

Breaking Up the Vicious Cycle of Poverty: How Can the School Performance of Children from Low-Income Households in Macedonia Be Improved?

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Abstract

The aim of the study is to examine the factors that affect educational achievements of children from low-income households in Macedonia. In addition, we compare the two distinctive social programs that provide assistance for children from poor households in the country. Our empirical strategy is based on the education production function, which is estimated using the ordinary least squares (OLS) and ordered probit approach. We regress an indicator for educational achievement on three groups of factors: i) individual characteristics; ii) household characteristics; and iii) school-related characteristics/variables.

The findings suggest that all three sets of factors are significantly related with the school performance of young individuals. Individual- and family-related

factors are more important than the school climate, although this finding may be related to the availability (and hence, the choice) of the school-related variables. Gender, father's education, and ethnicity were found to be significantly related to the educational achievement of students. Among the family factors, we find that the number of rooms at home and household consumption are positively related to school performance. On the other hand, household size, conditional cash transfers (CCTs) acceptance and the measures of parental involvement are negatively related to achievement. We find that only one measure of school context, the average grade in school, is significant.

Keywords: school performance, low-income households, Macedonia, education production function, conditional cash transfers

JEL classification: I24, I28, I38

1 Introduction

It is commonly understood that greater human capital is essential for higher productivity, growth and quality of life in general (Mendolicchio, 2005; Budria and Moro-Egido, 2009; Sondergaard et al., 2012). Education is the main avenue for the human capital of an individual to develop. Hence, children who are either left out of school or who underperform in school present not only a lost developmental potential for the society, but also suffer large individual losses (lower employment and wage prospects, lower quality of life etc.). There is increasing evidence that low school performance has long-lasting effects on students later in life (Blau and Kahn, 2001; Serbin, Stack and Kingdon, 2013).

Educational outcomes around the world are predominantly determined by socially-inherited factors (or circumstance) such as gender, parents' education, household income etc. rather than by factors that are in individuals' control, such as the time dedicated to learning, the motivation to learn etc. (Balcázar, Narayan and Tiwari, 2015). Indeed, many studies find a strong link between family income (or poverty) and school performance (Pong and Hao, 2007; Duncan,

of poor children (Fiszbein, Schady and Ferreira, 2009; Duncan, Magnuson and Votruba-Drzal, 2017). Even in cases when CCTs prove effective in fostering improvements, it is not clear whether those improvements are a result of the income support or of the incentives imbedded in the programs. As Fiszbein, Schady and Ferreira (2009) argue, the CCTs are probably limited in mitigating the household characteristics and environmental factors that are more important for school achievement other than the income itself, such as parenting practices, a stimulating environment for achievements at home, or the quality of education and services. Hence, learning about whether and how these other factors affect the school performance of poor children can bring about large improvements in schooling outcomes.

The ineffectiveness of CCTs presents the main motivation behind this particular study. In particular, the aim of the study is to examine the determinants, aside from the income itself, of the educational achievement of children from low-income households in the developing, transitional country of Macedonia. Based on theoretical foundations and previous literature, we distinguish three sets of factors: i) individual characteristics; ii) household-level characteristics; and iii) school-related characteristics. In addition, we compare two distinctive social programs that provide assistance for the children of poor households: the conditional cash transfers (CCTs) program, which has embedded conditions (that is, regular school attendance) and the child allowance (CA) program, which does not embed any conditions.

The findings of the study can be used by policymakers in designing more effective educational and social protection policies for improving the educational outcomes of the poor. Besides this general importance of the study, it also fills several other gaps in the literature. Firstly, while there is considerable research focusing on school performance in developed, OECD countries, or research focused on the school performance of immigrants' children (in developed countries), there is very little research on the topic of developing and transitional countries. Secondly, Macedonia is the first country in Europe and the Western

Balkan region to implement a CCT program, and hence this is the first study which will create knowledge on the determinants of school performance of poor children in the context of a transitional country. We still have to acknowledge that our aim is not to conduct an impact evaluation of the program but to learn what else (apart from the income) matters for the school performance of low-income students. The findings can either complement or substitute for the components of the CCT program. Thirdly, to our knowledge and based on our literature search, there are no studies for the Western Balkan region concerning the factors that affect school achievement either generally or for children from low-income families.

Our findings suggest that all three sets of factors have a significant effect on the school performance of young individuals. There is some difference in the factors affecting overall performance, specifically in the subjects of math and the mother tongue. Among the individual characteristics, gender, father's education, and ethnicity were found to be significantly related to the educational achievement of students. This is also the case for the household size, consumption, the number of rooms in the student's house, and the household characteristics. Parental involvement in schooling is negatively correlated with school achievement, as it is likely to be more important for worse performers. At the school level, the average grade in the school is found to be significant. In addition, we find that the CCT program is well-targeted and reaches the poorest households, whose children are among the worst performers in school.

The paper proceeds as follows. Section two explores the theoretical basis and previous research on the factors affecting the school performance of children. Section three describes the CCT and CA programs in Macedonia. The data and methodology are examined in section four, followed by the results in section five. Section six provides a discussion and conclusion.

2 Theoretical Foundation and Previous Research

There are two main theoretical strands that are most relevant for the current research topic: i) the general theoretical framework of *school learning*; and ii) theoretical approaches which explain the ways in which *poverty affects children's development*, including school achievement.

Wang, Haertel and Walberg (1993) developed a comprehensive model that explains the determinants of school learning. It is comprehensive in that it: i) involves previous theories of learning from different disciplines such as psychology, socio-cultural fields, and instructional theories; and ii) takes into account both the context in which learning takes place (local community, home and school), as well as the characteristics of the learners themselves. The developed theoretical model includes six categories/constructs: a) state and district governance and organization (state curriculum and textbook policies, assessment and grading standards, licensing of teachers etc.); b) home and community educational contexts (demographics of the area of residence, parental involvement and support in schooling, students' out-of-school time use etc.); c) school context (school characteristics such as private/public, school size, norms and rules, discipline, school policy on parental involvement, management of the school, and similar aspects); d) the design and delivery of curriculum and instruction (related to instruction in the class, class size, alignment of goals, instruction, assignments, and assessment); e) classroom practices (linked with the way in which curricula is implemented, such as classroom rules, communication within the classroom, the time students spend actively engaged in tasks etc.); and f) students' characteristics (gender, behavior, attitude toward subject matter and learning, grade retention etc.). The authors then tested this framework (using content analyses, expert ratings and meta-analyses) and found that proximal variables—psychological variables, instructional variables and the home environment—exert a strong influence over school learning. On the other hand, the distal variables, such as the state policy and school level policy and demographics, do not have a significant effect on learning. Currently, there

are studies that use this framework as a starting point in the analysis of school performance (for instance, Bouchamma, Lapointe and Richard, 2007; Rjosk et al., 2014), although they usually focus on one or several of these six categories. Our study includes three of the constructs, hence falling in the group of wide-ranging research studies.

The way in which poverty and income affect child development (including school achievement) has been studied within different scientific disciplines such as economics, sociology, developmental psychology, and others. Duncan, Magnuson and Votruba-Drzal (2017) summarize three main theoretical approaches which examine the influence of poverty over child development: the family and environmental stress perspective; the resources and investments perspective; and the cultural perspective.¹ According to the first perspective, the environment in which poor children live exerts negative influences on their development and achievements (Evans, 2004; Duncan, Magnuson and Votruba-Drzal, 2017). The poor children's environment includes overcrowded schools with a high level of noise and poor lighting, higher air pollution (from traffic, factory pollution in industrial neighborhoods, parent's smoking), crowded and noisy homes etc. The negative environment produces stress among poor children and has a negative effect on their social, psychological, mental, cognitive and academic development throughout life (Repetti, Taylor and Seeman, 2002; Evans, 2004).

