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"READING PERFORMANCE OF CHILEAN STUDENTS: A LOOK AT PRIMARY EDUCATION AND ITS INFLUENCE ON READING SKILLS BETWEEN 2012 AND 2017"

TESIS PARA OPTAR AL GRADO DE
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ABSTRACT

This thesis advances two main questions about school trajectories and reading performance, which is not very developed for Chile. First, it seeks to identify the patterns of educational trajectory in reading achievement for Chilean students, from 2nd-grade to 8th-grade. Furthermore, second, it seeks to identify predictive factors that affect these individual educational trajectories, particularly for high and low performing students in reading. Students' cohorts who take the SIMCE reading test in 2nd grade in 2012 and then in 6th grade in 2016; and students of 4th graders in 2013 and then 8th grade in 2017. They are used, forming pseudo-panels of students in each cohort. Academic mobility matrices are constructed in a first instance, and then an ordered logistic probability regression model is applied, with which the projections of belonging to specific categories of reading performance will be identified. The study provides robust conclusions that the most relevant factor in explaining academic performance is each student's past performance. Additionally, it is characterized that student mobility towards higher reading skills falls along the student's academic trajectory. Finally, it is identified that factors such as the cultural capital of families, preferences, and reading habits of parents are good predictors of permanence in the levels of reading performance. This thesis provides reliable conclusions for students who progress in the Chilean education system expectedly. It is recognized that the main conclusions are not directly related to students who repeat the course since these students present different educational backgrounds than the students analyzed.

Keywords: Education, Chile, reading comprehension, reading literacy, reading skills, educational outcomes

1. INTRODUCTION

Education is one of the main concerns of families and governments in the world. This interest is sustained in societies like the Chilean one since education is considered a central axis to achieve social mobility and better opportunities for adult life. This objective is one of the main motivations presented by Chilean families for their children to complete the school cycle, from primary education (such as kindergarten) to secondary education.

However, the Chilean education system has some shortcomings that make it impossible to reduce socio-economic and socio-cultural gaps between social groups. In the first place, the Chilean education system presents high degrees of educational inequality. In particular, it is observed that there is a very marked grouping by academic skills, a situation favored by the high degree of heterogeneity of Chilean students (Treviño, Valenzuela, Villalobos, Béjares, Wyman & Allende, 2018). This educational scenario has led to quite different results in terms of education, which depend primarily on educational establishments' socio-economic composition. These results can be seen in standardized national and international assessments. At a national level, 75% of the variance in SIMCE averages 4th grade among educational establishments is explained by the average socio-economic level of the students' families (Mizala, Romaguera & Urquiola, 2007). This performance gap can be seen at all educational levels and on all tests. During the last decade, a reduction in the gap between students by the socio-economic group has been observed. However, this difference is still very significant for the reading test (MINEDUC, 2019). While at the international level, the results obtained in PISA 2018, in which Chile participated along with 79 other countries, are stable compared to PISA 2015. However, when analyzing the long-term trend, it can be seen that in the reading test, there has been a significant rise in the average score since the first evaluation. In turn, the results obtained by Chilean students are lower than the OECD average but higher than the Latin American average (and above each of the other participating countries in the region) (MINEDUC, 2019). According to socio-economic levels, there is the same gap in the scores of Chilean students in the PISA test, where the average performance among the socio-economic quintiles is 100 points, which has been constant between the evaluations of 2009 and 2018 (OECD, 2019).

With these results, various authors such as Peña (2011), Núñez and Miranda (2011) propose that the Chilean school system has a high component of social determinism and that instead of serving as a mechanism for social mobility, it instead maintains unaltered the inequitable social conditions with which students begin their schooling. Studying these gaps is extremely important. Results of any standardized test at more advanced levels of schooling, it shows that there is an "inequality trap," or instead there is a heterogeneous situation. Family choices considerably affect the opportunities of the most vulnerable students, adding institutional mechanisms and school policies implemented in more advanced school periods (which would be concentrated from the end of primary education and the beginning of high school) (Mayol, Araya & Azócar, 2011).

This Chilean context, it is natural to ask whether the Chilean education system reproduces these problems in the skills that students can develop during their time in school, and in particular, for literacy skills, such as reading performance. We will understand how reading literacy is understanding, using, evaluating, reflecting on, and engaging with texts to achieve one's goals, develop one's knowledge and potential, and participate in society (OECD, 2019). Although the most studied relationship of transitivity is "Tell me in which school you study, and I will tell you how your future performance will be." There is not enough literature that

analyzes the influence of learning to read and understand what is read at the primary level and how important it is in students' educational performance and later citizens in the case of Chile.

This research presents the main question to be solved: ¿What is the performance mobility pattern for Chilean students in their reading skills in primary education? Once the pattern of academic mobility has been identified, the secondary question is: ¿What are the main factors that influence the probability of belonging to certain levels of reading achievement for Chilean students? These questions are attractive in the Chilean case since they seek to recognize at what stage of Chilean primary education the reading gap becomes evident for the first time. Besides, it would allow us to have an approximation of the real possibilities offered by the Chilean education system in improving students' reading skills. Finally, we hope to recognize specific characteristics of the student's environment that will allow us to determine if exposure to these favors reading performance throughout the years studied.

Two cohorts of students will be used to solve these questions between 2012 and 2017, corresponding to 2nd-grade and 8th-grade primary education. Their performance on the SIMCE reading test will be identified and will incorporate characteristics of the student, family group, academic establishment, and parental preferences towards reading behavior and habits. The methodology to be used will consist of two stages. Firstly, mobility or transition matrices will be constructed, making it possible to discover the mobility patterns among the different performance distributions of Chilean students. Secondly, a regression model of ordered logistic probabilities will be applied, which will identify the projections of belonging to specific performance categories, defined by academic criteria and pedagogical comparability, and others by grouping according to performance quintiles or deciles. It is expected that the results obtained will provide bright patterns that will make it possible to characterize reading performance within the cohorts analyzed. We also hope to contribute to identifying key factors that influence the probability of belonging to high reading achievement groups to suggest effective public policy strategies to initiate the path toward more significant reading equity in the Chilean education system.

Among the main results, we find that there are high persistence and low mobility among Chilean student cohorts. It is observed that moving toward higher performance groups is increasingly difficult over the years. Additionally, students who are at average reading achievement levels are more likely to progress to higher achievement levels. The estimation of the probabilities of belonging to reading achievement groups towards the end years of the cohorts studied depends mostly on the performance observed in the initial years of education. It was also identified that variables of socio-cultural capital of families, preferences, and reading habits of parents, would be the main factors that would increase the probability of belonging to higher performance groups in reading skills.

This research contemplates six additional chapters to this general presentation. Chapter two describes the literature on the main aspects to be recognized in reading skills in primary education, educational improvement trajectories, and the Chilean educational context. The third chapter describes the context of the SIMCE test and the main characteristics of the databases used. The fourth chapter presents the methodology used in the study. The fifth chapter presents the results of the two methodologies used to identify the hypothesis. The sixth chapter analyses the National Reading Plan 2015-2020 from the perspective of the findings of this research, and the seventh chapter reports the main conclusions and suggestions for public policy approaches in the area of research.

2. LITERATURE REVIEW

This literature review will focus on two aspects essential to the development of this research. First, we will explore the literature related to early school reading comprehension and the importance of these skills in children's educational development. Second, evidence will be presented in the development of literature related to academic trajectory and school performance. This literature has made significant advances over the past 20 years due to the incorporation of data panels. The incorporation of these strategies has made it possible to monitor students and compare their evolution in the school system.

2.1. READING COMPRENHENSION IN ELEMENTARY SCHOOL

Reading comprehension is one of the most complex processes for the educational development of school-age children.[1] Considering this complexity, the concept of reading comprehension has been changing over the last few years. Since the PISA 2000-2012-2017 reports there is no significant difference in its definition.[2] However, its name since it moves from referring to reading comprehension to reading competence. The emphasis is placed on the ability to apply and use what acquired through reading. For the Ministry of Education, the reader assumes an active role, relating his or her previous knowledge with the messages that he or she discovers in reading. This concept is reflected in the curricula for the subject of Language in which learning objectives are established about reading comprehension, focusing on the application of comprehension strategies, understanding of stories read, and understanding of non-literary texts (MINEDUC, 2012).

However, it is necessary to detail the possible problems that exist for optimal reading competence. Duke, Pressley & Hilden (2004) provide answers to two questions about the school performance of fourth-graders in the United States. For these researchers, a student presents reading problems when there is a lack of word recognition and subsequent interpretation. It's implied that they do not possess the fluency to recognize words and listen to themselves read, without understanding what is being read.[3] Also, the authors provide a framework for qualifying a student as a good reader.[4] However, they qualify that for most students, comprehension is only one of their reading problems. They argue that students at this level of education have problems with reading fluency, have a poor short-term memory, and-or have problems with Language. Finally, according to their research, the authors point out that the creation of long-term reading strategies (such as prediction, questioning, and imagination) is instrumental in promoting students' reading comprehension. Teachers should be actively involved in these strategies, as they should explain and guide the student towards the path of a

[1] Studies related to reading comprehension detail the main models of the creation of reading habits in children, and how they acquire these skills. This study is evident, as there is greater interest in studying phonological awareness and different linguistic skills involved in the reading process (Sepulveda & Martinez, 2018). As expected, this research will not focus on the reading process nor its various application models. They will be taken as given and as requiring further research.

[2] The concept of reading literacy defined in the introduction to this document. Go to page 5.

[3] In this way, the authors simplify the meaning of reading comprehension. For them it would be word recognition and oral language comprehension, the latter being a skill that is part of human endowment

[4] Among the primary approaches, they stress that a reasonable reader knows what to look for in the text, based on well-developed understandings of the structure of the texts. Competent and mature readers also know the grammar of stories, i.e., the parts of a story. They expect stories to first present information about the setting and characters, followed by a sequence of actions that includes the problems faced by the characters and their attempts to solve those problems. They further detail that they also make inferences while reading, permitted by their background knowledge. The most salient inferences that readers make, at least with narrative texts, are causal. Good readers pay more attention to causal relationships than to other relationships implicit in the texts. Finally, advantaged readers focus on associations and inferences that make the essence more sensitive by filling in the gaps in the text that allow them to understand the big ideas in the text

good reader. Besides, these strategies should encourage student motivation. It is noted that motivation to read is a key, but it decreases as students progress through school, with the decline beginning during the elementary grades.

While the motivational aspect is essential, the home background is perhaps more critical to student performance. Wasik & Hendrickson (2004) detail that there are at least three types of parental characteristics that affect learning and reading comprehension: culture and ethnicity, parental beliefs, and socioeconomic status. Strong associations between home literacy practices and children's reading comprehension achievements have also been documented. Leseman & de Long (2001) conducted a longitudinal study of the effects of family literacy practices on reading comprehension in children aged 4-9. These authors found that the literacy environment in the home, including the availability of reading materials, parental support for reading, and the amount of shared reading time, has long-term effects on reading comprehension.

Hixson & McGlinchey (2004) test differences between household composition, in terms of race and income, and relate them directly to results in oral reading fluency for American students. These authors conduct tests to compare Caucasian and African-American students' performance, incorporating data for those who receive some (partial or complete) schooling subsidies.[5] Through multiple regression, they identify that oral reading fluency skills are the most influential for these students. However, the authors recognize that the group estimate is biased. For high socioeconomic and Caucasian students, the model prediction and their oral reading fluency skills are underrepresented, while for low-income and African-American students, the score is overrepresented. One of the possible explanations for the bias in the estimate is that fully-subsidized students spend more time in their schools so that exposure to the school environment and the demands it places on them results in better oral reading fluency and consequently, higher test scores.

2.2. EDUCATIONAL PATHS

Evidence from studies related to students' school careers, related to reading comprehension, will be presented below. It is important to note that studies with data panels and-or follow-up of students over time were privileged.

Bast & Reitsma (1998) discover the existence and causes of increased individual differences in reading in the first grades of primary school. Based on annual observations, the authors manage to prove that the Matthew effect allows us to explain the differences in reading results. To this end, the model explains that the increase in individual differences is due in part to word recognition skills.[6] However, in terms of reading comprehension, the authors cannot establish any relationship between the model's predictions and actual effects on reading skills. Despite that, the authors found evidence of interactive relationships between reading and other cognitive skills, behaviors, and motivational factors, which are supposed to cause increasing differences among readers. One relevant aspect to consider is that the authors point out that home literacy seemed not to have a direct effect on reading. However, a more sophisticated home environment is positively related to vocabulary. Thus, with vocabulary as an intermediate variable, home literacy has an indirect effect on reading comprehension.

[5] Refers only to paid lunch or free / reduced lunch.

