear trends				Yes		
Quadratic trends					Yes	
Cubic trends						Yes

Notes: Regional unemployment rate refers to the year of high school completion. OLS regressions with robust SE clustered at school level. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA and National Students' Registries.

Table 9
Subsequent educational outcomes: heterogeneous effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Student gender		*School track*		*Parents education*	
	Females	*Males*	*Academic*	*Non-academic*	*Tertiary*	*Non-tertiary*
Panel A. Completed high school						
Share of unemployed parents	-0.0159	-0.0019	-0.0542*	0.0289	-0.0205	-0.0039
	(0.0216)	(0.0241)	(0.0303)	(0.0265)	(0.0254)	(0.0210)
R2	0.19	0.22	0.16	0.21	0.20	0.21
N.Obs.	1003890	959937	970191	993689	638275	1325562
Panel B. High school diploma mark						
Share of unemployed parents	-1.6792**	-2.5485***	-1.7098*	-2.4056***	-3.2616***	-1.6470**
	(0.8121)	(0.7944)	(1.0037)	(0.8300)	(0.9469)	(0.6989)
R2	0.45	0.41	0.46	0.41	0.48	0.42
N.Obs.	924444	836456	916309	844648	589421	1171475
Panel C. Enrolled at university						
Share of unemployed parents	-0.0404	-0.0505*	-0.0290	-0.0524*	-0.0870***	-0.0394
	(0.0287)	(0.0272)	(0.0295)	(0.0290)	(0.0336)	(0.0247)
R2	0.29	0.36	0.15	0.22	0.26	0.32
N.Obs.	924444	836456	916309	844648	589421	1171475
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
School-level and regional unempl. rate controls	Yes	Yes	Yes	Yes	Yes	Yes
Linear trends	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regional unemployment rate refers to the year of high school completion. OLS regressions with robust SE clustered at school level. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA and National Students' Registries.

Table 10
Subsequent educational outcomes: mothers vs. fathers unemployment status

	(1)	(2)	(3)	(4)	(5)	(6)
	Dep. Variable: Completed high school					
	All	Males	Females	All	Males	Females
Share of unemployed fathers	-0.0386	-0.0326	-0.0499			
	(0.0303)	(0.0380)	(0.0346)			
Share of unemployed mothers				-0.0060	-0.0116	-0.0043
				(0.0222)	(0.0275)	(0.0262)
R2	0.21	0.23	0.19	0.21	0.23	0.19
N.Obs.	1932057	944641	987363	1961376	942059	985176
Mean (SD) of dep. variable:	0.896 (0.306)	0.871 (0.336)	0.920 (0.271)	0.896 (0.306)	0.871 (0.336)	0.920 (0.271)
	Dep. Variable: High school diploma mark					
	All	Males	Females	All	Males	Females
Share of unemployed fathers	-1.8648*	-3.3434***	-0.5544			
	(0.9716)	(1.1899)	(1.2287)			
Share of unemployed mothers				-2.2171***	-2.4531***	-1.9798**
				(0.7472)	(0.9217)	(0.9850)
R2	0.44	0.45	0.41	0.44	0.45	0.41
N.Obs.	1733652	823593	910000	1757440	821569	908185
Mean (SD) of dep. variable:	79.757 (12.497)	77.623 (12.360)	81.688 (12.305)	79.757 (12.497)	77.623 (12.360)	81.688 (12.305)
	Dep. Variable: Enrolled at university					
	All	Males	Females	All	Males	Females
Share of unemployed fathers	-0.0627**	-0.0492	-0.0715*			
	(0.0276)	(0.0411)	(0.0425)			
Share of unemployed mothers				-0.0456*	-0.0501	-0.0233
				(0.0249)	(0.0320)	(0.0339)
R2	0.32	0.36	0.29	0.33	0.36	0.29
N.Obs.	1733652	823593	910000	1757440	821569	908185
Mean (SD) of dep. variable:	0.634 (0.482)	0.574 (0.494)	0.688 (0.463)	0.634 (0.482)	0.574 (0.494)	0.688 (0.463)
FE, controls and linear trends	Yes	Yes	Yes	Yes	Yes	Yes

Notes: robust SE clustered at school level. The regressions include the full set of controls, fixed effects, and linear trend as in specifications of column 3 of Table 8. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. **Source**: own elaborations from Invalsi NEPSA and National Students' Registries.