The resource and investment perspective is mainly based in the theory of household production, and is rooted in economics, but has ever since been spilling over into the fields of psychology and social science, as well. According to Gary Becker (1991), the development of a child is a product of bequests and investments. Bequests represent family capital, such as reputation, connections, genetic predispositions, as well as aspirations, values and preferences that a child acquires by belonging to a certain family. Marjoribanks (1996) further distinguishes two aspects of family culture that represent the human capital of the

¹ The emerging fourth approach is developed by neuroscientists and is related to differences in the brain architecture.

family, which determines the learning environment at home, and social capital which is related to the parent-child relationship. Investments, on the other hand, depend on the resources available to parents (time and money), their preferences and their long- or short-term orientations etc. (Becker, 1991; Duncan, Magnuson and Votruba-Drzal, 2017). Parents of poor children would therefore invest less in their children, buy fewer books and supporting school materials, but would also probably invest less time in supporting their children at and for school (as a result of inflexible jobs, unusual working hours etc.).

The cultural perspective is related to the pathways in which the cultures, values and norms of poor communities affect the development and aspiration of a child, belonging mainly to the field of sociology. This approach mainly draws on the so-called culture of poverty model developed by Oscar Lewis in 1966 (Lewis, 1998). According to Lewis, poor people live in a specific culture which is transferred from generation to generation. It is a culture where people feel marginalized, helpless, powerless, focus on the present without much care about the future etc. It is essentially a way of life which cannot easily be changed by eliminating income poverty; a culture of poverty is much more persistent and difficult to change. According to this approach, poverty affects child's development and achievements through exposure to this culture along with its values and norms, but also through the everyday living environment of the children (joblessness, female-headed households, crime, gangs, sexual promiscuity, welfare dependency etc.) (Duncan, Magnuson and Votruba-Drzal, 2017).

What follows from these theoretical frameworks is that the learning environment and the educational outcomes are influenced by a combination of many factors, which can be generally grouped into the following categories: individual factors (or demographic); home-related factors; and school context and climate and neighborhood or community factors. Indeed, this classification is also aligned with the education function approach (see, for instance, Levacic and Vignoles, 2002). In practice, studies that examine the determinants of school performance can be classified into studies that focus on between-students differences or

wealth, education, occupation of parents etc. (Duncan, Morris and Rodrigues, 2011; Sandilands et al., 2014; Duncan, Magnuson and Votruba-Drzal, 2017) (section 2.2 provides a further discussion on SES). According to Legewie and DiPrete (2012), boys are more sensitive to school environment and SES than girls so that a negative SES composition of a school will negatively affect their attitudes toward school, work habits and effort, and hence their performance. Similarly, Feinstein and Symons (1999) and Li, Allen and Casillas (2017) argue that parental involvement in schooling and parent-child communication about school has a greater effect on girls than boys. Most studies also include students' race and/or ethnicity, finding that minority groups/immigrant children usually underperform (Pong and Hao, 2007; Casillas et al., 2012; Thapa et al., 2013).

2.2 Family Context

Scientists, educators and society consider family and home environment to be the crucial and most salient out-of-school factor affecting school outcomes of children (Wang, Haertel and Walberg, 1993; Marjoribanks, 1996; Porumbu and Necşoi, 2013; Li, Allen and Casillas, 2017). Researchers distinguish two types of influence that the family exerts on their children's school achievements. Porumbu and Necşoi (2013) classify those influences as either direct or indirect through behavioral models. Coleman (1988) differentiates between the human capital effect, wherein parents' education affects the home learning environment, and the social capital effect, demonstrating thereby the strength of the relationship between parents and children. Irrespective of the terminology used, these authors point out the fact that the family affects school performance through its characteristics (income, education of parents, size of the family etc.), but also through parental involvement and attitude, parenting style, expectations from children, aspirations they instill in their children, supervision etc. The distinction between these two categories is not very strict since, for instance, parents' education strongly affects their parenting style or expectations.

Studies find a clear link between family income and school performance. For instance, Duncan, Morris and Rodrigues (2011) find that an increase of family income by USD 1000 annually, over a course of 2–5 years, will improve achievement scores by about six percent of a standard deviation. Similarly, Dahl and Lochner (2012) found that a USD 1000 increase in income would increase school performance by six percent of a standard deviation (whereas the maximum increase of the income under the Earned Income Tax Credit in the US—their program of interest—was USD 2100). As argued in section 1, the undisputable link between family income and school performance motivated many governments (especially in Latin America) to introduce income support programs to the poor with the intention of boosting school performance of their children. However, many of those programs were found to be ineffective in improving school outcomes. Many authors argue that the income does not directly affect school performance but only through a more complex construct—the SES. SES is closely related to the concept of parental cultural capital, which includes parents' education or social status, parents' expectations, home environment (such as the possession of books), (Alves et al., 2013; Huang and Liang, 2016). Education of parents affects school performance through the social networks and reputation of the family, but also indirectly through the parental involvement (PI), home resources, attitudes, and expectations. Many authors find that parents' higher education leads to higher school performance (Livaditis et al., 2003; Pong and Hao, 2007). For instance, Livaditis et al. (2003) found that male students from a lower SES (defined through father's education and occupation) had a ten-fold higher probability to fail a school year in secondary school; the effect was slightly smaller for girls. Mother's education also had a significant effect. Pong and Hao (2007) found that immigrant students with fathers who completed college education had one third of a standard deviation better performance than those whose fathers had a high school education. Huang and Liang (2016) find that an increase of one level of parental education increased students' performance in TIMSS by 2.7 points on average for the 32 countries

included in the study.³ In a cross-country analysis based on the PISA results⁴, Balcázar, Narayan and Tiwari (2015) show that SES is the most important factor determining inequality in opportunity, hence the creation of a new term: the ‘silver spoon’ phenomenon in which a disadvantaged background significantly reduces the chances of succeeding in life.

Many authors find a strong relationship between parental involvement (PI) and school achievement of children, arguing that it can remedy any negative effects from income (Jeynes, 2005; Bouchamma, Lapointe and Richard, 2007; Shute et al., 2011; Porumbu and Necşoi, 2013; Serbin, Stack and Kingdon, 2013). Singh et al. (1995) distinguish between four groups of PI: parental aspiration, parent-child communication, home structure (such as discipline and rules), and parental involvement in school activities. Jeynes (2005) provides a similar classification, while also using the term parenting style, i.e. the support and help that parents provide to their children. Shute et al. (2011) classify the activities related to PI into two categories: home activities (aspirations, discussions about school, reading at home, checking homework etc.) and school activities (parents’ contacts with the school, participation at parent-teacher meetings, volunteering at school etc.). Although most of the studies on PI are correlational, there are also many studies involving different types of regression analyses. In a meta-analysis of 41 studies, Jeynes (2005) found that PI improved academic performance of urban elementary school pupils by 0.7 to 0.75 of a standard deviation, the effect also being significant for children from disadvantaged backgrounds (either by race, ethnicity, or family income). Feinstein and Symons (1999) found that an increase of PI in child’s schooling from 0 to 1 (the highest level) would increase the combined test scores by 24.4 percentage points (measured on a scale of 0–100).⁵ They found that PI is the most important variable influencing school outcomes. There are certain aspects of PI that are found to be more effective for

3 TIMSS is the Trends in International Mathematics and Science Study. For a comparison, the low international benchmark is 400 points, which means that this effect is quite small.