[6] It refers to the phenomenon that better readers become even better, and the weaker readers become relatively more impoverished. This outcome refers not only to the different components of reading ability, such as word recognition and reading comprehension skills but also to the development of cognitive skills related to reading. For more detail, see Bast & Reitsma (1998).

Similarly, the authors find no direct effect of leisure time reading and attitudes towards reading. To contrast this result, the researchers propose a relationship for reading and vocabulary, mediated by the frequency or volume of reading during leisure time. The results indicate that good readers tended to read more frequently during leisure time than wrong readers. These leisure-time reading activities were related to differences in vocabulary size at the end of second grade. In turn, vocabulary affects subconscious reading comprehension.

Gentaz, Sprenger-Charolles, Theurel & Colé (2013) studied possible reading performance predictors in low-income students. These researchers consider that the primary skills involved in reading comprehension are decoding, listening comprehension, and vocabulary. These variables, the methodology's innovation, relates them to spelling accuracy, the academic level of the students, and the socioeconomic status. It is proven that listening comprehension and decoding skills always significantly predicted reading comprehension through a longitudinal analysis and measurements at the beginning and end of first grade for students. Along with this, decoding is more significant when reading comprehension was assessed throughout the task using short expressions. This evidence is significant for the development of this work because the authors state that the application of this type of evaluations, associated with those of listening comprehension and vocabulary, can allow the early identification of children who are at risk of having difficulties in reading, and establish early remedial training, which is the most effective for them, even in a context of social vulnerability.

Spörer, Brunstein & Kieschke (2009) explore the possibilities of implementing strategies to improve reading skills in German primary school students. The authors conduct an experiment based on treatise and control groups, in which treatise students are taught reading strategies, applying them in small groups guided by an instructor.[7] These strategies were enhanced by peer teaching, both in groups and in pairs. Among the main results, treated students obtained higher scores in reading comprehension. Besides, they made greater use of strategies developed by the experimenter than traditional training and control students. Besides, students who practiced peer teaching in small groups outperformed students in instructor-led and traditional instruction groups on a standardized reading comprehension test. These findings further strengthen the evidence for the peer effect in teaching content in primary education.

2.3. CHILEAN CONTEXT AND REFERNCE MODEL

Chile is one of the countries with the worst reading performance of the OECD member countries, in which only 2% of the adult population understands what they read clearly, while the OECD average is close to 10.5% (OECD, 2016). Then more than 50% of adults are below the so-called functional illiteracy, unlike OECD countries with 19.4%. This level is characterized where individuals do not possess the ability to apply reading and comprehension in the development of their daily and work activities (OECD, 2019). Finally, it should be noted that Chile is the country with the highest proportion of people in the lowest category, with 20.4% of the population surveyed during the PIAAC test (Arroyo & Valenzuela, 2018)[8]. Along the same lines, but for 15-year-old students, the results delivered by PISA 2018 are not encouraging. In Chile, the proportion of students below the basic competency level is close to 32% and is higher than in OECD countries.[9] Also, the same international organization recognizes that those who do not achieve this minimum level face an unfavorable current and

[7] The strategies are to summarize, question, clarify, predict

[8] These results are among the countries participating in the sample.

[9] It is defined as the basic level to level 2, perform efficiently in today's society where students are demonstrating the essential competencies. Being below level 2 is associated with difficulties in achieving future goals related to studies or a good career (OECD, 2016)

future condition. The majority of these students will have difficulties in continuing their studies, developing careers, and performing work that is satisfactory to them (MINEDUC, 2019). Finally, the most alarming data presented for students in 2th grade, where only 4 out of 10 students are at the appropriate reading level for the course (MINEDUC, 2017).[10]

The development of this degree thesis considers as a guide to the paper of Valenzuela, Allende, Sevilla & Egaña (2013). This study advances in the two main questions about school trajectories analyzed in the international literature and scarcely developed for Chile. The first one focuses on modifying students' educational trajectories, especially the most vulnerable ones. While the second is to identify protective and risk factors that affect these individual education trajectories. The authors use quasi-data panels of students taking the SIMCE standardized test between 2002 and 2008, for both Language and Mathematics tests. They use transition matrix methodologies and multinomial probabilistic regression models to determine the mobility pattern of Chilean students. Among the main results found by the authors, they conclude that the Chilean school system is characterized by an early and high socioeconomic level conditionality in academic performance and a low level of upward mobility of this performance. This conclusion is very relevant for the development of this thesis since it is considered a very powerful antecedent within the framework of the Chilean education system. Moreover, the focus of research to be addressed in this thesis is to focus on the same methodology, but limiting it only to reading comprehension skills and expanding the analysis window from 2nd grade. Additionally, the authors provide robust conclusions that the most relevant factor in explaining academic performance is the early achievement of each student. Again, this is very relevant to this paper, since academic performance in the early years is critical and largely conditions future performance. Finally, and in line with the evidence presented in Caro (2009) for Canada, and Entwisle, Alexander & Olson (2005) for the USA, it is identified that the different types of capital that each child's family possesses -economic, cultural and human- are relevant to improve mobility opportunities or maintain high-performance conditions. For the Chilean context, the average of these characteristics in the school that each child attends is even more important, which is why equal access to schools with better conditions and performance is critical for equal opportunities in the performance trajectories.

Finally, it is essential to note that the Chilean education system presents the highest rates of segregation and participation in the private sector. This point is relevant to this thesis since it is expected that the results obtained will have this kind of bias. Valenzuela, Bellei & Ríos (2014), based on an empirical analysis of school segregation by socio-economic status in Chile, the authors estimate that socio-economic differences in Chilean education have been increasing over time, both for primary and secondary schools. Also, the authors note that some market dynamics operating in Chilean education (such as privatization, school choice, and fee payment) represent a relevant proportion of the variation observed in school segregation.

[10] An acceptable level is classified when the students who reach this level have satisfactorily achieved the requirements of the Chilean curriculum. This definition implies demonstrating that they have acquired the essential knowledge and skills stipulated in the curriculum for the period evaluated (MINEDUC, 2017)

3. DATA SECTION

3.1. SIMCE: EDUCATION CHILEAN TEST

The primary source of data for this research is the results of the national system for the assessment of learning outcomes (or in Spanish SIMCE). It founded in 1988, and primary purpose is to contribute to the improvement of the quality and equity of education, reporting on the learning achievements of students in different learning areas of the Chilean curriculum, and relating them to the school and social context in which they learn (MINEDUC, 2020).

Since 2012, the SIMCE test has become the evaluation system that the Education Quality Agency uses to assess the learning outcomes of establishments, evaluating the achievement of the contents and skills of the current curriculum, in different subjects or areas of learning, through a measurement that applies to all students in the country who attend the levels evaluated. Among the levels assessed are four primary education levels (2nd Basic, 4th Basic, 6th Basic, 8th Basic), and only one secondary education level (2nd Middle). The tests held annually, although, since 2018, the evaluation has not held for 8th grade.

The Ministry of Education uses learning standards for the classification of scores. These understood as the content that students must know and demonstrate, in the SIMCE assessments, at certain levels of compliance with the learning objectives stipulated in the curriculum in force for each educational level (MINEDUC, 2020). These standards seek to answer the question of how adequate a student's learning is in a given course and subject.

The learning standards classified into three levels. They are transversal-scored for each grade level. However, they are subject to meeting the curricular objectives of each grade level. In appendix, Tables 3.1.1 to 3.1.4 provide a full description of the meaning of each learning standard. The following is a general description of each level:

- **Acceptable Level**: The student satisfactorily meets the requirements of the academic curriculum.
- **Elementary Level:** The student complies with the requirements of the academic curriculum in a partial manner.
- **Insufficient Level:** Students who are classified at this level are unable to consistently demonstrate that they have acquired the most basic knowledge and skills stipulated in the curriculum for the period been evaluated.

The scores of this test, they have different levels of classification, which depend on the academic grade that the student is taking. However, the scores are worked on to have the same scale of 250 means and standard deviation of 50 points. Table 3.1 shows the classifications of each level and their scores.

Grade	2th	4th	6th	8th
Acceptable	+ 265 points	+ 285 points	+ 279 points	+ 292 points
Elemental	215 and 264 points	241 and 284 points	233 and 278 points	244 and 291 points
Insufficient	- 214 points	- 240 points	- 232 points	- 243 points

Table 3.1 – SIMCE Reading Test Score Standards

3.2. DATABASE AND STATISTICS

SIMCE databases that coincide with the same student cohort will be used in different measurements over time, forming two data panels that correspond to the 2012 - 2016 and 2013 - 2017 cohorts. The reason for the division of panels is that for the year 2018, the Ministry of

Education of Chile did not carry out the test for 8th-grade elementary school. Therefore, for the first data panel, the initial year is 2th-grade, while the final trajectory in the first panel reaches 6th-grade (in 2016) and in the second panel reaches 8th-grade (in 2017).

Given the lack of panels in Chile that follow the academic performance of different cohorts of students throughout their school life, the proposed methodology is an alternative for monitoring this objective, and the two periods used correspond to part of the scarce possibilities of implementing it. Additionally, information is available from completing surveys of families applied in conjunction with SIMCE tests, secondary databases of the Ministry of Education: Directory of Establishment, Performance and Teaching Staff and Student Registry of Chile (RECH in Spanish).

In a first look at the data obtained from the different institutions in charge, we can appreciate the distribution of the scores according to a type of school, socioeconomic level, and learning levels; this information found in tables 3.2.1 to 3.2.3. As one would expect for Chile, achievement levels are higher in students who attend private schools, compared to students in other schools. It is interesting to analyze that for both cohorts, the maximum average score achieved in 4th grade.

Also, accompanied by stable levels of participation in the composition of the types of schools that participate in this test. These results are found in Table 3.2.4.

Year	2012	2014	2016
Grade	2th	4th	6th
Public School	243,5	256,0	240,1
	(47.49)	(48.24)	(49.42)
Private Subsidized School	259,2	272,3	257,9
	(46.19)	(47.19)	(49.24)
Private School	284,6	301,0	285,7
	(41.54)	(43.31)	(45.08)
Total	256,0	269,2	254,2
N	132.818	131.863	127.397

Year	2013	2015	2017
Grade	4th	6th	8th
Public School	253,9	234,4	232,6
	(49.05)	(50.68)	(47.21)
Private Subsidized School	272,5	256,6	251,9
	(47.05)	(49.95)	(48.18)
Private School	300,6	287,1	278,1
	(41.29)	(45.59)	(46.65)
Total	268,7	251,7	247,9
N	125.678	122.093	125.796

*Standard deviation in parentheses

Table 3.2.1 – SIMCE Reading Test Score by Type of School
(Not Balanced Paneldata)

Year	2012	2014	2016
Grade	2th	4th	6th
Low Income	235,4	250,2	237,7
	(46.89)	(47.00)	(48.00)
Low Medium Income	242,3	255,0	238,8
	(46.99)	(47.77)	(49.27)
Medium Income	255,3	267,9	252,7
	(45.96)	(47.39)	(49.27)
High Medium Income	269,0	281,6	267,5
	(44.18)	(45.28)	(47.57)
High Income	284,5	300,5	285,1
	(41.50)	(43.13)	(45.19)
Total	256,0	269,2	254,2
N	132.818	131.863	127.397

Year	2013	2015	2017
Grade	4th	6th	8th
Low Income	248,1	230,5	227,3
	(48.02)	(48.77)	(44.82)
Low Medium Income	253,3	234,1	232,4
	(48.66)	(50.21)	(47.00)
Medium Income	268,1	251,4	247,8
	(47.16)	(49.99)	(47.83)
High Medium Income	284,1	269,0	262,3
	(44.23)	(47.93)	(47.13)
High Income	300,6	286,7	278,0
	(40.86)	(45.42)	(46.50)
Total	268,7	251,7	247,9
N	125.678	122.093	125.796

*Standard deviation in parentheses

Table 3.2.2 – SIMCE Reading Test Score by Socioeconomics Income
(Not Balanced Paneldata)

Year	2012	2014	2016
Grade	2th	4th	6th
Acceptable	298,1	316,4	308,2
	(23.20)	(23.11)	(21.08)
Elementary	241,1	263,7	256,3
	(14.25)	(12.30)	(13.16)
Insufficient	183,5	206,1	195,4
	(22.78)	(23.23)	(25.73)
Total	256,0	264,2	248,8
N	132.818	131.863	127.397

Year	2013	2015	2017
Grade	4th	6th	8th
Acceptable	315,2	308,4	316,5
	(22.28)	(21.18)	(19.07)
Elementary	263,4	256,3	266,2
	(12.26)	(12.93)	(13.44)
Insufficient	204,1	192,1	202,8
	(26.02)	(27.55)	(28.01)
Total	264,0	246,9	243,8
N	125.678	122.093	125.796

*Standard deviation in parentheses

Table 3.2.3 – SIMCE Reading Test Score by Learning Standards
(Not Balanced Paneldata)

Year	2012	2014	2016
Percentage	2th	4th	6th
Public School	36,85%	36,67%	36,72%
Private Subsidized School	54,07%	53,85%	54,14%
Private School	9,08%	10,22%	9,14%
Total	100%	100%	100%
N	132.818	131.863	127.397

Year	2013	2015	2017
Percentage	4th	6th	8th
Public School	35,93%	35,92%	35,67%
Private Subsidized School	53,81%	53,85%	53,35%
Private School	10,27%	10,22%	10,98%
Total	100%	100%	100%
N	125.678	122.093	125.796

Table 3.2.4 – Composition of the Schools in SIMCE Reading Test
(Not Balanced Paneldata)

As seen in the above tables, the performance of Chilean students is highly concentrated by performance levels and the educational establishments' social and economic conditions. In particular, we see that performance for the reading test decreases over time. One possible explanation is that as Chilean students advance in primary education, their reading skills do not advance in the same proportion as academic levels. This conclusion is supported by the fact that the number of students who belong to acceptable performance levels in 6th grade and 8th grade fall considerably about the previous two courses. Therefore, there would be a distribution of students among the other performance levels. This hypothesis is confirmed in the results section of this paper.