Table 11
Subsequent educational outcomes: peers' unemployed parents education

	(1)	(2)	(3)
	Completed high school		
Parents with or w/o secondary education			
Share of unemployed peers with at least HS Diploma	-0.0148		-0.0106
	(0.0252)		(0.0251)
Share of unemployed peers w/o HS Diploma		-0.0665**	-0.0659**
		(0.0261)	(0.0261)
R. squared	0.21	0.121	0.21
Parents with or w/o tertiary education			
Share of unemployed peers with tertiary education	-0.0173		-0.0140
	(0.0443)		(0.0445)
Share of unemployed peers w/o tertiary education		-0.0449**	-0.0448**
		(0.0213)	(0.0213)
R. squared	0.21	0.21	0.21
N.Obs.	1966146	1966146	1966146
	High school diploma mark		
Parents with or w/o secondary education			
Share of unemployed peers with at least HS Diploma	-2.9696***		-2.6780***
	(0.9376)		(0.9316)
Share of unemployed peers w/o HS Diploma		-4.7450***	-4.5991***
		(0.8759)	(0.8739)
R. squared	0.44	0.44	0.44
Parents with or w/o tertiary education			
Share of unemployed peers with tertiary education	-3.1268*		-2.8436
	(1.8467)		(1.8464)
Share of unemployed peers w/o tertiary education		-3.9436***	-3.9132***
		(0.7295)	(0.7290)
R. squared	0.44	0.44	0.44
N.Obs.	1761279	1761279	1761279
	Enrolled at universityl		
Parents with or w/o secondary education			
Share of unemployed peers with at least HS Diploma	-0.0157		-0.0091
	(0.0302)		(0.0301)
Share of unemployed peers w/o HS Diploma		-0.1037***	-0.1032***
		(0.0292)	(0.0293)
R. squared	0.33	0.33	0.33
Parents with or w/o tertiary education			
Share of unemployed peers with tertiary education	0.0228		0.0276
	(0.0592)		(0.0592)
Share of unemployed peers w/o tertiary education		-0.0664***	-0.0667***
		(0.0238)	(0.0238)
R. squared	0.33	0.33	0.33
N.Obs.	1761279	1761279	1761279
Fixed effects, controls and linear trends	Yes	Yes	Yes

Notes: OLS regressions with robust SE clustered at school level. The regressions include the full set of controls, fixed effects, and linear trend as in specifications of column 3 of Table 8. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.
Source: own elaborations from Invalsi NEPSA and National Students' Registries.

Table 12
Mediation analysis: Aspiration Secondary

	(1)	(2)	(3)	(4)
		Dependent variable:		
	Aspiration Secondary		Completed high school	
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	0.0003			
	(0.0007)			
Share of peers with at least one UP	-0.0396***	-0.0099	-0.0046	-0.8375
	(0.0135)	(0.0192)	(0.0103)	(1.2680)
Aspiration Secondary			0.1326***	-20.8946
			(0.0010)	(31.7721)
F statistic				0.44
R2	0.06	0.20	0.21	
N.Obs.	1953419	1953419	1953419	1953419
	Aspiration Secondary		High school graduation mark	
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	-0.0006			
	(0.0006)			
Share of peers with at least one UP	-0.0421***	-2.0280***	-1.9514***	3.7653
	(0.0136)	(0.6564)	(0.3791)	(4.7685)
Aspiration Secondary			1.8159***	137.3661
			(0.0416)	(110.5004)
F statistic				1.75
R2	0.04	0.44	0.44	
N.Obs.	1752454	1752454	1752454	1752454
	Aspiration Secondary		Enrolled at university	
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	-0.0006			
	(0.0006)			
Share of peers with at least one UP	-0.0421***	-0.0545**	-0.0492***	0.3649
	(0.0136)	(0.0218)	(0.0162)	(0.3291)
Aspiration Secondary			0.1260***	9.9441
			(0.0018)	(7.6263)
F statistic				1.75
R2	0.04	0.30	0.30	
N.Obs.	1752454	1752454	1752454	1752454

Notes: OLS and IV regressions with robust standard errors clustered at the school level. All the regressions include the baseline control variables, fixed effects, and school-specific trends as for the baseline models column (4) of Table **??**. The definitions of the control variables is in Table **??**. **Source**: own elaborations from Invalsi NEPSA (G10, s.y. from 2011-12 to 2017-18) and National Students' Registries (s.y. from 2013-14 to 2020-21).