4 Programme for International Student Assessment.

5 Authors use the term “parent interest”, which corresponds to PI as defined here.

school performance than the others. Jeynes (2005) argues that it is not direct PI, such as visiting the school, checking homework, establishing home rules etc. that affects performance, but the expectations of parents, aspirations and parenting style that make all the difference. Similarly, Shute et al. (2011) and Porumbu and Necşoi (2013) argue that parents' expectations, communication with children about school, an authoritative (not authoritarian) parenting style and a future vision bring higher payoffs in terms of achievements of their children. In a study of 32 countries across the world, Huang and Liang (2016) found that the so-called embodied cultural capital (i.e. parents' expectations) are most important for student success, whereas parental education (the institutionalized cultural capital) and book possessing (measuring objectified capital) had a weak relationship with school performance.

Apart from the general studies, studies that focus on the school performance of poor children (for instance, Serbin, Stack and Kingdon, 2013; Li, Allen and Casillas, 2017) also find a strong influence of PI on school performance. These studies give policymakers important directions for future reforms; Jeynes (2005: 260) argues that "any group [including the most vulnerable children] can experience the advantages of parental involvement". However, this does not necessarily imply that such reforms or changes are easy to implement.

2.3 School Context and Climate

In modern societies, schools are one of the most important institutions for the socialization of young people, knowledge acquisition, and personality development, all apart from the family. There are many studies investigating the effect of school context on the performance of students (Bouchamma, Lapointe and Richard, 2007; Pong and Hao, 2007; Lai, Sadoulet and de Janvry, 2011; Sandilands et al., 2014; Huang and Liang, 2016; Li, Allen and Casillas, 2017) that find a modest to large effect of school on performance. In a review of 200 papers on school climate, Thapa et al. (2013) conclude that "school climate matters"

(2013: 369). These studies include several common characteristics of schools and school climate, such as the size of the school and class size, type (public vs. private), some measures of staff quality and engagement level, school policies, rules and procedures, resources and equipment, the teacher-student ratio, and some measure of what is termed 'school advantage'. The latter is usually measured by the share of students coming from low SES (Huang and Liang, 2016), the average grade in school (Pong and Hao, 2007) and similar components. Studies which are focused specifically on low-income students also include measures of (the perception of) school safety and climate (for instance, Li, Allen and Casillas, 2017). Bouchamma, Lapointe and Richard (2007) conclude that studies related to class size are inconclusive, i.e. they do not consistently show that a small class size provides an advantage in terms of better learning and achievements. Rivkin, Hanushek and Kai (2005) found that there is a positive effect of class size but the effect disappears after the sixth grade of elementary school, whereas Dolton and Vignoles (1999) showed that the effect of class size is non-linear (the included squared term of class size is significant and negative). In a cross-country study, Huang and Liang (2016) find that school size does not have a significant effect on school performance.

There are also studies that examine the relationship between peer effect and students' performance. The peer effect can come from the school and class environment, but also from the neighborhood. Within the school, the peer effect can be approximated by combining the average grade of the school, the proportion of children in the class coming from non-manual background, the number of suspended students in the school etc. (Feinstein and Symons, 1999). The concept is similar to the school advantage/disadvantage examined above. Many studies find that class and/or school peer effect significantly shapes students' performances in school (Feinstein and Symons, 1999; Ammermueller and Pischke, 2009; Imberman, Kugler and Sacerdote, 2009; Legewie and DiPrete, 2012), although the mechanism through which peer effects exert the influence has not been largely examined due to data and methodology constraints. According

to Legewie and DiPrete (2012), there is a strong connection between the SES composition of a class/school and the peer group effect, since characteristics such as high ability, motivation, and self-efficacy are more present among high SES students. Ammermueller and Pischke (2009) found that, based on a number of books at home, a one-standard deviation change in peer composition leads to a 0.17 standard deviation change in reading test scores of fourth graders in a sample of six European countries.⁶ Feinstein and Symons (1999) found that a positive peer effect could increase students' test scores by 10.3 percentage points (measured on a scale of 0–100), although they show that the effect is non-linear. Similarly, based on a natural experiment following Hurricane Katrina in the United States, Imberman, Kugle and Sacerdote (2009) discovered a significant effect peers exert over school performance and that the peers' effect is not linear but monotonic, allowing the students to succeed due to high-achieving peers and, respectively, to be hindered by the low-achieving peers. They argue that the peer effect comes from students learning from each other or from the teachers' change in behavior due to changes in students' performance distribution.

There is no strong evidence that the student-teacher ratio (STR) has a significant effect on student achievements. For instance, Feinstein and Symons (1999), Rivkin, Hanushek and Kai (2005) and Lai, Sadoulet and de Janvry (2011) do not find evidence for the importance of STR. The technology, equipment and resources of the school can have a significant influence on student learning. Most studies that examine the effect of technology on learning conclude that the effect of the technology mainly depends on the overall context in which the technology is used, such as the curricula, assessment practices, teacher preparedness, and technology acceptance (Roshelle et al., 2000) and only if it is related to a specific subject area (Lei and Zhao, 2007).

Based on an analysis of ten studies, Hanushek and Rivkin (2010) conclude that the teacher quality has an important effect on students' performance. The estimated

⁶ The authors use data from the Progress in International Reading Literacy Skills (PIRLS); peer composition is calculated based on the number of books at home, sex, age, speaking a foreign language at home etc., and is calculated on class level, not school level.

teacher value added is relatively large: the average improvement for reading from the ten studies conducted is 0.11 of a standard deviation and 0.15 of a standard deviation for math. However, the authors present some methodological problems in measuring teacher quality. Similarly, Lai, Sadoulet and de Janvry (2011) explain that while most studies find a significant effect of the teacher-fixed effects on student test scores, the effect cannot be explained by the observable teacher characteristics which should proxy teacher quality. Using a natural experiment in schools in Beijing, Lai, Sadoulet and de Janvry (2011) find that teacher quality and qualifications are the most important factors concerning students' success within the school context. Teacher qualifications in the study are represented through the official ranks of teachers (where each teacher is officially ranked on a scale of 1–4), educational level, training, years of teaching etc. Rivkin, Hanushek and Kai (2005) also discovered that teacher quality is the most important determinant of students' outcomes within the overall school context, although they also argue that teachers' observable characteristics (education, work experience etc.) explain very little of the variability in teacher quality. Their findings show that an increase of teacher quality distributions by one standard deviation would exert large effects in terms of students' achievements, higher than the costly declines of the teacher-student ratio, which was in a policy focus in Texas at the time of the study. In addition to teacher quality, some studies argue that teachers' academic expectations from students are also a very important predictor of students' performances in school (Kraft, Marinell and Yee, 2016).

3 Transformation of the Product Markets, the Innovation System and the Financial System

Conditional Cash Transfers (CCTs) are generally safety net programs that transfer some cash to the poor, which is conditional on a certain behavior, such as school enrollment or attendance, healthcare check-ups of children etc. The CCT program in Macedonia was first implemented at the beginning of

the 2010/2011 school year, and is still in place. The program provides cash transfers to poor households (those eligible for the Social Financial Assistance or SFA) if they have children of secondary school age and if these children attend secondary school at least 85 percent of the time. The objective of the program was to increase secondary school enrollment and reduce the high dropout rates among the poorest share of the population. The total amount of the subsidy is MKD 12000 per year (slightly less than EUR 200), paid either in monthly or quarterly installments.⁷ The program is nation-wide.