4. METHODOLOGY

Following the above, an essential part of this thesis will consider the methodology of Valenzuela, Allende, Sevilla, and Egaña (2013). This methodological strategy will consist in determining the relative location of students concerning the total distribution of scores in the SIMCE reading test. This strategy will be adopted since it is impossible to compare SIMCE score averages over time between different levels or grades. Therefore, students will be group into deciles and groups of these belonging to the respective year and test.

It is important to note that by having the levels of achievement for each educational level (see Table 3.1.5), it is possible to analyze the mobility presented by students within these levels. Also, cut-off scores have been established through the proposal of panels of experts, a proposal that is then sanctioned by a technical committee (MINEDUC, 2018).

Besides, the strategy for groups of deciles will make it possible to identify the most vulnerable students - in terms of educational performance - much more precisely in a given group of the population and to compare their evolution and trajectory in other grades and concerning other groups of students (Valenzuela, Allende, Sevilla & Egaña 2013).

This methodology is basing on two stages. Transition Matrices are estimating in the first stage, which is widely used in social sciences to construct social mobility indexes. The matrices are based on Markov chains, defining as a representation of system varies its state over time and where each change constitutes a transition. One of the main characteristics of these changes is that they do not respond to a deterministic pattern and therefore are not predictable (Rosati, 2011). However, it is possible to know the probabilities of transition between one state and another in the system. That is the probability of a future state as a function of previous states. A transition probability between two states of a system over two instants of time is the conditioned probability of being in a specific state, having been in another state in a previous instant of time. The quantification totality over transition probabilities of the elements about the system to each of the states, a transition matrix can be constructed (Rosati, 2011). Finally, a transition matrix is a square matrix, where each row and column corresponds to one of the possible states of the system, and the elements of the matrix represent the probability that the next state is that of the column if the current state is that of the row.

Therefore, these matrices will allow observing p_t^{t+1} the observed probability of a particular group d_0 (decile, yield, among others) in a period of moving to another group d_1 in the following period t+1, so that the following scenarios can occur: $d_0 = d_1; d_0 > d_1; d_0 < d_1$ (Valenzuela, Allende, Sevilla & Egaña 2013).

Once the transition matrices are achieved, mobility indices will be created and applied to the distribution of school performance, according to the work of Valenzuela, Allende, Sevilla & Egaña (2013) and Sapelli (2010). It is relevant to consider that the information provided by the transition matrices can be synthesized into different indicators. The most basic indices are the movements between percentiles, which may include transitions towards higher positions or transitions that imply a worsening of the relative situation. Most of the available indicators, however, attempt to provide synthetic measures or average variations of the set of individuals included in the distribution from the characteristics of the transition matrix (Ayala & Sastre, 2002). The indices that will be worked on are the Shorrocks, Bartholomew, and Immobility Ratio indices.

The Shorrocks index calculates $S = \frac{n-tr(P)}{n-1}$ where n is the number of groups into which the distribution of school results is divided (rows of the transition matrix). It is limited between 0 and $\frac{n}{n-1}$, $tr(P) = n$ would imply that all individuals remain in the same group to be studied, so there is no mobility and S = 0. While $tr(P) = 0$ would imply total mobility between groups and $S = \frac{n}{n-1}$. For this index, n=10, 5, and 3 are used because they are the number of groups in each distribution.

Meanwhile, Bartholomew's index calculates $B = \sum_{i=1}^{n} \sum_{j=1}^{n} p_{ij}|i-j|$ and is limited between zero and infinity. When there is no mobility, all individuals are on the diagonal, so B=0, while it is not possible to identify a benchmark for the index if all individuals are outside the diagonal.

Finally, the Immobility Ratio is simply the sum of the main diagonal of the Transition Matrix. The higher the value of said sum, the greater the intertemporal stiffness. This index is bounded between zero and 1.

For each index, the following groups will be considered:

SIMCE Test Reading	Description
Deciles (10)	The population is divided into 10 groups by score test performance
5th (10-20-40-20-10)	The population is divided into 5 groups by score test performance
3th (30-40-30)	The population is divided into 3 groups by score test performance
Test Score Standards (I-E-A)	The population is divided into 3 groups by score test standards

Table 4.1 – Composition of the Schools in SIMCE Reading Test

All the above indices interpret mobility from a relative perspective, ignoring the absolute dimension of possible transitions. One way of incorporating the absolute component into the procedures for measuring mobility with transition matrices is to calculate as reference intervals, instead of percentiles, constant percentages concerning the mean or median corresponding to the initial distribution (Ayala & Sastre, 2002).

Once the existing pattern of mobility in Chile has been identified, the second stage will consist of identifying the probability of belonging to a particular decile or group of deciles. A multivariate response model is used to take into consideration the order reflected by the analysis varies according to the deciles or groups of scores—the creation of this variable by shows which deciles correspond to the highest scores in the SIMCE tests. The order between categories, where differences between adjacent categories cannot be treated as equal (Liao, 1994), represents a different category and level. The most commonly used probabilistic models in this type of ordered response analysis are the Logit and Probit Ordered models (Greene, 2003). These models are commonly known as parallel regression models.

Cameron and Trivedi (2005) develop this type of probabilistic ordered response m model, based on the model $y_i = \beta' x_i + u_i$, which corresponds to a model for ordered m alternatives where the dependent variable takes the following form:

$$y_i = j \; if \; \alpha_{j-1} < y_i < \alpha_j \qquad (1)$$

Thus the ordered response model consists of finding the vector of parameters β and the (m-1) thresholds $\alpha_1, \ldots., \alpha_{m-1}$, which will be obtained by maximizing the likelihood function, by defining the probability associated with each response as follows:

$$\Pr(y_i = 0) = \Pr(u_i < \alpha_0 - \beta' x_i) = F(\alpha_0 - \beta' x_i) \tag{2}$$

then for any $y_i = j$ with $j > 0 \neq J$ the probability will be:

$$\Pr(y_i = j) = \Pr(u_i < \alpha_0 - \beta' x_i) - \Pr(u_i \leq \alpha_{j-1} - \beta' x_i) = F(\alpha_j - \beta' x_i) - F(\alpha_{j-1} - \beta' x_i) \tag{3}$$

Finally, for the last stretch where $y_i = J$ the probability will be obtained by the difference:

$$\Pr(y_i = J) = \Pr(u_i \geq \alpha_{J-1} - \beta' x_i) = 1 - F(\alpha_{J-1} - \beta' x_i) \tag{4}$$

For all probabilities to be positive, the condition must be met:

$$0 < \alpha_1 < \alpha_2 < \cdots < \alpha_{J-1} \tag{5}$$

Then, to estimate the specifications of the Logit or Probit models, it is enough to replace the proposed general cumulative distribution function F, with a particular logistic or normal distribution (Liao, 1994), respectively. Where the commonly used functional forms for F are:

$$\text{Logit: } \mathrm{F}(\beta' x_i) = \frac{e^{\beta' x_i}}{1 + e^{\beta' x_i}}; \tag{6}$$

$$Probit: \mathrm{F}(\beta' x_i) = \int_{-\infty}^{\beta' x_i} \emptyset\,(t)dt = \Phi(\beta' x_i) \tag{7}$$

The specification of the previous model shows us that the estimation consists simply of estimating a binary response model for each category j, between the lowest and highest values, in this way the estimation will consist of $j - 1$estimates with different intercepts and identical slopes, this is what is known as the parallel regression assumption (Long, 2012). One consequence of this assumption is that adjacent categories of results can be combined and consistent but inefficient estimates can obtain from the estimated β_k (Long, 2012).

In the first stage, the results of the transition and correlation matrices only allow us to detect the behavior of a particular group over the years, without considering that the effect on students' educational outcomes can be explained by a set of exogenous variables, such as family, school and institutional characteristics, which also affect student learning. That is why analysis with probability models for ordered data will allow us to detect those factors that directly influence the patterns of movement between deciles. The estimated model has the following form:

$$y_i = \beta_0 + \beta_1 I_i + \beta_2 S_i + \beta_3 H_i + \beta_4 P_i + u_i \tag{8}$$

Where y_i is an ordinal categorical variable indicating to which group each student belonged in 2016.[11] I_i corresponds to a vector of individual and household characteristics within which they

[11] Two specifications are used: the performance groups according to Test Score Standards (I-E-A); and by performance quintiles 10, 20, 40, 20, 10

will be considered: the performance group to which each student belonged in the year 2012.[12] The average number of years of education of the parents in 2012; if any parent belongs to an originary people; the cultural capital of the family for the year 2012[13], per capita income of the student's household in 2016[14], student's gender; whether the student attended pre-kindergarten or kindergarten. A similar procedure will be done for the panel of 4th graders in 2013 and 8th graders in 2017.

S_i is the set of variables associated with the establishment and the course belonging to the student. The establishment's dependence is incorporated[15], the number of students per class and level; the average schooling of the parents of the class; the average monetary income of the families of the class (in order to capture the par effect); the rural condition of the school and the socio-economic category of the educational establishment[16]. Similar procedures will be carried out for the years 2013 and 2017.

H_i refers to the set of variables that reflect the student's reading habits at home. In particular, these questions capture the interaction of the student and parents in the reading habit. These data are obtained thanks to the parent questionnaire that is given in each SIMCE test that is carried out in Chile. The incorporation of these variables is key within this specification, since it allows for direct testing of the influence of the reading habit on each student and his or her performance; and to incorporate educational public policy strategies to improve student reading performance. The questions vary according to the years in which the test is taken. However, the questions asked of parents in the first year of each panel are identified.[17] Given this difficulty, two types of specifications are made according to the data panel. In 2012-2016, the questions which include: ¿How often do parents read stories to the student?, ¿How often do parents accompany the student to read?, ¿How often do parents accompany the student to the library?, ¿How often do parents discuss the readings with the student?, and ¿When did the reading begin with the student?. These questions are answered by parents in 2012 and 2013, respectively. This data allows us to see if students can incorporate these habits early and how they influence performance. In 2013-2017 only the questions ¿How often do parents read stories to the student?.[18]

[12] Two specifications are used: the performance groups according to Test Score Standards (I-E-A); and by performance quintiles 10, 20, 40, 20, 10.

[13] This variable is captured through the number of b.ooks in the household. The original variable present in the data panel is ordinal categorical. A transformation of the variable into a continuous variable is performed. For this, it is assumed that the book household behaves as a uniform distribution. This specification allows for a better representation of the book variable. Finally, the result obtained, and a variable is divided into the number of books in the household between 11 and 50; and greater than 50

[14] It is divided into 100 to simplify the reading of the results.

[15] If the establishment is a public school, private subsidized school, and private school.

[16] This category is awarded by the Ministry of Education of Chile. Schools are divided according to low, lower-middle, middle, upper-middle and high income.

[17] For 2012-2016, only responses from 2012 (2nd grade) are considered. While for 2013-2017, only answers from 2013 (4th grade) are considered.

[18] The answers to the questions had the following structure. They are categorical, ordinal variables, where each parent responds according to the frequency with which they perform the event. This frequency can be one or more times per year, one or more times per month, one or more times per week, one or more times per day. The responses are transformed into dummy variables, where the response is one of the parents responds yes; 0 if the parent responds no.