Table 13
Mediation analysis: Aspiration Tertiary

	(1)	(2)	(3)	(4)
	Dependent variable:			
	Aspiration Tertiary	Completed high school		
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	-0.0069***			
	(0.0017)			
Share of peers with at least one UP	-0.0312	-0.0136	-0.0125	0.0218
	(0.0210)	(0.0190)	(0.0102)	(0.0200)
Aspiration Tertiary			0.0344***	1.1168***
			(0.0005)	(0.1913)
F statistic				44.99
R2	0.32	0.19	0.19	
N.Obs.	1871853	1871853	1871853	1871853
	Aspiration Tertiary	High school graduation mark		
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	-0.0066***			
	(0.0018)			
Share of peers with at least one UP	-0.0273	-2.0741***	-2.0222***	-1.7459***
	(0.0217)	(0.6618)	(0.3869)	(0.4334)
Aspiration Tertiary			1.8695***	11.8283***
			(0.0192)	(4.2976)
F statistic				38.97
R2	0.31	0.44	0.45	
N.Obs.	1698132	1698132	1698132	1698132
	Aspiration Secondary	Enrolled at university		
	(First stage)	(Baseline OLS)	(Endogenous OLS)	(2SLS)
External monitoring	-0.0066***			
	(0.0018)			
Share of peers with at least one UP	-0.0273	-0.0457**	-0.0392**	-0.0226
	(0.0217)	(0.0221)	(0.0161)	(0.0194)
Aspiration Tertiary			0.2335***	0.8329***
			(0.0008)	(0.1922)
F statistic				38.97
R2	0.31	0.29	0.33	-0.17
N.Obs.	1698132	1698132	1698132	1698132

Notes: OLS and IV regressions with robust standard errors clustered at the school level. All the regressions include the baseline control variables, fixed effects, and school-specific trends as for the baseline models column (4) of Table **??**. The definitions of the control variables is in Table **??**. **Source**: own elaborations from Invalsi NEPSA (G10, s.y. from 2011-12 to 2017-18) and National Students' Registries (s.y. from 2013-14 to 2020-21).

A Appendix: Conceptual framework

In this Appendix, we provide a simple conceptualization of the main theoretical foundations for the effects we seek to study and on the expected directions of the relationship investigated. We start from the basic assumptions in the theory of aspirations, that is aspirations influence investment (in education, in our specific case) in a non-monotonic way (Genicot and Ray, 2017; Dalton et al., 2016):

$$U(y) = u(y) + w_0(z) + w_1(max\{z - a, 0\}) \tag{7}$$

where: U represents the individual utility function, composed by three payoffs. $u(y-k(z))$ is the utility derived from the current level of investment (y); w_0 is the direct effect of the future realization of y, i.e. z (university enrolment, for example); w_1 is the *milestone utility* the individual derives the future realization of the outcome exceeds the individual aspiration (a). Moreover, aspirations are a function ($\Psi(\cdot)$) of own state (y) and of the "society"-wide distribution of the state variable (F_y):

$$a = \Psi(y, F_y) \tag{8}$$

In Appendix Figure B.3 we report the classical illustration of the investment decision for different aspirations levels (Genicot and Ray, 2017; La Ferrara, 2019). It shows that, given the non-linear characteristic utility function, when aspirations are low compared to the future achievable outcome, aspirations are satisfied and the individual will exert higher effort to increasing aspirations, thus achieving higher future outcome. However, when aspirations are too high compared to the future achievable outcome the individual gives up by not exerting any effort leading to a drop in investment, as *frustration* is generated.

A distinct element introduced by the theories developed by Genicot and Ray (2017) is the so-called *aspirations window*, that is not all society influences aspirations in the same way, individuals j that are closer to i matter more, e.g.:

$$\Psi(y, F_y) = by + (1 - b)\frac{\sum_{j \neq i} w_j y_j}{N_j} \tag{9}$$

As aspirations depend on on own and society-wide state, equation 9 must satisfy some important properties, which we shortly recall hereafter:

1. *Regularity* Ψ is continuous and non-decreasing in y;
2. *Scale invariance* $\Psi(\lambda y, F^\lambda) = \lambda\Psi(y, F_y)$ for all $\lambda > 0$, where F^λ stands for the distribution when all incomes in F are scaled by λ: $F^\lambda(\lambda y) = F(y)$ for all y;
3. *Range Boundedness* $\min\{y, \min F\} \leq \Psi(y, F_y) \leq \max\{y, \max F\}$ for all F and y;

4. *Social monotonicity* $\Psi(y, F'_y) \geq \Psi(y, F_y)$ when F' weakly (stochastically) dominates F.