Those eligible households for the CCT, who have children of secondary school age, are the recipients of the Social Financial Assistance (SFA), which is the largest safety net program in the country. The SFA accounts for about 0.5 percent of GDP in the country, and about 50 percent of total spending on social assistance. SFA is a mean-tested monetary transfer granted to people who are fit for work, but who are very poor and cannot support themselves and their families. The maximum amount of the SFA is approximately EUR 90 (for a five-member household), and the level depends on the size of the household. SFA is mainly targeted at households in the poorest tail of the income distribution. In 2009, the World Bank reported that 55 percent of the total SFA benefits were distributed to households in the poorest income quintile, 22 percent were collected by those in the second poorest quintile, and 11 percent were collected by those in the middle quintile (World Bank, 2009). The total annual amount of the subsidy provided by the CCT, for an individual secondary school-age child, is about 20 percent of the maximum SFA level. Given that there is a large difference between reported income of the poor households (SFA recipients) and the reported expenditures, the CCT transfer is estimated at covering around 6–7 percent of the annual household expenditure for the targeted households (Armand and Carneiro, 2016). Although these households report fairly low levels of household income, they report levels of monthly expenditure that are five to eight times larger, which suggests that they are underreporting income.

⁷ The program design was experimental in that it included several modalities: payment to the mother vs. payment to the head of the household (usually an older male); monthly payments vs. quarterly payments.

At the baseline of the CCT, a comparison group was identified for the purposes of conducting an impact evaluation. The comparison (slightly richer group) consisted of household recipients of the child allowance (CA) with children of secondary school age. The CA households are not eligible for CCT because in those households at least one of the parents should be employed (which makes them ineligible for the SFA). CA is a monetary transfer provided for the purpose of covering a part of the costs of bringing up and developing a child. This is a non-universal household income-based support where the eligibility criteria depend both on total household income and on the employment status of the child's caretaker. The monthly payment per child attending secondary school is very similar to that of the CCT (whereas the amount is smaller for primary school-age children). According to Armand and Carneiro (2016), the two groups—the CCT and CA beneficiaries—are not directly comparable and are distinctive but they can be compared based on the assumption that the trend in outcomes experienced by CA households is the same as the one that would have been experienced by SFA households in the absence of the CCT. CA beneficiaries are slightly richer, more educated, are living in better conditions and are enjoying higher levels of expenditure.

An impact evaluation was conducted using data from the baseline (prior to program implementation) and two follow-ups (Fall 2012 and Fall 2013). It was established that the CCT exerts a strong impact on the school enrollment of children in secondary school, but does not impact school attendance (Armand and Carneiro, 2016).⁸ Secondary school enrollment at the start of the program was already at 60 percent, and the program increased it by 10 percentage points. Given that the CCT did not intend to improve educational achievements/performance, but only enrollments and attendance, the impact evaluation study does not examine the issue of school performance of the recipients.

⁸ The Report is not available online but can be provided upon request by the authors.

4 Data and Methodology

4.1 Sampling and Data

At the start of the program in 2010, there were in total 45,138 households that were the recipients of the SFA and 11,450 CA-receiving households. The population of the survey consisted of all households that were the recipients of SFA and CA with at least one child of secondary school age. In 2010, a sample of potential respondents to the survey was produced using the electronic database of the recipients of all types of financial assistance provided by the Ministry of Labor and Social Policy (MLSP) / Social Work Centers (SWCs). The use of the electronic database for sampling allowed us to identify 5,404 CA and 12,481 SFA households with at least one child of secondary school age. After the enumeration was done, we decided to sample 17 SFA households and 3 CA households per municipality at baseline.⁹ In the following two rounds of the survey, some changes to the sample were made so as to achieve a high response rate (and minimize the attrition rate), as well as to mitigate the problem of low participation rates in the CCT across baseline households (one CA household interviewed at baseline in each municipality was randomly replaced by one new SFA household). Within the sampled households in the three rounds of the survey, we collected data on 3,154 primary (grades 5–9) and secondary school children (although the focus is on the secondary school children, we also have data on their siblings attending primary school).

Both at the baseline and at the follow-ups, rich household data and school records were collected which provided the basis for our analysis. In particular, a detailed questionnaire was designed for the evaluation of the program and was composed of several modules: demographics, education, health, labor force participation, employment, business enterprises, agricultural activities, other sources of income, housing conditions, durable goods, food expenditures and consumption, non-food expenditures, expectations, program participation, and knowledge about

⁹ Those sampled households, which were found not to be the recipients anymore or to be recorded in the database with some incorrect information, were appropriately replaced.

the CCT and other public programs. The household survey was supplemented with administrative records from schools reporting school attendance and school performance for each student in the surveyed households. School characteristics were however available only for 1,678 observations/students, hence halving the sample.

4.2 Methodology

Based on the theoretical framework and literature review developed in section 2, we cluster the potential factors of school performance in three groups: i) individual (or socially-inherited) characteristics; ii) household-related characteristics; and iii) school-level characteristics, although there is some overlap between these three distinct groups/inputs.

The most often used *individual characteristics* in the previous studies are: student's gender, age, ethnicity, parent's education, school absences, time needed to reach the school, IQ of the child, motivation etc. *Household characteristics* usually capture household size, whether the household receives some form of social assistance, household consumption or income, expenditure on textbooks, the number of rooms at home, books at home, as well as the extent of parental involvement with the student and the school. The third category, that is, the *school-related characteristics*, captures the characteristics of student's enrolled school, including the student's average grade, the teacher-student ratio, if the school has a system for helping laggards, if it has science equipment, the number of suspended students, characteristics of teachers and the principal etc.

Based on the above discussion, we devise our methodology as based on the education production function (EPF). A neat overview of the application of the EPF can be found in Levacic and Vignoles (2002: 324, Table 1). We specify the EPF as follows:

$$Grade_i = \alpha + \beta_j I_i + \gamma_j H_i + S_i + \varepsilon_i, \quad (1)$$

whereby $Grade_i$ refers to the sum of the two grades the student achieved on the final two tests, irrespective of the modules' subjects; separately, we will be using only the grade in mathematics and the mother tongue. I_i is a vector of variables capturing student's or parent's individual characteristics and includes: student's gender, age, ethnicity, parent's education, as well the number of school absences and the time needed to reach the school. H_i captures household-level characteristics, as follows: household size, the number of months the household was/is getting social financial assistance, whether the household receives CCT or CA, the logs of the household consumption¹⁰ and the expenditure on textbooks, the number of rooms at home, as well the extent of parents' engagement with the student and the school. S_i captures the characteristics of the school of the student's enrollment, including the average grade at the school level, the teacher-student ratio, if the school has a system for helping laggards, if it has science equipment and the number of suspended students. ε_i is the usual error term which is assumed to be well-behaved. Note that we use the sum of the two grades, not their average, for two simple reasons: i) in statistical terms, this would not affect the results except the constant; and ii) this will enable the utilization of the ordered probit method.