P_i is the set of preferences or expectations that parents have about the reading habit and their children. These variables are included to capture the effect that parents have on their children's academic aspirations. Besides, for capturing the repetition of reading behaviors by students, could be in terms of expectations for their children, the expectation of the highest educational level that their children will achieve is included. The variable is divided between the child finishing high school and finishing some degree of higher education. While the reading habits of parents include the questions: ¿Do parents read-only if they have to? ¿Do parents talk about what they read? ¿Do parents read in their free time? ¿Do parents read-only to get? ¿Do parents consider reading important? ¿Do parents wish they had more time to read? These questions are answered by parents in 2012 and 2013, respectively.[19] This data allows us to see if students can incorporate these habits early and how they influence performance. Similar procedures will be carried out for the years 2013 and 2017, but for these data, ¿how many hours do parents spend reading?.

u_i is the error term that is independent and identically distributed (iid).

In estimating the models described above, data loss was obtained for each panel, as shown in Table 4.2. For the 2013-2017 panel, the loss amounts to 27%. Although the amount of data would not correspond to a moderately high amount of lost information (Rubin, 1996; Shafer and Olsen, 1998), it would represent it for the second panel. This fact means that it is not possible to say that the validity and efficiency of estimation methods that use analyses with complete data, such as logit or ordered probit, can be assured when the data are incomplete (Rubin, 1976). Thus, in order to gain efficiency and to be able to work with the ordered model using complete data, missing values were imputed.

Data Panel Description				
	2012 - 2016		2013 - 2017	
	Obs	%	Obs	%
Estimated data	73.217	87,53%	71.015	76,10%
Imputed Data	10.432	12,47%	22.308	26,67%
Total Data	83.649		93.323	

Table 4.2 – Loss of information due to missing data

Considering that this work follows the same methodology as Valenzuela, Allende, Sevilla & Egaña (2013), the imputation method applied is similar. This data imputation procedure begins with Little & Rubin (1987). These authors point out that a mechanism that generates lost data will be ignored when it meets any of the following assumptions:

- Completely Random Missing Data (MCAR). In the case of this imputation, the missing data would not be different from the non-lost data since it is assumed that the missing data were random, and therefore there is no unobserved variable that influences the obtaining of these values.
- Randomly missing data (RWD). This assumption implies that the relationship between observed and missing values on average is not different (Schafer and Olsen, 1998). Additionally, it is added that the loss of data depends on known values and therefore, can be entirely described by the variables observed in the database (Wayman, 2003). Finally, MAR is the formal assumption that allows first to estimate the relationships between the variables with the observed data, and then use these relationships to obtain unbiased predictions of the lost values using the observed values (Schafer and Olsen, 1998).

[19] The answers to the questions have the following structure. They are dummy variables, where the answer is one of the parent answers yes; 0 if the parent answers no

For this research, the primary source of missing data is considered to be from the parent questionnaires. These questionnaires must be completed (voluntarily by parents) when students take the SIMCE test, sending them to the student's home to be completed by a family member. In this context, the supposed MAR will likely be fulfilled, and then the mechanism of the lost data generation will be ignored. A reasonable argument for considering this assumption is that households, where parents have a more significant concern for their children's education, will be the ones to complete. Thus, if this assumption is fulfilled, we know that parents with higher education, cultural capital, and socio-economic level are those who generally show more significant dedication or interest in the studies of their children, so that the loss of data would depend on known values and could be described entirely by the variables observed, fulfilling the RAF assumption.

The allocation method used for this investigation is multiple imputations.[20] This methodology has specific characteristics that make it desirable over other imputation methods among which it should be noted that the inferences (standard errors, p-values) obtained with this method are generally valid.[21] This validity is achieved by incorporating uncertainty into the missing data (Shafer and Olsen, 1998). Another feature of this methodology is that multiple imputations prove to be very efficient. Rubin (1987) demonstrated that the asymptotic efficiency of the multiple imputation techniques. In particular, if the sample has 30% of lost information, using 20 imputations would give us an efficiency of 98.5%, while using 40 imputations gives us 99.3%.

In practical terms, this method consists of three main steps. First, it consists of creating m complete databases, filling in each lost data m times using m independent realizations. In a second step, the m imputations made are analyzed, treating each new database as if it were the real one; and finally, the results obtained from the m full database analyses are combined to obtain the so-called imputed repeated inference (Rubin, 1987).

Finally, Valenzuela, Allende, Sevilla, and Egaña (2013) detail that one of the possible sources of data loss is students who repeat a course. However, given the construction of the data panels for this work, only those students who have taken the tests during the years analyzed in the data panel are considered. It is important to note that this methodological decision may lead to under-represented results, representing only those students who have taken all the tests. The inclusion of students who repeat courses implies studying the composition and characteristics of these students in-depth, along with the causes of repetition. That is why the inclusion of these analyses is far from the objectives set out at the beginning of this research, and together with being labor and time-intensive, only descriptive statistics on this type of student will be provided.

[20] Irrespective of the method of allocation; it should be borne in mind that the values imputed correspond to estimates of the correct values. Therefore, any analysis that ignores the uncertainty inherent in the predictions made will also have other associated problems, such as minimal standard deviations, artificially low p-values, and type I error rates that may be greater than nominal levels (Shafer and Olsen, 1998)

[21] The most widely used and straightforward technique for imputation is to delete observations with missing data (listwise, casewise). The problem with applying this methodology is that it can be very inefficient, in the sense that by discarding all the observations where a missing value is found, one can be eliminating important information contained in the non-lost values of those observations. Additionally, this type of procedure can bias the results if the subjects which finally provide the complete database are not representative of the entire sample (Shafer and Olsen, 1998)

5. ANALYSIS AND DISCUSSION

5.1. DATA PANEL ANALYSIS

The purpose of this thesis is to know the trajectories in the academic performance, using the SIMCE test, for the Reading test for the 2012-2016 and 2013-2017 cohorts. It is expected that a group of students will not take the SIMCE test for various reasons. In order to identify these cases and reasons why we did not observe them, we used the information from the Ministry of Education in the Enrolment and Performance databases for both cohorts, which is briefly described in Table 4.1.1 and Table 4.1.2. Firstly, the base year of each cohort was considered to be 2012/2013 (as appropriate). Subsequently, student matches were made for each educational level, that is, a follow-up score was made for students who start in 2nd grade, and take the test in the following two years of the cohort. These result about this methodology, only consider who have done the SIMCE test in all years are given the test. Once the number of students taking the test in the respective years is obtained, the data of the families and the establishment are added. Finally, the database is cleaned to have only students who have been promoted to the next school level. As mentioned in the methodological part, repeaters' students present problems that escape the objective of this research, and which are the subject of another thesis in itself.

As a result of the methodology, for the 2012-2016 cohort, there are 258,772 students enrolled in second grade by 2012. Of these students, 240,917 (93%) take the SIMCE Reading test in that year, and 132,657 students retake the test in 2016, representing about 55% of the students who were in second grade. Considering this last group of students, 45,908 present some problems in their data. Among the main problems, 15,239 (33%) of these students only took the test in 2012, while 28,942 (66%) only took it in 2016. Finally, it is interesting to note that only 1,715 (4%) students present problems with repeating or dropping out of the school system.

Finally, 86,749 students are used to make up the 2012-2016 panel of SIMCE scores for both years, with which the analysis of mobility or school trajectory matrices is carried out. While from this subgroup, only 83,649 students had all the indicators required for multivariate estimates on the factors that influence the probability of mobility in school performance during the period. These students present a large part of their data because their families completed the SIMCE complementary surveys on both occasions, or they only lacked background information that could be resolved employing an imputation strategy. Finally, for 3,100 students who completed the SIMCE, there were problems with repeating or dropping out of the school system.

Data Panel Description (2012-2016)					
258.772	Number of students enrolled in 2th grade				
240.917	Number of students doing SIMCE Reading test in 2012				
132.657	Number of Students that make up the data panel				
86.749	**Full Test Score Students**	**65%**	**45.908**	**Problems Test Score Students**	**35%**
73.217	Full Data	84%	15.239	SIMCE Reading Score only in 2012	33%
10.432	Incomplete Data (Imputed Data)	12%	28.942	SIMCE Reading Score only in 2016	63%
3.100	Repeat or Retired from the School System	4%	1.715	Repeat or Retired from the School System	4%

Table 5.1.1 – Data Panel Description – 2012/2016 years

While for the 2013-2017 cohort, there are 257,380 students enrolled in fourth grade by 2013. Of these students, 246,055 (96%) took the SIMCE Reading test in that year, and 128,223 students retook the test in 2017, representing about 53% of the students in fourth grade. Considering this last group of students, 33,497 present some problems in their data. Among the main problems, 20,538 (61%) of these students only took the test in 2013, while 11,398

(34%) only took it in 2017. Finally, only 1,335 (4%) students present problems with repeating or dropping out of the school system.

94.726 students are used to make up the 2013-2017 panel of SIMCE scores for both years, with which the analysis of mobility or school trajectory matrices is carried out for this cohort. While from this subgroup, only 93.323 students had all the indicators required for multivariate estimates on the factors that influence the probability of mobility in school performance during the period. These students present a large part of their data because their families completed the SIMCE complementary surveys on both occasions, or only lacked some background information that could be resolved through an imputation strategy. Finally, for 1,403 students who completed the SIMCE, there were problems with repeating or dropping out of the school system. The percentage of imputed data for this cohort is higher than for 2012-2016, representing about 24% of the available data.

Data Panel Description (2013-2017)					
257.380	Number of students enrolled in 4th grade				
246.055	Number of students doing SIMCE Reading test in 2013				
128.223	Number of Students that make up the data panel				
94.726	**Full Test Score Students**	**74%**	**33.497**	**Problems Test Score Students**	**26%**
71.015	Full Data	75%	20.538	SIMCE Reading Score only in 2013	61%
22.308	Incomplete Data (Imputed Data)	24%	11.398	SIMCE Reading Score only in 2017	34%
1.403	Repeat or Retired from the School System	1%	1.335	Repeat or Retired from the School System	4%

Table 5.1.2 – Data Panel Description – 2013/2017

5.2. DESCRIPTIVE STATISTICS

As mentioned above, it is possible to compare the evolution of the achievement levels reached by students in the cohorts studied in this research. Table 4.2.1 briefly describes the differentials in gross scores between the 10% lowest-performing and the 10% highest performing students, lowest-performing students (insufficient), and the highest performing students (acceptable), for the years 2012/2016.

The results show that the differences are considerable in the average 10/10 and Acceptable/Insufficient scores, although they remain relatively stable during the years analyzed. In particular, the difference between 2nd-grade students for top 10% and bottom 10% performance is significant, reaching 7.89 SD. This difference marks a trend in the results obtained in the initial levels of each panel. As can be seen, the gap is narrowing over the years. However, this criterion for dividing the sample does not have any academic or pedagogical support that allows making performance comparisons. When we make the comparison between achievement levels set by the Ministry of Education of Chile, we can see that the differences have been growing over time. For students who are in 2nd grade, the difference in standard deviation is 1.03, while four years later, the difference is almost four times more, corresponding to 4.16 in SD. This increase in the gap is an indication that the Chilean education system deepens the differences between the outcome groups. Although the decomposition about this gap; and how much is to socio-economic, cultural, or establishment factors, marks a profound reference to the patterns of educational segregation.

		2th Grade (2012)	6th Grade (2016)
Reading Score Gap (Standard Deviation)	10% High - 10% Low	7,89	3,43
	Acceptable-Insufficient	1,03	4,16
Overall Reading Scores (Absolute values)	10% Low Performance	172,62	166,78
	Insufficient	188,03	198,14
	Acceptable	298,90	308,97
	10% Best Performance	334,10	337,34
	Standard Deviation	46,81	49,93

Table 5.2.1 – Difference of scores between 2th grade and 6th grade by performance group in SIMCE Reading test in (Balanced Panel, absolute values and in standard deviations)

The above differences are similar for students in 4th grade; the difference in standard deviation is 3.50, while four years later, the difference is 8.39 SD. Finally, it is interesting to note the difference between the groups that have 10% high and 10% low achievement, since the difference falls over the years along with the panel. This difference suggests that the distribution of students is more concentrated over time. However, to confirm this hypothesis, the mobility matrices for the respective cohorts should be assessed. The difference in returns for the 2013-2017 cohort is shown below.

		4th Grade (2013)	8th Grade (2017)
Reading Score Gap (Standard Deviation)	10% High - 10% Low	6,21	1,31
	Acceptable-Insufficient	3,50	8,39
Overall Reading Scores (Absolute values)	10% Low Performance	178,68	163,93
	Insufficient	206,85	205,49
	Acceptable	315,67	317,02
	10% Best Performance	348,04	333,34
	Standard Deviation	48,82	49,20

Table 5.2.2 – Difference of scores between 4th grade and 8th grade by performance group in SIMCE Reading test in (Balanced Panel, absolute values and in standard deviations)

5.3. TRANSITION MATRICES

The mobility matrices carried out among the cohorts present authoritative information on the composition of performance gaps. As described in the methodological chapter, the students of the 2012-2016/2013-2017 panel were distributed according to their scores -from lowest to highest - in the SIMCE language tests for each year. The transition matrices were made for the performance decile groups, for the performance quintiles 10-20-40-20-10, for the performance trios 30-40-30 and performance score test I-E-A.