From point 3, we should notice that aspirations are restricted to lie in the range of the observed realizations of y in the society. Moreover, an implication we can derive from point 4 is that an increase (decrease) in the level of y everywhere else, leaving i's y unchanged, raises (lowers) individuals' aspirations. In the case of our empirical setting, we should derive that a recession which lowers in aggregate the level of wealth, will also tend to lower individuals' aspirations.

A final point to touch in our conceptual framework is the idea of the aspiration window, that is the intuition that, in some sense, for the individual the society matters as long as it lies in the individual's aspiration window. The concept of aspiration window circumscribes what i sees of F. For instance, as in Ray (2006), an aspiration window could be formed from an individual's cognitive world, her zone of similar or attainable individuals. In our context, it may entail that the the narrower the aspiration window considered, the higher the effect of a change in F on a.

To conclude, we can derive some testable implications for our empirical estimations:

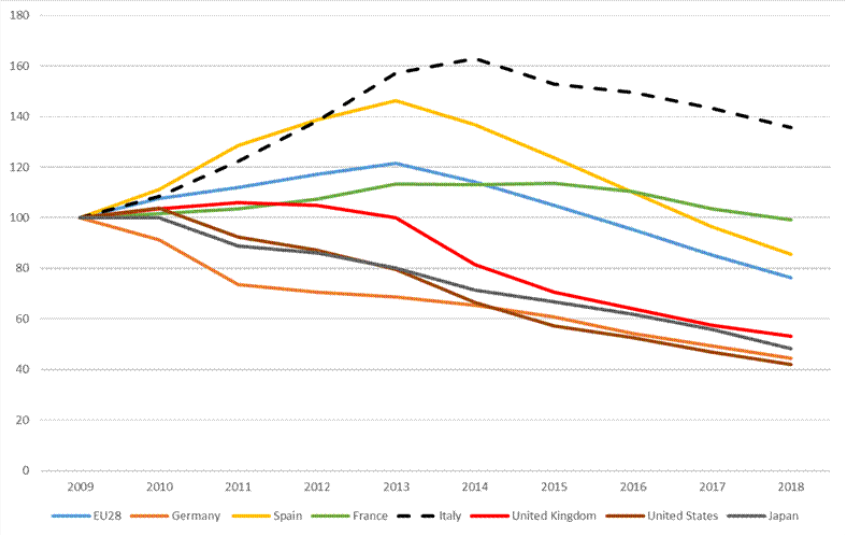
(i) A recession observed within one's cognitive window lowers aspirations.

(ii) The narrower the cognitive window (aspiration window) considered, the larger the effect on aspirations.

(iii) A change (drop) in aspirations will affect investment in education in a potentially non monotonic way. If initial aspirations were too high relative to starting state, z may increase. Otherwise it will decrease.

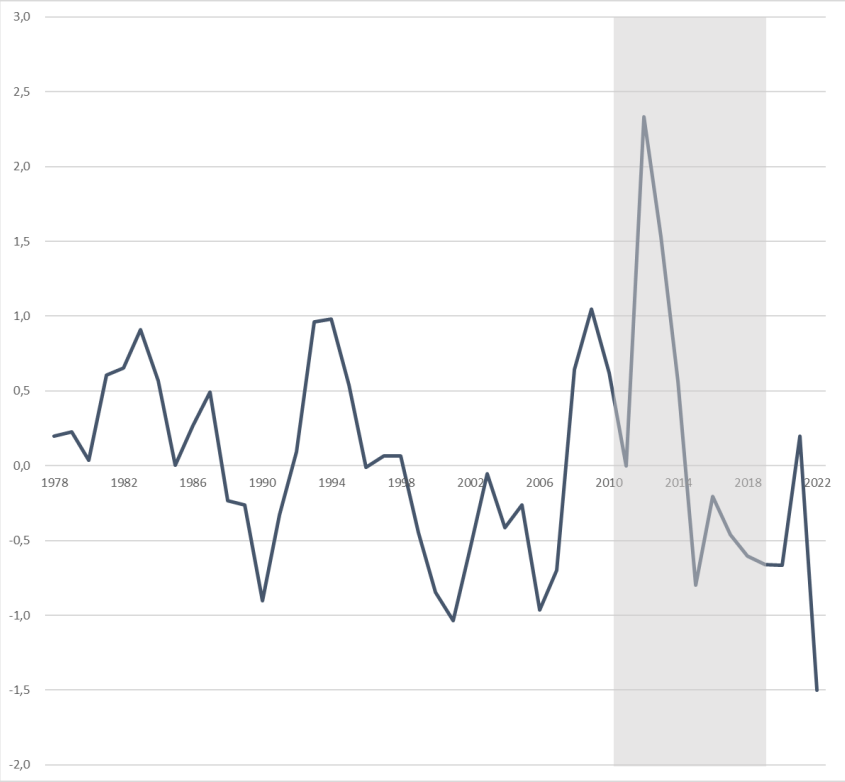
B Appendix: Additional Figures and Tables