To estimate the coefficients in (1), we rely on two approaches: ordinary least squares (OLS) and the ordered probit technique. The OLS modeling approach will treat school performance as a cardinal variable, implying that the difference in performance between any two adjacent scores/grades is the same as for any other two adjacent scores, which is a reasonable assumption for grades. However, the discrete nature of the dependent variable may raise some doubts about the properties of the residuals. Hence, we provide the estimates of an ordered probit function, which has been proven to be resistant to this problem (see Feinstein and Symons, 1999).

¹⁰ The household consumption is used as a better proxy for the living standard of households relative to the household income. In poor families, who are receiving social assistance, there may be significant underreporting of an income (for instance, income earned from informal activities, remittances etc.) as it may lead to a withdrawal of their right to assistance.

Table 1 presents the descriptive statistics of the variables of interest in our sample. The size of the sample is reduced when we include school-level characteristics, as we do not have data on all the schools which were attended by the students participating in this study. However, given that most studies find that school characteristics significantly influence the achievements of students, we decided not to exclude them from the study.

Regarding the students' characteristics, the data show that the genders are equally represented in the sample. The average age of students is 13 years, with the minimum being around 9 years and the maximum 19 years. In general, fathers are more educated than mothers. Ethnic minorities are slightly overrepresented in the sample of low-income households than in the general population, with a share of about 60 percent.

Table 1: Descriptive Statistics

Variable	Description	Observations	Mean	Std. Dev.	Min	Max
Individual (demographic) characteristics						
Gender	1 = male; 0 = female	3154	0.51	0.50	0	1
Age	In years	3154	13.93	2.16	9.50	19.50
Absences from school	No. of absences expressed in classes	3154	2.98	0.18	1	3
Ethnic Albanian	1 = ethnic Albanian; 0 = Macedonian	3154	0.38	0.48	0	1
Other ethnicity (than Macedonian)	1 = all ethnic minorities; 0 = Macedonian	3154	0.22	0.42	0	1
Household characteristics						
Father's education	Years of schooling	3154	5.67	2.67	0	16
Mother's education	Years of schooling	3154	4.93	2.45	0	19
The household receives CCT	1 = if the household receives CCT; 0 = otherwise	3154	0.10	3.00	0	1
The household receives child allowance	1 = if the household receives CA; 0 = otherwise	3154	0.04	0.20	0	1
Household consumption	Log of total reported household consumption expressed in Macedonian denars (MKD)	3127	9.84	0.68	7.49	13.37

Number of rooms at home	Number of rooms	3154	3.07	1.26	0	10
Family size	No. of members living in the same household	3153	4.72	1.12	3	12
Time needed to reach the school	In minutes	3152	23.51	19.89	0	180
Log of the costs of textbooks	Log of reported costs for textbooks for all children within the household, expressed in Macedonian denars (MKD)	3154	0.41	1.59	0	9.10
Frequency of checking school reports	How many times per school year has the parent checked school reports (paid a visit to the school and checked the records)	3093	1.94	0.93	1	4
Frequency of attending parental meetings	No. of parental meetings attended per year	3100	2.04	0.97	1	5
Frequency of asking the child about the school	How many times parents has the parent asked the children about the school	3091	1.25	0.61	1	4
School context and climate						
Average school grade	Average grade of each school attended by the sampled students	1718	3.33	0.49	0	4.43
Teacher-student ratio	Ratio of the number of teachers per each student	1708	0.08	0.02	0.02	0.33
Support to laggards	1 = the school has a system to help laggards; 0 = no system	3154	0.35	0.48	0	1
The school has science equipment	1 = school has science equipment; 0 = no	1718	0.59	0.49	0	1
Number of suspended students	No. of students who were suspended from school	1718	6.49	19.91	0	194
School performance (achievement)						
Result in mathematics	Value from 1 (worst performance, needs to repeat the course) to 5 (outstanding performance)	814	2.32	1.01	1	5
Result in mother tongue	Value from 1 (worst performance, needs to repeat the course) to 5 (outstanding performance)	626	3.24	1.12	1	5
Combined result	Simple sum of the previous two variables	3154	5.58	1.88	2	10

Source: Authors' calculations.

The average size of the households is about 5 members, which is higher than the national average but is expected for low-income families. Households in the sample have been receiving SFA for 107 months (8 years and 11 months) on average. The average school grade of the schools attended by the low-income children is 3.33 (on a scale of 1–5). There are 0.08 teachers per student (or 12.5 students per teacher). About 35 percent of schools have a system to help laggards, while 60 percent have science equipment.

For school performance, the average combined grade (score) from the two exams taken by students in our sample is 5.6 (on a scale from 2 being the lowest score on both exams to 10 being the highest score on both exams). The average grade in the math exam of the 814 students is low, set at 2.3 (2 is the passing grade), whereas the average is slightly higher for the mother tongue, set at 3.2.

5 Results

The results based on OLS are given in Table 2. We report the results according to the dependent variable used: the sum of the grade in the two subjects; the grade in mathematics; and the grade on the mother tongue exam. The pairing of the results for each dependent variable is due to the fact that initially we used only the individual and household characteristics, and afterwards we added the school-related characteristics. This is done because the sample is significantly reduced when school characteristics are added: a large share of the sample does not have data for the school the student attends.

Our results are broadly in line with the findings in the literature as elaborated in section 2. On average, males perform worse than females, by approximately half a grade, which is expected, based on the previous studies. Older students also perform worse, but the significance of the variable is lost when school characteristics are added, except for mathematics performance, where the result remains robust. Father's education is important only for the overall performance so that students with more well-educated fathers perform better, which is in

line with the observations in the literature review section. On the other hand, surprisingly, mother's education is completely insignificant. Our results show that ethnicity is an important determinant of school performance. Ethnic Albanians perform worse than ethnic Macedonians for the overall grade in a magnitude of more than half a grade. However, the difference vanishes for both mathematics and mother tongue. Still, other ethnicities in our sample, predominantly Roma, perform worse than ethnic Macedonians more consistently. Absences from school are found to be important only for the mother-tongue performance, so that the more frequent the absences, the lower the grade, but this does not make a difference for math, which is a surprising result. The time needed to reach the school, on the other hand, is important mainly for math performance, suggesting that the more time needed to reach the school, the lower the grade in math.

Turning our attention to household characteristics, we find that family size is important for overall performance: students in larger families perform worse. Dependence on SFA is irrelevant for the performance, probably because all poor families involved in the study have similar characteristics irrespective of how long they have been receiving the assistance. We observe that households that receive a CCT have students who perform worse than the non-receivers, in particular, in mother tongue. This is expected, as CCTs are directed at the most vulnerable households where the dropout rate, absenteeism and low performance are prevalent. On the other hand, we do not observe any difference in the school performance of the children living in households that receive CA compared to non-receivers.

School performance is significantly related to household consumption: higher consumption increases school performance, so that if consumption (being an approximation of household's income) grows by four to six percent, school performance increases by one grade. This result is important and sizable. Spending on textbooks, on the other hand, is not important. The number of rooms in the households matters only for overall and mother-tongue performance: more rooms at home provide individual, quiet space for study, which results in better

performance. However, it is insignificant for math performance, which is again a counterintuitive result. The three variables measuring parents' engagement with the student's and school activities are significant but predominantly for the mother-tongue performance, and are negatively correlated with student's performance. This may suggest that parents engage in children's schooling predominantly when children display poor results.