The transition matrices are characterized by the presentation in each box of three data that are relevant for interpretation. The first box shows the actual distribution of the group for the initial years of the cohort, according to the distributions of the final years of the data panel; that is, the distribution of group i of the year 2012/2013 according to the final performance groups for 2016/2017. Second, we present the final distribution of students in the 2016/2017 cohort

according to the performance groups for the initial years of the data panel; that is, the distribution of group j of the year 2016/2017 according to the final performance groups 2012/2013. Finally, the last box shows the number of students in each performance group.

However, for the presentation of the results in this section, a simplification of the mobility matrices will be presented, to make the results more readable. Only the distribution of the groups for the initial years of the cohorts will be considered, according to the final performance groups and the number of students per group. The original version of each mobility matrix will be found in the appendix of this research.

5.3.1. 2012-2016 ANALYSIS

The score trajectory of the mobility matrices for the 2012-2016 cohort in academic performance gives the following characteristics. First, there is a high persistence of the extreme deciles of academic performance (1 and 10). In language, 32% of the students who performed the least in 2nd grade remain in that group in 6th grade. When constructing the 10-decile matrix, and considering only the students on the balanced panel (those who have scored in both 2012 and 2016), it can be seen that the average of the SIMCE language test in 2nd grade (2012) reaches 254.78 points, presenting only a 1.2 point difference with all students taking the test in 2nd grade (256 points). If we look at the range of scores for each decile, it is quite narrow (between 12 and 22 points), except for the two extreme deciles (102 and 32 points respectively).[22]

On the other hand, the decile score ranges show that although the first two deciles have scores between 90-216 points. Applying the test score standards classification in the data, for all of this range, this score is associated with an insufficient performance level, reflecting that it is far below the necessary to handle the expected knowledge for 2nd-grade. Also, the sixth decile analyzed about this cohort; it can be seen they enter the classification of Acceptable, which is associated with an "advanced" level with what is expected for 2nd-grade.

However, this result is limited when the students pass to 6th grade. In particular, the number of students who are considered to be at an insufficient level (now included in the third decile) increases, while the number of students who are at a higher level for that school year decreases, narrowing the sample from the eighth decile. These results are in line with those presented by Valenzuela, Allende, Sevilla, and Egaña (2013). However, the variation proposed by this research, is that identified in the initial levels of education (2nd-grade), there is about 40% student population that has an above-average performance in their reading skills. Therefore, it can be seen that the Chilean educational system is not increasing the number of students who understand what they read, but rather that each year that passes, they are segregating more students with better and worse performance. It is important to note that this result is limited only to students who have not repeated any course. It would be expected, according to the results of Valenzuela, Allende, Sevilla, and Egaña (2013), that the students who repeat some courses present an even worse situation in distribution by performance deciles.

Table 5.3.1.1 shows the mobility matrix for the performance of decile groups. One of the main characteristics of this analysis is that students who are in low achievement deciles (1,2,3,4) have low possibilities of progressing their reading skills to another level of learning. In particular, these deciles concentrate nearly 65% of the population, which confirms the Chilean education system's low mobility characteristics. In particular, it would be expected that they would not

[22] The descriptive statistics can be analyzed in the appendices of this section, which are at the end of the document

overcome the condition of academic vulnerability. In turn, it is interesting to look at the mobility presented by the high-performance deciles (8,9,10), which also presents a high probability of falling in performance. In particular, if a student is in decile 10 for 2nd-grade, he or she has a 38% chance of remaining in the same decile. However, the chance of falling between deciles 6 and 9 is much more significant to continue. This factor is relevant, as this drop in performance rating means that students will move from a higher or Acceptable level in 2nd grade, to an Elementary level or only with the necessary reading skills.

		2016										
	Deciles	1	2	3	4	5	6	7	8	9	10	Total
2012	1	**36,53**	24,11	15,13	9,99	6,67	3,66	2,14	0,95	0,66	0,15	100
		3461	1716	1036	710	472	320	188	96	65	21	8085
	2	24,36	**21,15**	16,53	13,19	9,13	6,81	4,41	2,53	1,21	0,65	100
		2390	**1621**	1214	976	821	635	403	236	135	84	8515
	3	13,68	15,88	**16,00**	14,79	12,69	10,64	7,47	4,93	2,94	0,97	100
		1579	1406	**1245**	1132	971	866	574	377	276	110	8536
	4	9,97	13,14	14,53	**14,49**	13,61	12,22	9,37	6,85	4,26	1,57	100
		1118	1092	1189	**1072**	1080	1052	780	573	432	222	8610
	5	6,81	9,47	12,09	12,59	**13,69**	13,13	12,10	9,86	6,77	3,50	100
		764	892	1043	998	**1058**	1121	996	787	649	437	8745
	6	4,66	6,68	9,29	10,98	12,40	**13,22**	14,52	12,15	9,93	6,15	100
		539	645	809	877	1023	**1156**	1165	957	915	715	8801
	7	2,81	4,61	7,23	8,81	11,08	13,06	**13,93**	14,79	13,56	10,12	100
		353	475	661	755	883	1156	**1128**	1168	1177	1112	8868
	8	1,86	2,98	4,65	6,41	8,47	10,68	13,23	**16,57**	17,98	17,18	100
		238	332	441	538	748	960	1068	**1242**	1488	1713	8768
	9	1,23	2,21	3,32	4,65	6,09	8,05	11,66	16,52	**20,99**	25,27	100
		171	225	323	416	543	789	993	1285	**1693**	2580	9018
	10	0,98	0,88	1,79	2,68	4,02	5,50	8,69	14,23	22,72	**38,50**	100
		109	119	192	245	346	499	711	1077	1709	**3704**	8711
	Total	102,90	101,12	100,58	98,59	97,85	96,98	97,53	99,38	101,02	104,06	**100**
		10722	8523	8153	7719	7945	8554	8006	7798	8539	10698	**86657**

Table 5.3.1.1 – Transition Matrix for deciles between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: Student numbers from each grid)

These results are ratified by the mobility matrix for test score standards. For this cohort, students in 2nd grade have a 65% probability of remaining in a vulnerable situation for reading scores. The exciting thing about this statistic is that only 7% of the students can reach a level of performance above the average (acceptable). Considering that this classification has a pedagogical basis, it is an essential challenge for policymakers to consider creating public policies that promote student mobility towards higher levels of achievement. Consider the last distribution to the 30-40-30 distribution; the results are quite similar.

		2016			
	3th Group	30% Lowest	40	30% Highest	Total
2012	30% Lowest	**60,44**	34,54	5,02	100,00
		13608	7776	1130	22514
	40	25,37	**49,79**	24,84	100,00
		9564	**18769**	9362	37695
	30% Highest	6,93	30,98	**62,09**	100,00
		1837	8206	**16448**	26491
	Total	92,75	115,31	91,94	**100,00**
		25009	34751	26940	**86700**

Table 5.3.1.2 – Transition Matrix for 3rd group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: Student numbers from each grid)

		2016			
	Performance	Insufficient	Elemental	Acceptable	Total
2012	Insufficient	**63,20**	29,15	7,66	100,00
		15735	7257	1906	24898
	Elemental	29,33	**40,54**	30,12	100,00
		8650	**11957**	8884	29491
	Acceptable	9,18	24,98	**65,84**	100,00
		2741	7460	**19658**	29859
	Total	101,71	94,68	103,62	**100**
		27126	26674	30448	**84248**

Table 5.3.1.3 – Transition Matrix for Test Score Standards group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: Student numbers from each grid)

Finally, the 10-20-40-20-10 mobility matrix is created to observe the mobility that exists among students in the performance averages. These students have a 47% chance of remaining at their performance level. In turn, these students have a similar probability of increasing or decreasing performance on the reading test (19.02% and 19.43%, respectively). This probability is the highest of the entire sample, which confirms that the immobility of the Chilean education system is a reality and directly impacts students' reading skills.

		2016					
	5th Group	10% Lowest	20% Lowest	40	20% Highest	10% Highest	Total
2012	10% Lowest	**42,80**	34,05	20,90	1,99	0,26	100,00
		3461	2754	1690	161	21	8087
	20% Lowest	23,26	**32,19**	37,40	6,00	1,14	100,00
		3969	**5491**	6381	1024	195	17060
	40	7,92	19,43	**46,54**	19,02	7,10	100,00
		2776	6810	**16313**	6665	2487	35051
	20% Highest	2,31	7,44	34,06	**32,08**	24,12	100,00
		411	1326	6072	**5719**	4300	17828
	10% Highest	1,25	3,57	20,68	31,98	**42,52**	100,00
		109	311	1801	2786	**3704**	8711
	Total	77,54	96,68	159,58	91,07	75,14	**100**
		10726	16692	32257	16355	10707	**86737**

Table 5.3.1.4 – Transition Matrix for 5th group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: Student numbers from each grid)

5.3.2. 2013-2017 ANALYSIS

The inclusion of this cohort in this research has two reasons. First, it seeks to analyze the variation and mobility of Chilean students about their performance and subsequent interpretation of their reading skills with a larger window of time. If we consider this aim, a reasonably clear warning should be made. This methodology was adopted since the SIMCE test for 8th grade was not carried out in 2018. Therefore, the only approach to address the proposed methodology was to build a cohort with different students. This result implies that the wealth of data and the monitoring that was intended to be carried out with the 2012-2016 cohort is lost. Furthermore, therefore, this approach can provide us with specific patterns of what we might expect in the performance of students who attended 8th grade in 2018. Secondly, it is carried out to update the mobility obtained by Valenzuela, Allende, Sevilla, and Egaña (2013), and to contrast the progress or regression of the Chilean educational system.

The trajectory of the mobility matrices scores for the 2013-2017 cohort in academic performance shows the following characteristics. First, it ratifies the high persistence of the extreme deciles of academic performance (1 and 10). While there is mobility towards higher levels of 10%, as about 42% of students in the worst decile start, but only 32% remain in the

high-performance deciles. This last result is impressive since we can see progress on the students' higher performance levels.

When constructing the ten decile matrix, and considering only the students in the balanced panel (those who have scored in both 2013 and 2017), it can be seen that the average of the SIMCE language test in 4th grade (2013) reaches 269.18 points, presenting only 0.5 points of difference with all the students who take the test in 4th grade (268.70 points). If we look at the range of scores for each decile, it is quite narrow (between 12 and 26 points), except for the two extreme deciles (82 and 47 points respectively). These results are similar to those obtained by the authors in the analysis of 4th-grade and 8th-grade students between 2002 and 2008. This analysis is quite indicative that in a nine-year window, the test results have remained virtually similar.

On the other hand, the decile score ranges show that although the first two deciles have scores between 118-226 points. If we apply the test score standards classification in the data, it is associated with an insufficient performance level, reflecting that it is far below the necessary to handle the expected knowledge for 4nd-grade. However, the concern is that within this cohort, students who are up to the fourth decile of performance have insufficient performance. That is, 40% of students are at a level below what they should know in 4th-grade. Although we cannot generalize about the performance of possible cohorts that can be studied, it is very worrying that these students do not possess the necessary skills in one of the crucial years for the primary education trajectory. Unfortunately, it is not possible to investigate what happened to this cohort of students in 2nd grade, since the measurements of this course in Chile began in 2012, and these students would be in 2nd grade by 2011. However, from the eighth decile analyzed for this cohort, it can be seen they enter the Acceptable classification, which is associated with an "advanced" level with what is expected for 4nd-grade.

However, this result is limited when the students pass to 8th grade. In particular, the number of students who are considered to be at an insufficient level (now included in the fifth decile) increases, while the number of students who are at a higher level for that school year decreases, narrowing the sample from the ninth decile. Once again, these results are in line with those presented by Valenzuela, Allende, Sevilla, and Egaña (2013). Furthermore, we can even correctly state that these results are even more catastrophic in terms of performance since a level of performance is advanced with worse test scores, and a high-performance decile is eliminated (from eighth to ninth). Therefore, it can be seen that the Chilean education system, at higher grades, is not increasing the number of students who understand what they read, but rather that each year that passes, they are segregating more students with better and worse performance. It is important to note that this result is limited only to students who have not repeated any course. It would be expected, according to the results of Valenzuela, Allende, Sevilla, and Egaña (2013), that the students who repeat some courses present an even worse situation in distribution by performance deciles.