Figure B.1
Unemployment rate in selected EU countries and UK (2009=100)



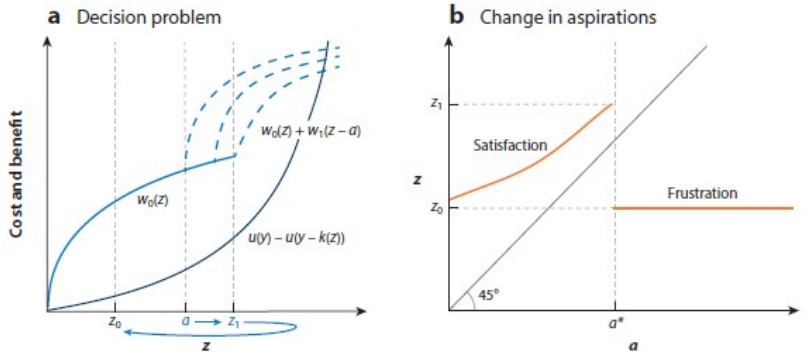
Notes: the figure shows the unemployment rate between 2009 and 2018 (2009=100) in selected EU countries, UK, and EU28 average. **Source**: own elaboration from data from Eurostat.

Figure B.2
Percentage change in yearly unemployment rate in Italy (1978−2022)



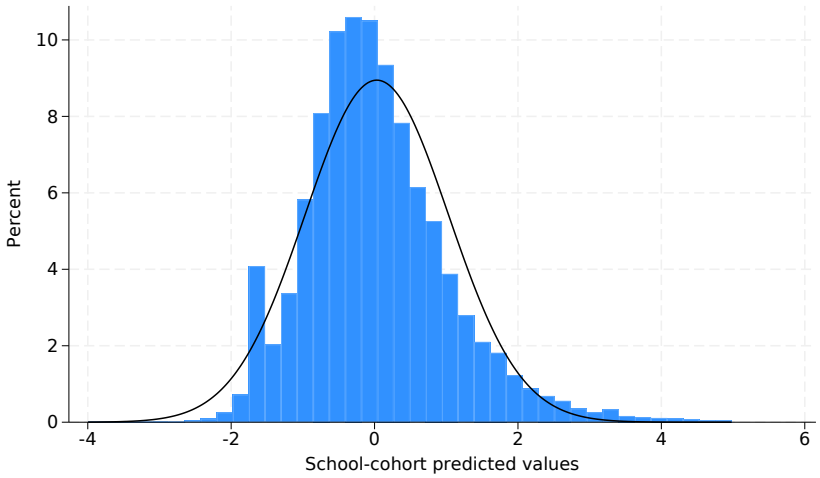
Notes: the figure shows the percentage change in yearly unemployment rate in Italy over the period 1978−2022. The gray area visually identifies the period when students' aspirations were stated. **Source**: own elaboration from data from Italian National Bureau of Statistics.

Figure B.3
Optimal investment z for varying a



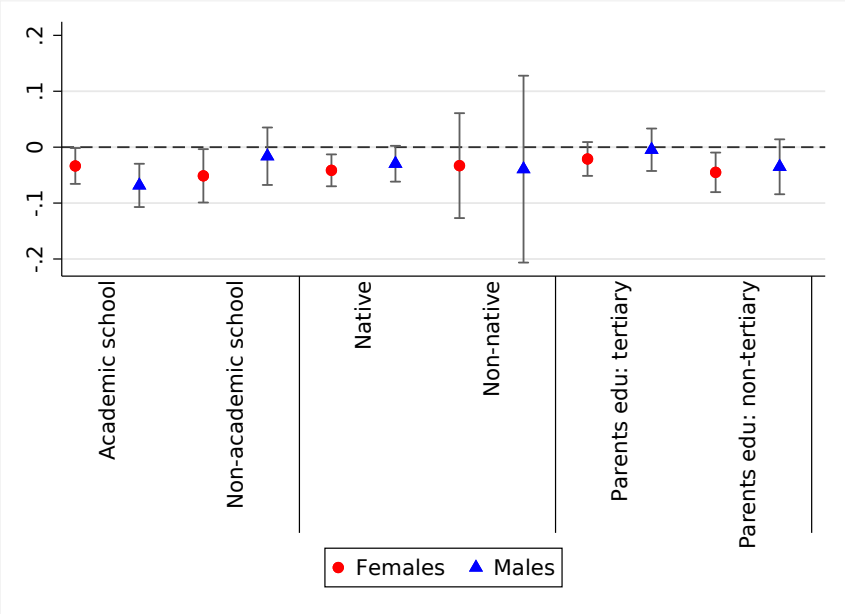
Notes: the figure is taken from Genicot and Ray (2017) and shows how the frustration is generated when choosing the optimal future achievement (z) for different levels of aspirations (a). **Source**: based on Genicot and Ray (2017).