From the set of school-related characteristics, only the average school grade and the number of suspended students are found significant. Students studying in higher-ranked schools—as judged by their average grade—perform better, possibly because they are stimulated by their peers. However, the coefficient is much smaller for math when compared to the mother-tongue. The number of suspended students is important for both math and mother-tongue performance, suggesting that the higher the rate of suspended students, the lower the performance. Given that these two variables provide a measure of the school's SES, the obtained results are as expected: schools with lower SES lead to students' lower performance.

In terms of the size of the effects of the individual factors, our results show that gender, average school grade and the ethnicity of a child are the most important factors related to school performance. This also holds for household consumption, which is consistently significant in all specifications. CCT acceptance is also an important and a large indicator of school achievement but only for the overall grade and for mother-tongue performance.

Table 2: Results, OLS

Variables	<i>Dependent variable</i>					
	<i>Sum grade of the two subjects</i>		<i>Grade in mathematics</i>		<i>Grade in mother tongue</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Individual characteristics						
Gender (1 = male)	-0.710*** (0.066)	-0.768*** (0.088)	-0.348*** (0.071)	-0.461*** (0.106)	-0.420*** (0.089)	-0.525*** (0.139)
Age (in years)	-0.072*** (0.019)	0.03 (0.039)	-0.073*** (0.018)	-0.070* (0.042)	-0.023 (0.025)	0.071 (0.062)

Father's education	0.060*** (0.019)	0.049** (0.025)	0.008 (0.019)	-0.032 (0.025)	0.047** (0.023)	0.04 (0.035)
Mother's education	0.009 (0.021)	-0.017 (0.027)	0.019 (0.020)	0.033 (0.029)	0.019 (0.027)	-0.03 (0.042)
Ethnic Albanian	-0.367*** (0.081)	-0.621*** (0.108)	-0.126 (0.088)	-0.197 (0.131)	-0.049 (0.104)	-0.123 (0.159)
Other ethnicity (than Macedonian)	-0.503*** (0.089)	-0.541*** (0.118)	-0.189** (0.089)	-0.108 (0.138)	-0.219 (0.189)	
Absences from school	0.034 (0.185)	-0.067 (0.261)	0.096 (0.113)	0.029 (0.157)	-0.663*** (0.197)	-0.970* (0.502)
Time needed to reach the school	-0.006*** (0.002)	-0.003 (0.002)	-0.005** (0.002)	-0.006** (0.003)	-0.003 (0.003)	0.000 (0.003)
Household characteristics						
Family size	-0.109*** (0.033)	-0.176*** (0.047)	-0.038 (0.031)	-0.031 (0.047)	-0.071 (0.052)	-0.182** (0.083)
The household receives CCT	-0.126 (0.116)	-0.438*** (0.133)	-0.029 (0.125)	0.023 (0.155)	-0.434** (0.192)	-0.648*** (0.238)
The household receives child allowance	0.026 (0.143)	-0.265 (0.210)	0.088 (0.155)	-0.075 (0.221)	-0.247 (0.218)	-0.291 (0.413)
Log of household consumption	0.171*** (0.054)	0.226*** (0.069)	0.113* (0.064)	0.271*** (0.097)	0.152** (0.072)	0.195* (0.108)
Log of textbook cost	0.018 (0.021)	0.023 (0.025)	-0.01 (0.025)	-0.015 (0.041)	-0.021 (0.026)	-0.011 (0.033)
Number of rooms at home	0.098*** (0.027)	0.063* (0.036)	0.023 (0.030)	-0.017 (0.042)	0.110*** (0.036)	0.071 (0.059)
Frequency of checking school reports	-0.056 (0.039)	-0.101** (0.050)	-0.011 (0.042)	-0.05 (0.067)	-0.053 (0.052)	0.024 (0.073)
Frequency of attending parental meetings	-0.069* (0.037)	-0.003 (0.048)	-0.046 (0.039)	0.004 (0.055)	0.057 (0.047)	0.124* (0.072)
Frequency of asking the child about the school	-0.065 (0.054)	-0.143** (0.069)	0.038 (0.058)	-0.021 (0.075)	-0.056 (0.077)	-0.362*** (0.095)
School-related characteristics						
Average school grade		0.798*** (0.092)		0.226** (0.099)		0.468*** (0.130)
Teacher-student ratio		-2.595 (1.694)		-2.529 (3.065)		-0.402 (2.665)
The school has a system to help laggards (1 = yes)		-0.011 (0.097)		-0.022 (0.124)		0.041 (0.169)
The school has science equipment (1 = yes)		-0.002 (0.087)		0.139 (0.111)		-0.245* (0.138)
Number of suspended students		-0.002 (0.002)		-0.004* (0.002)		-0.008** (0.004)
Constant	5.709*** (0.802)	2.225* (1.200)	2.319*** (0.737)	0.723 (1.362)	4.084*** (0.989)	2.755 (2.021)
3,051	3051	1676	786	320	601	251
R-squared	0.098	0.17	0.099	0.174	0.128	0.25

Notes: *, ** and *** signify statistical significance at the 10.5 and 1% level, respectively. Reported standard errors are robust to heteroscedasticity.

Source: Authors' estimations.

The main critique of these results is that the estimated coefficients do not differentiate between different levels of the grade. Recall that our dependent variables are ordered ones, so that the relationship between a certain determinant and school performance may vary at different levels of the grade. To investigate this further, we pursue an ordered probit estimation and then provide the marginal effects. Table 3 presents the results from the ordered probit estimation.

Table 3: Results, Ordered Probit

Variables	Dependent variable					
	Sum grade of the two subjects		Grade in mathematics		Grade in mother tongue	
	(1)	(2)	(3)	(4)	(5)	(6)
Individual characteristics						
Gender (1 = male)	-0.401*** (0.038)	-0.443*** (0.052)	-0.379*** (0.078)	-0.560*** (0.129)	-0.411*** (0.092)	-0.541*** (0.149)
Age (in years)	-0.041*** (0.011)	0.02 (0.024)	-0.076*** (0.020)	-0.079 (0.054)	-0.02 (0.025)	0.076 (0.066)
Father's education	0.033*** (0.011)	0.027* (0.014)	0.004 (0.021)	-0.043 (0.031)	0.048** (0.023)	0.039 (0.038)
Mother's education	0.006 (0.012)	-0.008 (0.016)	0.025 (0.022)	0.046 (0.035)	0.02 (0.027)	-0.029 (0.045)
Ethnic Albanian	-0.203*** (0.046)	-0.355*** (0.064)	-0.136 (0.097)	-0.217 (0.164)	-0.053 (0.104)	-0.123 (0.164)
Other ethnicity (than Macedonian)	-0.285*** (0.051)	-0.302*** (0.069)	-0.180* (0.099)	-0.078 (0.166)	-0.217 (0.193)	
Absences from school	0.02 (0.106)	-0.026 (0.160)	0.103 (0.134)	0.051 (0.196)	-0.673*** (0.210)	-1.034* (0.543)
Time needed to reach the school	-0.003*** (0.001)	-0.001 (0.001)	-0.006** (0.003)	-0.008** (0.003)	-0.003 (0.003)	-0.001 (0.004)
Household characteristics						
Family size	-0.061*** (0.019)	-0.102*** (0.027)	-0.029 (0.035)	-0.027 (0.058)	-0.069 (0.052)	-0.181** (0.086)
The household receives CCT	-0.073 (0.068)	-0.251*** (0.082)	-0.033 (0.154)	0.018 (0.205)	-0.457** (0.197)	-0.708*** (0.258)
The household receives child allowance	0.056 (0.078)	-0.094 (0.123)	0.111 (0.167)	-0.063 (0.291)	-0.215 (0.229)	-0.253 (0.443)
Log of household consumption	0.095*** (0.031)	0.136*** (0.041)	0.115* (0.068)	0.314*** (0.114)	0.147** (0.071)	0.199* (0.110)
Log of the costs for textbooks	0.01 (0.012)	0.014 (0.014)	-0.007 (0.030)	-0.015 (0.055)	-0.022 (0.026)	-0.014 (0.034)
Number of rooms at home	0.055*** (0.016)	0.044** (0.021)	0.019 (0.033)	-0.021 (0.052)	0.113*** (0.037)	0.085 (0.061)