Table 5.3.2.1 shows the mobility matrix for the performance of decile groups. Among the main characteristics presented in this analysis is that students who are in low achievement deciles (1,2,3) and even in the middle zones (4,5) have low possibilities of progressing their reading skills towards another level of learning. In particular, these deciles concentrate about 85% of the population, which confirms the Chilean education system's low mobility characteristics. In particular, it would be expected that they would not overcome the condition of academic vulnerability. In turn, for the high achievement deciles (8,9,10), the possibilities of remaining at the same levels are high, reaching 75% of moving between deciles 6 and 10. In particular, if a

student is in decile 10 for 4th grade, he or she has a 33% chance of remaining in the same decile, but the possibility of falling between deciles 6 and 9 is much more significant to continue. This factor is relevant since this drop in performance rating means that students will move from a higher or Acceptable level in 2nd grade, to an Elementary level or only with the necessary reading skills.

		2017										
	Deciles	1	2	3	4	5	6	7	8	9	10	Total
2013	1	**42,87**	23,88	14,48	8,26	5,32	2,57	1,77	0,53	0,20	0,10	100
		2102	1171	710	405	261	126	87	26	10	5	4903
	2	29,56	**23,98**	17,08	12,24	8,15	4,51	2,48	1,30	0,40	0,29	100
		1632	**1324**	943	676	450	249	137	72	22	16	5521
	3	21,20	21,45	**18,03**	14,02	10,67	7,16	3,99	1,91	1,13	0,44	100
		1196	1210	**1017**	791	602	404	225	108	64	25	5642
	4	15,81	18,31	17,33	**15,29**	12,11	8,77	5,78	3,70	2,08	0,82	100
		1017	1178	1115	**984**	779	564	372	238	134	53	6434
	5	10,76	15,02	16,01	15,17	**14,27**	11,23	8,30	5,51	2,72	1,01	100
		838	1169	1246	1181	**1111**	874	646	429	212	79	7785
	6	7,68	11,96	14,11	14,71	14,70	**12,60**	10,61	7,34	4,53	1,77	100
		689	1073	1266	1320	1319	**1131**	952	659	407	159	8975
	7	4,80	7,58	10,81	13,11	14,30	14,51	**13,52**	10,76	7,10	3,50	100
		520	821	1170	1419	1548	1571	**1464**	1165	769	379	10826
	8	3,23	5,02	7,93	10,04	12,23	13,91	15,18	**14,22**	11,45	6,78	100
		405	629	994	1258	1532	1743	1902	**1782**	1435	849	12529
	9	1,97	2,88	4,40	6,99	8,95	12,25	14,83	16,99	**17,17**	13,57	100
		277	404	617	981	1255	1718	2081	2384	**2408**	1903	14028
	10	0,93	1,27	1,80	2,71	4,41	6,78	10,11	15,53	22,86	**33,61**	100
		179	245	347	521	849	1305	1947	2991	4401	**6471**	19256
	Total	138,82	131,35	121,97	112,54	105,10	94,28	86,58	77,81	69,66	61,89	**100**
		8855	9224	9425	9536	9706	9685	9813	9854	9862	9939	**95899**

Table 5.3.2.1 – Transition Matrix for deciles between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: Student numbers from each grid)

These results are ratified by the mobility matrix for test score standards. For this cohort, students in 4th grade have a 66% probability of remaining in a vulnerable situation for reading scores. Interestingly, this statistic shows that only 7% of the students can reach a level of performance above the average (acceptable). These are quite similar to what is observed in 2nd-grade students. If we narrow this distribution to the 30-40-30 distribution, the results are quite similar.

		2017			
	3th Group	30% Lowest	40	30% Highest	Total
2013	30% Lowest	**70,38**	27,46	2,16	100,00
		11313	4414	348	16075
	40	35,58	**50,66**	13,76	100,00
		12114	**17245**	4684	34043
	30% Highest	8,94	37,31	**53,75**	100,00
		4097	17092	**24624**	45813
	Total	114,90	115,42	69,67	**100**
		27524	38751	29656	**95931**

Table 5.3.2.2 – Transition Matrix for 3rd group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: Student numbers from each grid)

		2017			
	Performance	Insufficient	Elemental	Acceptable	Total
2013	Insufficient	**66,60**	26,49	6,92	100
		19647	7814	2040	29501
	Elemental	31,24	**40,14**	28,62	100
		8980	**11537**	8227	28744
	Acceptable	10,73	26,21	**63,06**	100
		2818	6885	**16561**	26264
	Total	108,57	92,84	98,59	**100**
		31445	26236	26828	**84509**

Table 5.3.2.3 – Transition Matrix for Test Score Standards group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: Student numbers from each grid)

Finally, the 10-20-40-20-10 mobility matrix is created to observe the mobility that exists among students in the performance averages. These students have a 44% chance of remaining at their performance level. In turn, these students have a very different probability of increasing or decreasing their performance on the reading test (8.85% and 34.38%, respectively). This conclusion is consistent because if we look at the performance matrix's diagonal, it is more likely that the student is in the 50% performance group.

		2017					
	5th Group	10% Lowest	20% Lowest	40	20% Highest	10% Highest	Total
2013	10% Lowest	**57,14**	34,81	7,70	0,28	0,08	100
		5189	3161	699	25	7	9081
	20% Lowest	30,98	**45,96**	21,31	1,55	0,21	100
		5854	**8686**	4027	292	39	18898
	40	10,57	34,38	**44,77**	8,85	1,43	100
		4083	13284	**17295**	3421	551	38634
	20% Highest	2,98	13,84	48,47	**26,12**	8,59	100
		583	2703	9467	**5102**	1678	19533
	10% Highest	1,32	5,30	34,40	36,29	**22,69**	100
		129	518	3363	3547	**2218**	9775
	Total	102,99	134,29	156,64	73,08	32,99	**100**
		15838	28352	34851	12387	4493	**95921**

Table 5.3.2.4 – Transition Matrix for 5th group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: Student numbers from each grid)

5.3.3. COMPARATIVE COHORT ANALYSIS

Analyzing the two data cohorts together, we can summarize the main results:

- There is a high persistence of the extreme deciles of academic performance (1 and 10) for both cohorts. In particular, it is observed that in both cohorts, the number of students with insufficient performance levels increases over time and that the number of students with levels above average decreases over time. Students in the middle of the distribution, there is a higher likelihood of falling from level to level of achievement, particularly for the 2013-2017 cohort.
- Similarly to that proposed by Valenzuela, Allende, Sevilla, and Egaña (2013), we can see important intertemporal mobility of students between the different performance deciles. However, most of this mobility is located in the vicinity of the performance scores. In general, it is between the two deciles closest to that of belonging.
- These results confirm what Valenzuela, Allende, Sevilla, and Egaña (2013) have proposed, since the authors perform the same analysis, including the mathematics test. With this inclusion, the authors point out that the characteristics are quite similar by educational subsector (language and mathematics), although it has not been analyzed whether it is the students themselves who present these characteristics. Our analysis

indicates that the factors associated with educational performance trajectories are not specific to the sub-sector, but rather are linked to individual, establishment, or contextual factors. They also confirm that the composition of student mobility has been maintained over time since the authors researched information from at least nine years before this thesis.

- The advantage of using the test score performance distribution is that it gives us an academic meaning of the score ranges. The analysis shows the precariousness of the learning of the students analyzed. Since the ranges for 2nd-grade are comparable with the achievement levels identified for 6th-grade, and in turn for 4th-grade and 8th-grade. The above allows us to conclude that the trajectory in the academic performance of the 2012-2016 cohort for 2nd-grade presents a high degree of immobility in their performance. The 30% of students with the lowest performance, who mostly move in a range of results that keep them in a critical educational condition, present a structural restriction of achieving adequate or superior performance in the following years of schooling. A similar condition appears among students who in 4th grade achieve adequate or high academic performance, most of whom will maintain that condition, overcome it, or slightly reduce it.
- These results are consistent with international experience on the high persistence of educational performance throughout the schooling life of students, which shows that the academic gap between different groups is defined, to no small extent, from the first years of schooling. Therefore, the focus of analysis should be placed on cohorts similar to those of 2012-2016, where 2nd-grade data are collected.

The above conclusion anticipates that one of the most critical challenges of the Chilean school system is to focus its efforts on the learning of children in their first years of schooling and preschool education, ensuring that no child falls below high-performance thresholds at this early stage of their education.

5.4. MOBILITY INDEX ANALYSIS

Another way to determine whether mobility matrices account for a high degree of persistence in school performance in the cohorts studied is to estimate various indices based on these matrices. It is important to note that these indices are applied to other contexts, where population mobility analyses are carried out, such as indicators of income or family income. For this reason, there is no international comparability of these indices at the education level. However, the estimates made by the research of Valenzuela, Allende, Sevilla, and Egaña (2013) will be used as a reference. In turn, these authors compare the work of Sapelli (2010), who calculates the estimated indices for income mobility for the Chilean population between 1996 and 2006.

The deciles' estimates show that the three indices (Bartholomew, Shorrocks, and Immobility Ratio) follow the same mobility patterns as the research carried out between 2002 and 2008. The values for the three indices are 1.675 (Bartholomew), 0.857 (Shorrocks), and 0.229 (Immobility Ratio). Compared to the estimates made in the estimated performance groups, these indexes have lower values in the Shorrocks index. This index, the lower the value, the lower the mobility. This evidence is strong in both cohorts and at all levels of the performance distribution. It is interesting to note that for the 2012-2016 cohort, there would be less mobility in the 30-40-30 distribution, while for 2013-2017, the least mobility would be achieved in the test score performance distribution, the only one that is educationally comparable. This result would indicate that as students pass the courses, they increase their chances of staying in the first performance groups. Theoretically, the maximum value that the Shorrocks Index can

reach tends to increase as the number of groups decreases. However, it is increasingly showing a result closer to 0, showing a systematic reduction of mobility in educational performance.

The Immobility Ratio is lower than the authors' estimate, which also reflects lower mobility in school performance. This difference is consistent for both cohorts and distributions, except for the 2013-2017 cohort. In this distribution, the Immobility Ratio is higher than the authors' estimate, which would indicate more mobility in that group. However, the difference is not significant in Test Score Performance, but the comparison for deciles is much higher.

For Bartolomew's index, if the value is low, the mobility is lower. The pattern of mobility is similar for the two cohorts. Similar to the other indices, they move in the same direction as the base work, although for the decile distribution, and in both cohorts, the Bartholomew index obtained is significantly higher. This movement suggests that there is greater mobility than in the cohorts of 9 years ago, but that the general pattern of movement remains intact over time. The results are shown in tables 5.4.1 and 5.4.2.

2012 vs 2016			
SIMCE Test Reading	B	S	I
Deciles	3,988	0,670	0,198
5th Group	1,657	0,787	0,185
3rd Group	1,130	0,647	0,171
Test Score Performance	0,997	0,662	0,168

Table 5.4.1 – Mobility Index between 2012 and 2016
(B: Bartholomew; S: Shorrocks; I: Immobility Ratio.)

2013 vs 2017			
SIMCE Test Reading	B	S	I
Deciles	4,260	0,650	0,415
5th Group	1,593	0,526	0,197
3rd Group	0,905	0,624	0,175
Test Score Performance	0,827	0,471	0,206

Table 5.4.2 – Mobility Index between 2013 and 2017
(B: Bartholomew; S: Shorrocks; I: Immobility Ratio.)

5.5. ORDERER LOGISTIC ANALYSIS

This chapter describes the results of estimating the probability of belonging to a specific educational performance group in 6th grade or 8th grade, depending on the educational conditions achieved in second or 4th grade by the student, as well as other individual and family attributes, such as the course and school to which they belong. In the appendix, we can see the descriptive statistics for each of the studied cohorts' variables.

For the estimations, the test score performance and 10-20-40-20-10 performance distributions were chosen. Among the main reasons for choosing these distributions over the others, we find that they allow a comparison of the academic level with a pedagogical basis for test score performance. While the distribution by performance quintiles, allows us to have a more acute vision about the extremes of the sample, and have a clear vision about the average students. The estimates are made through logistic regressions. The estimated coefficients correspond to the marginal effects on the probability of belonging to a given academic performance group in 6th-grade or 8th-grade by increasing the control variable analyzed by one unit, keeping the rest of the control variables constant. The results of the regressions without marginal effects can be found in the appendices of this section.