Figure B.4
Cohort-to-cohort variation in share of peers with unemployed parents within schools



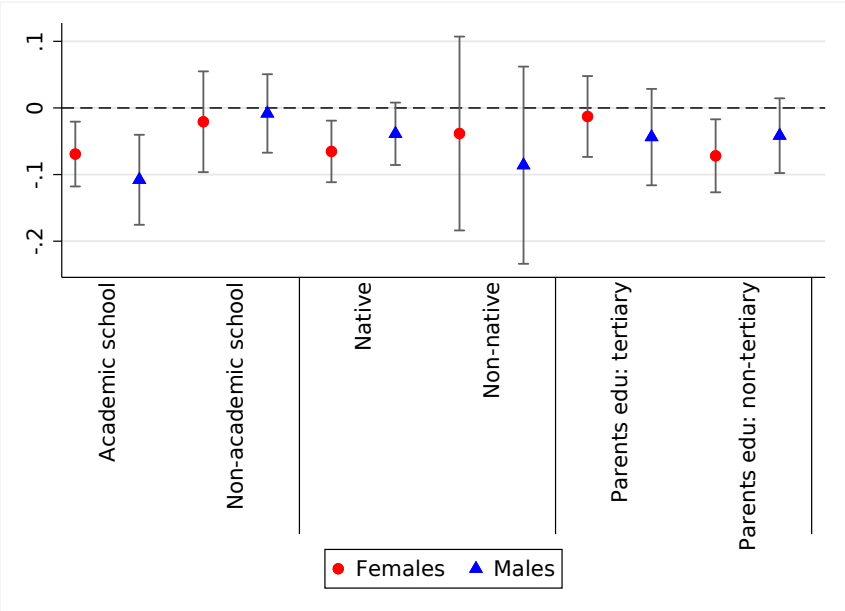
Notes: the histogram shows the predicted share of peers with unemployed parents from a regression of the share of peers with unemployed parents on school and cohort fixed effects; the black line represents the normal distribution. **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Figure B.5
Heterogeneous effects by gender: aspiration secondary



Notes: the figure shows the effect of the variations in the school share of peers with at least one unemployed parent on aspiration secondary, by sub-groups of the population and by students' gender. **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Figure B.6
Heterogeneous effects by gender: aspiration tertiary



Notes: the figure shows the effect of the variations in the school share of peers with at least one unemployed parent on aspiration tertiary, by sub-groups of the population and by students' gender. **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Table B.1
Residual variation

Variation in parents' unemployment rate of peers	Mean	SD
Raw variable	0.0528	0.0337
Residuals after removing FE and Linear Trend	0.0000	0.0198

Notes: Robust SE clustered at school-year level (160 clusters); significance levels: *** p<0.01, ** p<0.05, * p<0.1. **Source**: own elaborations from Invalsi NEPSA from 2010-11 to 2017-18.

Table B.2
Balancing test: observable students' characteristics

	Dep. Var.: $UP_{sc}^{(-i)}$			
	(1)	(2)	(3)	(4)
Female	0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R2	0.59	0.67	0.67	0.67
First generation immigrant	0.0003***	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
R2	0.59	0.67	0.67	0.67
Second generation immigrant	-0.0001	-0.0001*	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
R2	0.59	0.67	0.67	0.67
Ahead year	-0.0003	0.0000	0.0002	0.0003**
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
R2	0.59	0.67	0.67	0.67
Repeating year	0.0001**	0.0001*	0.0001	0.0001
	(0.0001)	(0.0000)	(0.0000)	(0.0000)
R2	0.59	0.67	0.67	0.67
First term grade	-0.0000	-0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R2	0.59	0.67	0.67	0.67
Parents with univ. degree	-0.0001**	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R2	0.59	0.67	0.67	0.67
N.Obs.	2557714	2557714	2557714	2557714
School and Cohort FE	Yes	Yes	Yes	Yes
Linear trends		Yes		
Quadratic trends			Yes	
Cubic trends				Yes