Frequency of checking school reports	-0.034 (0.022)	-0.059** (0.029)	-0.011 (0.046)	-0.052 (0.080)	-0.051 (0.054)	0.023 (0.076)
Frequency of attending parental meetings	-0.039* (0.021)	-0.006 (0.029)	-0.047 (0.043)	0.001 (0.069)	0.052 (0.048)	0.125 (0.077)
Frequency of asking the child about the school	-0.035 (0.031)	-0.082* (0.042)	0.039 (0.064)	-0.025 (0.099)	-0.057 (0.076)	-0.373*** (0.101)
School-related characteristics						
Average school grade		0.478*** (0.056)		0.315** (0.139)		0.535*** (0.145)
Teacher-student ratio		-1.298 (1.007)		-4.075 (3.764)		0.139 (2.866)
The school has a system to help laggards (1 = yes)		-0.019 (0.057)		0.003 (0.150)		0.032 (0.176)
The school has science equipment (1 = yes)		-0.006 (0.052)		0.186 (0.140)		-0.269* (0.143)
Number of suspended students		-0.001 (0.001)		-0.005 (0.003)		-0.009* (0.005)
Observations	3,051	1,676	786	320	601	251

Notes: *, ** and *** signify statistical significance at the 10.5 and 1% level, respectively. Reported standard errors are robust to heteroscedasticity.

Source: Authors' estimations.

The results largely corroborate those obtained in Table 2. However, the advantage of using the ordered probit model is that we can produce—by estimating the marginal effects—the differential effects of the various determinants on school performance. Table 4 presents the marginal effects. Here we comment only on the marginal effects for the combined score of 10 (the highest grade of 5 achieved in both subjects) for the most important factors. Males on average have a 3 percent lower chance to achieve a score of 10 relative to girls. Students from Albanian and other (mainly Roma) ethnicities have 2.1 and 1.7 percent respectively lower chances to have a score of 10 compared to ethnic Macedonians. The findings also suggest that the CCT program is indeed properly targeted not only at the poor, but also at poor performance students. It actually keeps them in school, even if they receive low grades, and it provides them with the possibility of repeating the school level. In particular, students who live in households that receive CCT have 1.4 percent lower probability to achieve a score of 10 relative to the non-recipients. On the other hand, CA is unrelated to student performance, simply

because it does not tie the assistance with any particular schooling outcome. If household consumption increases by 10 percent, then the probability that the student obtains a score of 10 increases by 8.8 percent. Similarly, an additional room at home increases the probability of scoring a 10 by 0.3 percent.

The results show that two of the three measures that we use to approximate parental involvement (PI) in schooling are correlated with school performance, but in a negative way. In particular, the frequencies of checking school reports and of asking the student about the school are negatively related with higher grades. This negative correlation between the measures of PI and school performance seems counterintuitive at first glance. However, there are two potential explanations for this result. Firstly, our sample consists of low-income households/children (with relatively low-educated parents), which means that they display similar home behavior and attitudes toward school. Hence, we may assume that, within the sample, parents of the worst performers are actually more frequently asking their children about school. Secondly, as argued in section 2, parental involvement is much more than asking children about the school or engaging in school activities. For instance, Singh et al. (1995) distinguished four groups of PI: parental aspirations, parent-child communication, home structure (such as discipline and rules), and parental involvement in school activities (see section 2.2). Similarly, Jeynes (2005) argued that it is not the direct PI—such as visiting the school, checking homework etc.—that affects the performance, but instead, it is rather the expectations of parents, their aspirations and parenting style. Unfortunately, our sample does not include variables that can measure these other aspects of PI.

Among the school-related factors, it is only the school “advantage”, measured as the average school grade, which is related to students’ performance. This variable has the largest correlation with school performance, such that an increase of the average school grade by 1 increases the chances for a student to receive a score of 10 by 3.1 percent. Other factors, which were included in the study measuring the school context, prove not to be significantly related to school performance.

Table 4: Marginal Effects

Variables	2	3	4	5	6	7	8	9	10
Gender (1 = male)	0.0201*** (0.004)	0.0645*** (0.008)	0.0717*** (0.009)	0.0171*** (0.004)	-0.0405*** (0.005)	-0.0405*** (0.006)	-0.0372*** (0.005)	-0.0249*** (0.004)	-0.0303*** (0.005)
Age (in years)	-0.0009 (0.001)	-0.003 (0.003)	-0.0033 (0.004)	-0.0007 (0.001)	0.0019 (0.002)	0.0019 (0.002)	0.0017 (0.002)	0.0011 (0.001)	0.0013 (0.002)
Father's education	-0.0012* (0.001)	-0.0040* (0.002)	-0.0044* (0.002)	-0.0010* (0.001)	0.0026* (0.001)	0.0025* (0.001)	0.0023* (0.001)	0.0015* (0.001)	0.0017* (0.001)
Mother's education	0.0004 (0.001)	0.0012 (0.002)	0.0013 (0.003)	0.0003 (0.001)	-0.0008 (0.002)	-0.0007 (0.001)	-0.0007 (0.001)	-0.0004 (0.001)	-0.0005 (0.001)
Ethnic Albanian	0.0184*** (0.004)	0.0551*** (0.011)	0.0562*** (0.010)	0.0083*** (0.003)	-0.0366*** (0.007)	-0.0329*** (0.006)	-0.0288*** (0.006)	-0.0185*** (0.004)	-0.0212*** (0.004)
Other ethnicity (than Macedonian)	0.0168*** (0.005)	0.0483*** (0.012)	0.0469*** (0.010)	0.0045*** (0.002)	-0.0328*** (0.008)	-0.0280*** (0.007)	-0.0239*** (0.005)	-0.0150*** (0.003)	-0.0167*** (0.004)
Absences from school	0.0012 (0.007)	0.0038 (0.024)	0.0042 (0.026)	0.0009 (0.006)	-0.0025 (0.015)	-0.0024 (0.015)	-0.0022 (0.013)	-0.0014 (0.009)	-0.0017 (0.010)
Time needed to reach the school	0.0001 (0.000)	0.0002 (0.000)	0.0002 (0.000)	0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Family size	0.0047*** (0.001)	0.0152*** (0.004)	0.0168*** (0.005)	0.0037*** (0.001)	-0.0099*** (0.003)	-0.0095*** (0.003)	-0.0086*** (0.002)	-0.0057*** (0.002)	-0.0067*** (0.002)
The household receives CCT	0.0136** (0.005)	0.0399*** (0.014)	0.0392*** (0.012)	0.0042** (0.002)	-0.0271*** (0.010)	-0.0233*** (0.008)	-0.0200*** (0.006)	-0.0126*** (0.004)	-0.0141*** (0.004)
The household receives child allowance	0.0047 (0.007)	0.0146 (0.020)	0.0151 (0.019)	0.0024 (0.002)	-0.0097 (0.013)	-0.0088 (0.011)	-0.0077 (0.010)	-0.005 (0.006)	-0.0057 (0.007)
Log of household consumption	-0.0062*** (0.002)	-0.0201*** (0.006)	-0.0222*** (0.007)	-0.0049*** (0.002)	0.0130*** (0.004)	0.0126*** (0.004)	0.0114*** (0.004)	0.0075*** (0.002)	0.0088*** (0.003)