5.5.1. 2012-2016 DATA PANEL

The results for the score performance test distributions give us that the primary variable that explains the belonging to a certain level of academic performance in 6th grade (2016) is the result achieved in 2nd grade (during the year 2012), reflecting a high degree in the persistence in the relative academic performance. On the one hand, the probability of belonging to students with insufficient performance in 6th grade is almost 24 percentage points higher than if the student belonged to the 30% best academic performance in 2nd grade. The probability projected by the model is the same level of performance in 6th grade is 48%, which ratifies what was found in our mobility matrices for this cohort. Analyzing the overall probability for the different performance states is 34% for acceptable performance, 42% for being at an elementary performance level, while only 24% probability of being at the insufficient performance level for 6th-grade. These results suggest that at least 76% of students who reach 6th grade achieve an overall understanding of a full text or a section of the text, integrating close, salient, or repeated ideas into the text, or drawing conclusions about the text.

When considering the variables of student family characteristics, it is possible to establish that the more considerable cultural capital of students' families. Also, higher parental schooling and better monetary income are facilitating mechanisms for achieving better academic performance. Including these data reflects various types of family capital that affect performance in the first years of schooling and directly affect later academic performance. In addition to this result, students must attend pre-school education, such as pre-kindergarten or kindergarten, particularly for students who are in underachievement levels, as the sign of the marginal effect is positive. These results are similar to those presented by Valenzuela, Allende, Sevilla, and Egaña (2013).

Female students are more likely to perform better on the reading test. If they are in the acceptable range, a woman is 3.8% more likely than a man. Man is at the underperformance level; he is 3.4% more likely to be at that level than a woman. This fact reflects that the gender advantage in the sub-sector is amplified throughout the school cycle and is consistent since historically, for Chile, women have better reading performance, consistent with evidence from the baseline research.

Considering the characteristics of schools, the composition of students per class, and the school's condition is relevant. In particular, if the number of students is more significant in the class, students who are in elementary and acceptable levels are favored, although the values are significant, the marginal effect is quite small. This effect shows initially that the par effect would have a positive effect on reading skills. Whether the schools are public or Private subsidized (public-private), it is confirmed that, for students at the lower level, public schools would have a 6 percent impact on belonging to that level in 2016. Students who are at acceptable learning levels in 2016 are less likely to be in public schools. These results indicate that the best results on this test are obtained by private or Private subsidized schools and that the concentration of students with insufficient levels is more significant in public schools. Besides, these results are consistent with all the assessments made of the Chilean school system, both national, such as the university selection test, and international, such as the PISA test. In these evaluations, a high level of segregation is seen in schools, where the best results are from private institutions, and Private subsidized or public schools present similar results (OECD, 2010; Valenzuela, 2009; Valenzuela and Sevilla, 2011).

Marginal Effects Ordered Logit Model (2012-2016) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)				
		(1)	(2)	(3)
	Predicted Probability	33,99%	41,73%	24,28%
Student Family Caractheristics	Performance 2012 (Acceptable Level)	0.48***	-0.042***	-0.438***
		(0.004)	(0.002)	(0.003)
	Performance 2012 (Elementary Level)	0.217***	-0.019***	-0.198***
		(0.004)	(0.001)	(0.004)
	Average Years of Education Father	0.003***	-0.001***	-0.003***
		(0.001)	(0.001)	(0.001)
	Average Years of Education Mother	0.003***	-0.001***	-0.002***
		(0.001)	(0.001)	(0.001)
	Native People Father	0.019***	-0.002***	-0.017***
		(0.006)	(0.001)	(0.005)
	Native People Mother	0.021***	-0.002***	-0.019***
		(0.006)	(0.001)	(0.006)
	Number of Books in Household (11<x<50)	0.0050	-0.0010	-0.0040
		(0.003)	(0.001)	(0.003)
	Number of Books in Household (x>51)	0.024***	-0.003***	-0.022***
		(0.004)	(0.001)	(0.004)
	Household per capita income	0.001***	-0.001***	-0.001***
		(0.001)	(0.001)	(0.001)
	Student's Gender	-0.038***	0.004***	0.034***
	(1=Man; 0=Female)	(0.003)	(0.001)	(0.003)
	Student went toPre-kindergarten	-0.02***	0.002***	0.018***
	(1=Yes; 0=No)	(0.006)	(0.001)	(0.006)
	Student went Kindergarten	-0.05***	0.005***	0.046***
	(1=Yes; 0=No)	(0.012)	(0.001)	(0.011)
School Caractheristics	Public School	-0.06***	0.006***	0.054***
	(1=Public School; 0=Other)	(0.013)	(0.002)	(0.012)
	Private Subsidized School	-0.028**	0.003**	0.025**
	(1=Private Subsidized School; 0=Other)	(0.013)	(0.002)	(0.012)
	Private School	0	0	0
	(1=Private School; 0=Other)	(0)	(0)	(0)
	Student per course	0.003***	-0.001***	-0.003***
		(0.001)	(0.001)	(0.001)
	Student by academic level	0.0010	-0.0010	-0.0010
		(0.001)	(0.001)	(0.001)
	Average Years of Education Father (Course)	-0.0010	0.0010	0.0010
		(0.002)	(0.001)	(0.002)
	Average Years of Education Mother (Course)	0.004**	-0.001**	-0.003**
		(0.002)	(0.001)	(0.002)
	Household per capita income (Course)	0.001***	-0.001***	-0.001***
		(0.001)	(0.001)	(0.001)
	Type of School	-0.064***	0.006***	0.058***
	(1=Urban; 0=Rural)	(0.005)	(0.001)	(0.005)
	Low Income School	0.0210	-0.0020	-0.020
		(0.017)	(0.002)	(0.015)
	Low Middle Income School	-0.0170	0.0020	0.0160
		(0.015)	(0.002)	(0.014)
	Middle Income School	-0.010	0.0010	0.0090
		(0.014)	(0.002)	(0.013)
	Upper Middle Income School	0.0010	-0.0010	-0.0020
		(0.013)	(0.002)	(0.012)
	Upper Income School	0	0	0
		(0)	(0)	(0)
	N	83649	83649	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.1a – Marginal Effects Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Marginal Effects Ordered Logit Model (2012-2016) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)					
			(1)	(2)	(3)
		Predicted Probability	33,99%	41,73%	24,28%
Home Reading Habits	Reading Stories	Annual	-0.0060	0.0010	0.0060
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.006)
		Monthly	-0.012**	0.002**	0.011**
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.005)
		Weekly	-0.0060	0.0010	0.0060
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.006)
		Daily	-0.0110	0.0010	0.010
		(1=Yes; 0=No)	(0.008)	(0.001)	(0.007)
	Accompany the student to read	Annual	0.022**	-0.002**	-0.02**
		(1=Yes; 0=No)	(0.009)	(0.001)	(0.008)
		Monthly	0.010	-0.0010	-0.0090
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.006)
		Weekly	-0.0070	0.0010	0.0070
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.006)
		Daily	-0.012*	0.001*	0.011*
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.007)
	Visiting the library	Annual	0.0020	-0.0010	-0.0020
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
		Monthly	-0.0040	0.0010	0.0040
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
		Weekly	-0.0050	0.0010	0.0050
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.007)
		Daily	-0.0010	0.0010	0.0010
		(1=Yes; 0=No)	(0.013)	(0.002)	(0.012)
	Discussing the Readings	Annual	0.0020	-0.0010	-0.0020
		(1=Yes; 0=No)	(0.009)	(0.001)	(0.008)
		Monthly	0.015**	-0.002**	-0.014**
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.006)
		Weekly	0.017***	-0.002***	-0.015***
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.006)
		Daily	0.011*	-0.001*	-0.01*
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.006)
	When did you start reading with the student?	Since he learned to speak	-0.0010	0.0010	0.0010
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.005)
		Since Pre-Kindergarden	0.024***	-0.003***	-0.022***
		(1=Yes; 0=No)	(0.006)	(0.001)	(0.005)
		Since 1th Grade	-0.014**	0.002**	0.013**
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.006)
		Since he learned to read	-0.0020	0.0010	0.0020
		(1=Yes; 0=No)	(0.007)	(0.001)	(0.006)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	-0.047***	0.005***	0.043***
		(1=Yes; 0=No)	(0.009)	(0.001)	(0.008)
		Maximum Education Level Child (Finishes University)	0.028***	-0.003***	-0.025***
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
	Reading Attitude	Parents read by necessity	-0.013***	0.002***	0.012***
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
		Parents talk about reading content	-0.0030	0.0010	0.0030
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
		Parents read in their free time	0.0050	-0.0010	-0.0040
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.003)
		Parents read only to get relevant information	-0.011***	0.001***	0.01***
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.004)
		Parents read because they consider it important	0.016***	-0.002***	-0.015***
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.003)
		Parents would like to have more time to read	-0.0020	0.0010	0.0020
		(1=Yes; 0=No)	(0.005)	(0.001)	(0.004)
		Parents enjoy reading	0.014***	-0.002***	-0.013***
		(1=Yes; 0=No)	(0.005)	(0.001)	(0.005)
		N	83649	83649	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.1b – Marginal Effects Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

One of the innovations of this research is to consider aspects of reading habits in the home, and parent-child interaction concerning reading behavior. In terms of reading habits at home, it is significant for student performance that stories are read to them at least once a month, with readings being discussed at least once a month or week. This last value is more relevant for those students who are at an acceptable level in 2016, contributing 1.7% to the prediction. Finally, for all performance levels, it is significant that parents begin reading with the student at the beginning of pre-school. It is observed that if parents read with the student, they are 2.4% more likely to belong to a high-performance level in 6th grade; otherwise, students are 2.2% more likely to belong to the low level. Additionally, if parents start reading with the student about three years later (or in 1st grade), students who are at a low level cannot reverse the result and are 1.3% more likely to stay at that level. This result is very high, as it puts the spotlight on the importance of the development of early reading behaviors by students.

Finally, the incorporation of parents' preferences about reading, and the expectations about the maximum educational level that their child will reach delivers relevant results. In terms of the educational expectations of students, it can be seen that if a student belongs to the insufficient reading level in 6th grade, parents only believe that he or she will finish high school; this effect is close to 4.3%. While if a student belongs to the acceptable performance level for this year, the belief that he or she will finish in some higher education institution corresponds to 2.8%. This pattern of results predicts that if parents perceive that if their child has reading problems, he or she will only finish compulsory education in Chile, while if he or she performs well, he or she will finish some degree of higher education. As for parents' reading preferences, it is significant whether parents enjoy reading and whether they consider reading relevant. This effect is relevant and significant for students who are at higher performance levels, influencing between 1.4% and 1.6% in the probability of belonging to this performance. On the contrary, if parents read out of necessity and to get the information they need, students are likely to perform poorly in 6th grade. These results can be seen in tables 5.5.1.1a and 5.5.1.b.

As for the 10-20-40-20-10 distribution, it gives that the probability of belonging to the lowest-performing group of students in 6th grade is almost 26 percentage points higher than if the student belonged to the best academic performance in 2nd grade. In turn, the probability projected by the model of following in the same level of performance in 6th grade is only 6.34%, which ratifies what was found in our mobility matrices for this cohort. If we analyze the overall probability for the different performance states, 5% is at 10% lower, 16% at 20% lower, 52% in the middle of the group, 21% at 20% higher, and only 6% at 10% higher. These results allow us to confirm the persistence of the reading results, since it is observed that it is highly probable that the student will remain in the performance quintile, without observing progress or deterioration in his or her performance.

The student's familiar behavior and school characteristics give the same results as in the previous specification. Only the statistical significance for family cultural capital variables and per capita income is amplified. In terms of reading habits at home, and parent-child interaction about reading behavior, the importance of reading with the student and discussing reading is emphasized, extending the frequency to at least one week or once a day; that is, if a student discusses reading more frequently with his or her parents, he or she is more likely to be in the high-performance deciles. Finally, the incorporation of parental preferences about reading, and expectations about the highest educational level present similar conclusions as in the previous distribution, but with reduced statistical significance. These results can be seen in tables 5.5.1.2a and 5.5.1.2b.