Notes: OLS regressions with robust SE clustered at the school level; each cell represents the coefficient of the correlation between the share of school peers with an unemployed parent ($UP_{sc}^{(-i)}$) and the observable characteristic reported in each row. **Source**: own elaborations from Invalsi NEPSA, G10, school years from 2010-11 to 2017-18.

Table B.3
Balancing test: student's status with unemployed parent and share of peers with unemployed parents

	Dep. Var.: Share of peers with unemployed parent in high school cohort					
	(1)	(2)	(3)	(4)	(5)	(6)
At least one parent unemployed	-0.0012***	0.0010***	0.0010***	-0.0006***	-0.0006***	-0.0006***
	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
R2	0.59	0.59	0.60	0.68	0.68	0.68
N.Obs.	2557714	2557714	2557714	2557714	2557714	2557714
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Guryan et al. (2009) correction		Yes	Yes	Yes	Yes	Yes
Controls			Yes	Yes	Yes	Yes
Linear trends				Yes		
Quadratic trends					Yes	
Cubic trends						Yes

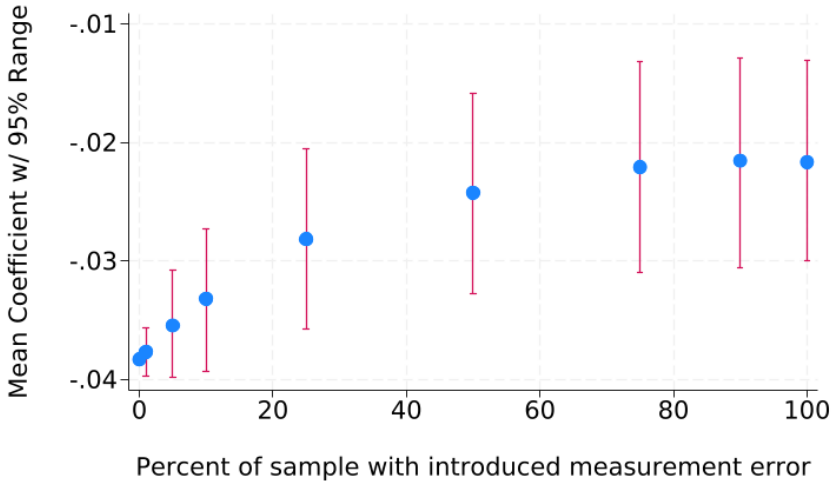
Notes: OLS regressions with robust SE clustered at the school level; each cell represent the coefficient of the correlation between the share of school peers with an unemployed parent ($UP_{sc}^{(-i)}$) and the observable characteristic reported in each row. **Source**: own elaborations from Invalsi NEPSA, G10, school years from 2010-11 to 2017-18.

Table B.4
Estimates of the effects on aspiration on the educational outcomes sample

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Aspiration Secondary						
Share of unemployed parents	-0.0603***	-0.0564***	-0.0477***	-0.0341**	-0.0328**	-0.0319**
	(0.0116)	(0.0116)	(0.0116)	(0.0135)	(0.0132)	(0.0130)
R2	0.04	0.05	0.06	0.06	0.06	0.06
Panel B. Aspiration Tertiary						
Share of unemployed parents	-0.0925***	-0.0807***	-0.0451**	-0.0649***	-0.0671***	-0.0680***
	(0.0199)	(0.0196)	(0.0196)	(0.0216)	(0.0211)	(0.0208)
R2	0.27	0.31	0.34	0.35	0.35	0.35
N.Obs.	1966146	1966146	1966146	1966146	1966146	1966146
School and Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls		Yes	Yes	Yes	Yes	Yes
School-level controls			Yes	Yes	Yes	Yes
Linear trends				Yes		
Quadratic trends					Yes	
Cubic trends						Yes

Notes: OLS regressions with robust SE clustered at the school level. **Source**: own elaborations from Invalsi NEPSA and National Students' Registries.