Log of the costs for textbooks	-0.0006 (0.001)	-0.0021 (0.002)	-0.0023 (0.002)	-0.0005 (0.001)	0.0013 (0.001)	0.0013 (0.001)	0.0012 (0.001)	0.0008 (0.001)	0.0009 (0.001)
Number of rooms at home	-0.0020** (0.001)	-0.0065** (0.003)	-0.0072** (0.003)	-0.0016* (0.001)	0.0042** (0.002)	0.0041** (0.002)	0.0037** (0.002)	0.0024** (0.001)	0.0029** (0.001)
Frequency of checking school reports	0.0027* (0.001)	0.0087** (0.004)	0.0096** (0.005)	0.0021* (0.001)	-0.0056** (0.003)	-0.0055** (0.003)	-0.0049* (0.003)	-0.0032* (0.002)	-0.0038* (0.002)
Frequency of attending parental meetings	0.0003 (0.001)	0.0009 (0.004)	0.0001 (0.005)	0.0002 (0.001)	-0.0006 (0.003)	-0.0006 (0.003)	-0.0005 (0.002)	-0.0003 (0.002)	-0.0004 (0.002)
Frequency of asking the child about the school	0.0037* (0.002)	0.0121* (0.006)	0.0134* (0.007)	0.0029* (0.002)	-0.0079* (0.004)	-0.0076* (0.004)	-0.0069* (0.004)	-0.0045* (0.002)	-0.0053* (0.003)
Average school grade	-0.0218*** (0.004)	-0.0709*** (0.009)	-0.0783*** (0.010)	-0.0171*** (0.004)	0.0460*** (0.006)	0.0445*** (0.006)	0.0402*** (0.006)	0.0264*** (0.004)	0.0311*** (0.005)
Teacher-student ratio	0.0593 (0.046)	0.1927 (0.150)	0.2127 (0.166)	0.0465 (0.038)	-0.1249 (0.097)	-0.121 (0.095)	-0.1092 (0.086)	-0.0717 (0.056)	-0.0845 (0.067)
The school has a system to help laggards (1 = yes)	0.0009 (0.003)	0.0028 (0.008)	0.0031 (0.009)	0.0007 (0.002)	-0.0018 (0.005)	-0.0018 (0.005)	-0.0016 (0.005)	-0.0011 (0.003)	-0.0013 (0.004)
The school has science equipment (1 = yes)	0.0003 (0.002)	0.0009 (0.008)	0.001 (0.008)	0.0002 (0.002)	-0.0006 (0.005)	-0.0006 (0.005)	-0.0005 (0.004)	-0.0003 (0.003)	-0.0004 (0.003)
Number of suspended students	0.0001 (0.000)	0.0002 (0.000)	0.0002 (0.000)	0 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Observations	1691	1691	1691	1691	1691	1691	1691	1691	1691

Notes: *, ** and *** signify statistical significance at the 10.5 and 1% level, respectively. Reported standard errors are robust to heteroscedasticity.

Source: Authors' estimations.

6 Conclusion and Discussion

The aim of the study was to examine the determinants of the educational achievement of children from low-income households in Macedonia. In addition, we made a comparison between the two current social assistance programs for low-income students: the conditional cash transfers (CCT) program and the child allowance (CA) program. The data for the study were collected through a rich household survey, which is matched with school records on school attendance and the performance of children.

The empirical strategy was based on OLS estimation and on an ordered probit model, where educational achievement (i.e. school performance) was measured through the student's sum grade (score) in the external examination (sum of the grades in two subjects). Following the literature findings, we provide a variation of the dependent variable so that we also estimate an equation where the dependent variable is the grade on the math test (only for those students who took the math exam in the external examination) and in the mother tongue. The regressors in the study were clustered into three groups: i) individual characteristics; ii) household-level characteristics; and iii) school-related characteristics/variables.

Our findings suggest that all three sets of factors have a significant effect on school performance of young individuals, although the overall explanatory power of the model is relatively low. There is some difference between the factors affecting the overall performance and those affecting the scores in math and mother tongue. Individual- and family-related factors are more important than the school climate, although this finding may be related to the availability (and hence, the choice) of the school-related variables. Among the individual characteristics, gender, father's education, and ethnicity were found to be significantly related to the educational achievement of students. This is consistent with the findings in the literature provided in section 2.1. The effect of gender and ethnicity is particularly consistent and large, which may suggest that the government policies concerning the reduction of class size, free textbooks provision, free

school transportation, increased use of technology, and others will not deliver the intended results of better achievement.

Among the family factors, we find that the number of rooms at home and household consumption are positively related to school performance, again, in line with the literature. On the other hand, household size, conditional cash transfer (CCT) acceptance, and the measures of parental involvement (PI) are negatively related with achievement. The findings suggest that the CCT program is indeed properly targeted not only at the poor, but also at the students with worse performance among the low-income households. It actually keeps those students in school, even if they receive low grades, and provides them with the possibility of repeating the class. This is not the case with child allowance (CA), which does not relate with school performance at all. In addition, given that the CCT increases household consumption, it also affects school performance indirectly.

The negative correlation between the measures of parental involvement (frequency of checking the school reports and asking the child about school) and school performance seems counterintuitive at first glance. However, there are two potential explanations for this result. Firstly, our sample consists of low-income households/children (with relatively low-educated parents), which means that they display similar home behavior and attitudes toward school. Hence, we may assume that, within the sample, parents of the worst performers are actually more frequently asking their children about school. Secondly, as argued in section 2, parental involvement represents much more than inquiring about the school or engaging in school activities; it includes parental aspirations, parent-child communication, parenting style etc. Due to data constraints, we were unable to include these other aspects of the PI in our study, which leaves room for further research. This is also important from a policy perspective, as previous studies conclude that every child, including the most vulnerable one, can benefit from greater parental involvement (Jeynes, 2005). However, most CCT programs fail to significantly improve student performance, as they are unable to influence

the home climate, which includes such aspects as the parenting style, parental aspirations or expectations from children.

The school context appears to be of no particular significance in the school performance of children from poor households in Macedonia. In particular, we established that only the measure of school advantage, that is, the average grade of the school, was found to be significant, and the correlation with the average grade in the school is actually the largest among all other factors. Class size is found not to be related to school performance, which is in line with some of the findings presented in section 2.3 (see for instance, Bouchamma, Lapointe and Richard, 2007; Huang and Liang, 2016). This implies that the costly efforts to reduce class size in order to boost performance may not be as effective. Unfortunately, due to data constraints, we were unable to include some other measures of the school climate or school advantage, such as students' ability, motivation and self-efficacy, parents' occupation, share of students with low SES etc. These additional variables would better capture the peer effect within the schools and could provide some policy guidance on school enrollment policies. In the current setting, low-income families mainly live in certain 'zones' (especially in the urban areas), and their children are segregated in schools, which—according to our findings—produces poor schooling outcomes. Additional further research may also include some measures of teacher quality, which can be a more important factor of school performance than the class size or the use of technology.

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