Figure B.7
Monte Carlo simulation exercise on measurement error: Aspiration Secondary



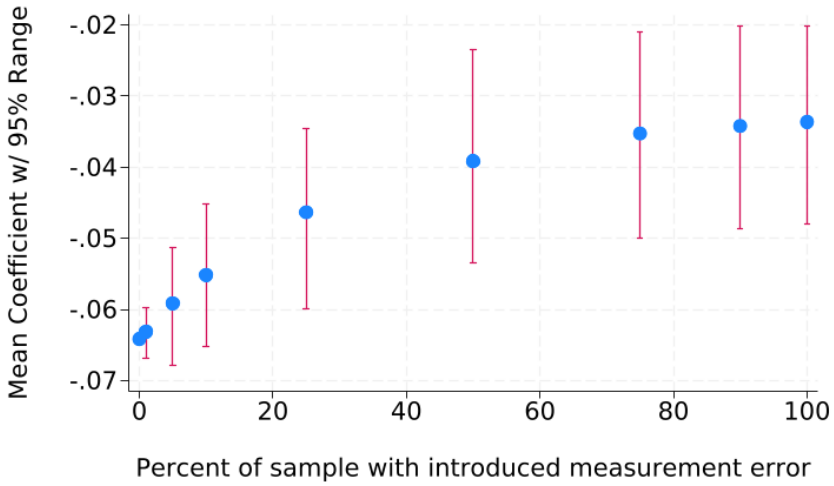
Notes: the figure shows the results (estimates and 95% confidence intervals) of a simulation exercise in which we progressively introduce artificial measurement error in the main explanatory variable (as indicated on the horizontal axes). **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.

Table B.5
Sensitivity and robustness checks

	(1)	(2)	(3)	(4)	(5)
Panel A. Aspiration Secondary					
Share of unemployed parents	-0.0267**	-0.0239*	-0.0339**	-0.0319**	-0.0334**
	(0.0116)	(0.0137)	(0.0136)	(0.0137)	(0.0148)
R2	0.11	0.11	0.11	0.11	0.10
N.Obs.	2557839	2557164	2557191	2557839	2296793
Panel B. Aspiration Tertiary					
Share of unemployed parents	-0.0515***	-0.0269	-0.0530***	-0.0520***	-0.0578***
	(0.0181)	(0.0177)	(0.0178)	(0.0178)	(0.0192)
R2	0.36	0.35	0.36	0.36	0.35
N.Obs.	2557839	2557164	2557191	2557839	2296793
Panel C. Completed high school					
Share of unemployed parents	-0.0271	-0.0164	-0.0059	-0.0197	-0.0220
	(0.0193)	(0.0180)	(0.0182)	(0.0184)	(0.0195)
R2	0.21	0.19	0.20	0.19	0.21
N.Obs.	1966146	1966062	1966123	1941136	1756227
Panel D. High school diploma mark					
Share of unemployed parents	-2.3553***	-1.4041**	-2.0305***	-2.1595***	-2.6769***
	(0.6800)	(0.6031)	(0.6424)	(0.6463)	(0.6836)
R2	0.44	0.32	0.44	0.44	0.44
N.Obs.	1761279	1761213	1761268	1742118	1575794
Panel E. Enrolled at university					
Share of unemployed parents	-0.0452**	-0.0277	-0.0420**	-0.0473**	-0.0413*
	(0.0218)	(0.0206)	(0.0207)	(0.0208)	(0.0220)
R2	0.32	0.31	0.32	0.32	0.32
N.Obs.	1761279	1761213	1761268	1742118	1575794
Specification:					
(i) Winsorized sample	Yes				
(ii) Achievement measure		Yes			
(iii)Year of birth FE			Yes		
(iv) Regional UR				Yes	
(v) LLM UR					Yes

Notes: OLS regressions with robust SE clustered at the school level. Specifications: (i) the variable UP is winsorized at the 1 and 99 percentiles; (ii) the Invalsi test score in grade 10 is used as achievement measure; (iii) year of birth fixed effects are added; (iv) and (v) add, respectively, the regional and local labor market unemployment rate of 35-65 years-old individuals. **Source**: own elaborations from Invalsi NEPSA and National Students' Registries.

Figure B.8
Monte Carlo simulation exercise on measurement error: Aspiration Secondary



Notes: the figure shows the results (estimates and 95% confidence intervals) of a simulation exercise in which we progressively introduce artificial measurement error in the main explanatory variable (as indicated on the horizontal axes). **Source**: own elaboration from Invalsi NEPSA, G10, s.y. 2010-11 to 2017-18.