	Marginal Effects Ordered Logit Model (2012-2016) (10-20-40-20-10 groups - Performance)					
		(1)	(2)	(3)	(4)	(5)
	Predicted Probability	5%	16%	52%	21%	6%
Student Family Caractheristics	Performance 2012 (10% Lowest)	0.305***	0.319***	0.007**	-0.319***	-0.311***
		(0.004)	(0.000)	(0.022)	(0.000)	(0.000)
	Performance 2012 (20% Lowest)	0.238***	0.248***	0.006**	-0.249***	-0.243***
		(0.003)	(0.000)	(0.021)	(0.000)	(0.000)
	Performance 2012 (40% Group)	0.149***	0.156***	0.004**	-0.156***	-0.152***
		(0.003)	(0.000)	(0.02)	(0.000)	(0.000)
	Performance 2012 (20% Highest)	0.059***	0.061***	0.002**	-0.061***	-0.06***
		(0.002)	(0.000)	(0.02)	(0.000)	(0.000)
	Average Years of Education Father	-0.002***	-0.002***	-0.001**	0.002***	0.002***
		(0.001)	(0.000)	(0.032)	(0.000)	(0.000)
	Average Years of Education Mother	-0.001***	-0.001***	-0.001*	0.001***	0.001***
		(0.001)	(0.001)	(0.063)	(0.001)	(0.001)
	Native People Father	-0.007***	-0.007***	-0.001*	0.007***	0.007***
		(0.003)	(0.001)	(0.062)	(0.001)	(0.001)
	Native People Mother	-0.01***	-0.01***	-0.001**	0.01***	0.01***
		(0.003)	(0.000)	(0.048)	(0.000)	(0.000)
	Number of Books in Household (11<x<50)	-0.003**	-0.003**	-0.0010	0.003**	0.003**
		(0.002)	(0.049)	(0.137)	(0.049)	(0.049)
	Number of Books in Household (x>51)	-0.009***	-0.01***	-0.001**	0.01***	0.009***
		(0.002)	(0.000)	(0.033)	(0.000)	(0.000)
	Household per capita income	-0.001**	-0.001**	-0.0010	0.001**	0.001**
		(0.001)	(0.038)	(0.122)	(0.038)	(0.038)
	Student's Gender	0.017***	0.017***	0.001**	-0.017***	-0.017***
	(1=Man; 0=Female)	(0.001)	(0.000)	(0.023)	(0.000)	(0.000)
	Student went toPre-kindergarten	0.008***	0.008***	0.001*	-0.008***	-0.008***
	(1=Yes; 0=No)	(0.003)	(0.002)	(0.064)	(0.002)	(0.002)
	Student went Kindergarten	0.021***	0.022***	0.001**	-0.022***	-0.021***
	(1=Yes; 0=No)	(0.005)	(0.000)	(0.041)	(0.000)	(0.000)
School Caractheristics	Public School	0.029***	0.03***	0.001**	-0.03***	-0.029***
	(1=Public School; 0=Other)	(0.005)	(0.000)	(0.032)	(0.000)	(0.000)
	Private Subsidized School	0.015***	0.016***	0.001*	-0.016***	-0.015***
	(1=Private Subsidized School; 0=Other)	(0.005)	(0.002)	(0.065)	(0.002)	(0.002)
	Private School	0	0	0	0	0
	(1=Private School; 0=Other)	(0)	(0)	(0)	(0)	(0)
	Student per course	-0.002***	-0.002***	-0.001**	0.002***	0.002***
		(0.001)	(0.000)	(0.024)	(0.000)	(0.000)
	Student by academic level	-0.0010	-0.0010	-0.0010	0.0010	0.0010
		(0.001)	(0.353)	(0.388)	(0.353)	(0.353)
	Average Years of Education Father (Course)	0.002*	0.002*	0.0010	-0.002*	-0.002*
		(0.001)	(0.06)	(0.146)	(0.06)	(0.06)
	Average Years of Education Mother (Course)	-0.002**	-0.002**	-0.0010	0.002**	0.002**
		(0.001)	(0.026)	(0.11)	(0.026)	(0.026)
	Household per capita income (Course)	-0.001***	-0.001***	-0.001**	0.001***	0.001***
		(0.001)	(0.000)	(0.046)	(0.000)	(0.000)
	Type of School	0.027***	0.028***	0.001**	-0.028***	-0.027***
	(1=Urban; 0=Rural)	(0.002)	(0.000)	(0.024)	(0.000)	(0.000)
	Low Income School	-0.0080	-0.0090	-0.0010	0.0090	0.0090
		(0.007)	(0.229)	(0.287)	(0.229)	(0.229)
	Low Middle Income School	0.0060	0.0060	0.0010	-0.0060	-0.0060
		(0.006)	(0.362)	(0.396)	(0.362)	(0.362)
	Middle Income School	0.0030	0.0030	0.0010	-0.0030	-0.0030
		(0.006)	(0.694)	(0.698)	(0.694)	(0.694)
	Upper Middle Income School	-0.0040	-0.0040	-0.0010	0.0040	0.0040
		(0.005)	(0.482)	(0.502)	(0.482)	(0.482)
	Upper Income School	0	0	0	0	0
		(0)	(0)	(0)	(0)	(0)
	N	83649	83649	83649	83649	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.2a – Marginal Effects Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

Marginal Effects Ordered Logit Model (2012-2016) (10-20-40-20-10 groups - Performance)							
			(1)	(2)	(3)	(4)	(5)
		Predicted Probability	4,81%	16,44%	51,88%	20,53%	6,34%
Home Reading Habits	Reading Stories	Annual	0.0040	0.0040	0.0010	-0.0040	-0.0040
		(1=Yes; 0=No)	(0.003)	(0.194)	(0.258)	(0.194)	(0.194)
		Monthly	0.0030	0.0030	0.0010	-0.0030	-0.0030
		(1=Yes; 0=No)	(0.003)	(0.239)	(0.295)	(0.239)	(0.239)
		Weekly	-0.0010	-0.0010	-0.0010	0.0010	0.0010
		(1=Yes; 0=No)	(0.003)	(0.807)	(0.808)	(0.807)	(0.807)
		Daily	-0.0040	-0.0040	-0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.004)	(0.307)	(0.35)	(0.307)	(0.307)
	Accompany the student to read	Annual	-0.007*	-0.007*	-0.0010	0.007*	0.007*
		(1=Yes; 0=No)	(0.004)	(0.063)	(0.148)	(0.063)	(0.063)
		Monthly	-0.0020	-0.0020	-0.0010	0.0020	0.0020
		(1=Yes; 0=No)	(0.003)	(0.61)	(0.618)	(0.61)	(0.61)
		Weekly	0.007***	0.007***	0.001*	-0.007***	-0.007***
		(1=Yes; 0=No)	(0.003)	(0.007)	(0.082)	(0.007)	(0.007)
		Daily	0.009***	0.009***	0.001*	-0.009***	-0.009***
		(1=Yes; 0=No)	(0.003)	(0.002)	(0.065)	(0.002)	(0.002)
	Visiting the library	Annual	-0.0020	-0.0020	-0.0010	0.0020	0.0020
		(1=Yes; 0=No)	(0.002)	(0.353)	(0.39)	(0.353)	(0.353)
		Monthly	0.0010	0.0010	0.0010	-0.0010	-0.0010
		(1=Yes; 0=No)	(0.002)	(0.949)	(0.949)	(0.949)	(0.949)
		Weekly	-0.0010	-0.0010	-0.0010	0.0010	0.0010
		(1=Yes; 0=No)	(0.003)	(0.884)	(0.884)	(0.884)	(0.884)
		Daily	-0.0040	-0.0040	-0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.005)	(0.46)	(0.482)	(0.46)	(0.46)
	Discussing the Readings	Annual	-0.0040	-0.0040	-0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.004)	(0.277)	(0.326)	(0.277)	(0.277)
		Monthly	-0.007***	-0.008***	-0.001*	0.008***	0.007***
		(1=Yes; 0=No)	(0.003)	(0.005)	(0.076)	(0.005)	(0.005)
		Weekly	-0.007***	-0.007***	-0.001*	0.007***	0.007***
		(1=Yes; 0=No)	(0.003)	(0.005)	(0.077)	(0.005)	(0.005)
		Daily	-0.0030	-0.0040	-0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.003)	(0.24)	(0.296)	(0.24)	(0.24)
	When did you start reading with the student?	Since he learned to speak	0.0020	0.0030	0.0010	-0.0030	-0.0020
		(1=Yes; 0=No)	(0.003)	(0.367)	(0.4)	(0.367)	(0.367)
		Since Pre-Kindergarden	-0.007***	-0.007***	-0.001*	0.007***	0.007***
		(1=Yes; 0=No)	(0.003)	(0.003)	(0.069)	(0.003)	(0.003)
		Since 1th Grade	0.008***	0.008***	0.001*	-0.008***	-0.008***
		(1=Yes; 0=No)	(0.003)	(0.003)	(0.069)	(0.003)	(0.003)
		Since he learned to read	0.0020	0.0020	0.0010	-0.0020	-0.0020
		(1=Yes; 0=No)	(0.003)	(0.6)	(0.609)	(0.6)	(0.6)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	0.017***	0.018***	0.001**	-0.018***	-0.018***
		(1=Yes; 0=No)	(0.004)	(0.000)	(0.038)	(0.000)	(0.000)
		Maximum Education Level Child (Finishes University)	-0.012***	-0.013***	-0.001**	0.013***	0.012***
		(1=Yes; 0=No)	(0.002)	(0.000)	(0.027)	(0.000)	(0.000)
	Reading Attitude	Parents read by necessity	0.005***	0.005***	0.001*	-0.005***	-0.005***
		(1=Yes; 0=No)	(0.002)	(0.001)	(0.063)	(0.001)	(0.001)
		Parents talk about reading content	0.0010	0.0010	0.0010	-0.0010	-0.0010
		(1=Yes; 0=No)	(0.002)	(0.559)	(0.573)	(0.559)	(0.559)
		Parents read in their free time	-0.0020	-0.0020	-0.0010	0.0020	0.0020
		(1=Yes; 0=No)	(0.002)	(0.24)	(0.297)	(0.24)	(0.24)
		Parents read only to get relevant information	0.005***	0.005***	0.001*	-0.005***	-0.005***
		(1=Yes; 0=No)	(0.002)	(0.003)	(0.069)	(0.003)	(0.003)
		Parents read because they consider it important	-0.008***	-0.008***	-0.001**	0.008***	0.008***
		(1=Yes; 0=No)	(0.002)	(0.000)	(0.034)	(0.000)	(0.000)
		Parents would like to have more time to read	0.0010	0.0010	0.0010	-0.0010	-0.0010
		(1=Yes; 0=No)	(0.002)	(0.832)	(0.834)	(0.832)	(0.832)
		Parents enjoy reading	-0.005**	-0.005**	-0.0010	0.005**	0.005**
		(1=Yes; 0=No)	(0.002)	(0.021)	(0.106)	(0.021)	(0.021)
		N	83649	83649	83649	83649	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.2b – Marginal Effects Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

5.5.2. 2013-2017 DATA PANEL

The distributions of score performance tests indicate that the primary variable that explains the belonging to a certain level of academic performance in 8th-grade (2017) is the result achieved in 4th-grade (during the year 2013), reflecting a high degree in the persistence in the relative academic performance. On the one hand, the probability of belonging to students with insufficient performance in 6th grade is 38 percentage points higher than if the student belonged to the 30% best academic performance in 4th grade. The probability projected by the model is the same performance level in 8th-grade is 39%, which ratifies what was found in our mobility matrices for this cohort. Analyzing the overall probability for the different performance states is 11% for acceptable performance, 40% for being at an elementary performance level, while only 49% probability of being at the insufficient performance level for 8th-grade. These results show that this cohort significantly worsened the results over the years. This result implies that almost half of the student population shows little evidence of reading various texts. They can only achieve an overall understanding of what is read in a full text or a section of it.

When considering the variables of student family characteristics, it is possible to establish that the more significant cultural capital of students' families. Also, more excellent parental schooling and better monetary income are facilitating mechanisms for better academic performance, reflecting that the various types of family capital affect performance in the first years of schooling and directly affect later academic performance. In addition to this result, students must attend pre-school education, such as pre-kindergarten, particularly for students who are in underachievement levels, since the sign of the marginal effect is positive.

On the other hand, it is confirmed that female students are more likely to perform better on the reading test. If they are in the acceptable performance range, it is 4.8% more likely for a female than for a male. Man's is at the underperformance level; he is 6% more likely to be at that level than a woman.

Considering the characteristics of schools, the composition of students per class, and the school's condition is relevant. In particular, if the number of students is higher in the class, students who are at the elementary and acceptable levels are favored, although the values are significant, the marginal effect is quite small. This marginal effect shows initially that the par effect would have a positive effect on reading skills. As for whether the schools are public, or Private subsidized (public-private), it is confirmed that for students at the lowest level, being in public schools would have a 4.5% impact on belonging to that level in 2017. While students at acceptable learning levels in 2017, they are less likely to be in public schools. These results confirm that the best results on this test are obtained by private or Private subsidized schools and that the concentration of students with insufficient levels is higher in public schools.

The reading habits of the home do not reflect the importance of this section in the previous cohort. These habits might because while the student is growing, he or she is performing academic tasks more independently, and it seems that much of the reading work was already formed in the first six years of education (2 years of pre-school education + 4 years of primary education).

The incorporation of parents' preferences about reading, and the expectations about the maximum educational level that their child will reach provide relevant results in the investigation. In terms of students' educational expectations, it is noted that if a student is at an insufficient reading level in 8th grade, parents only believe that he or she will finish high school.

Marginal Effects Ordered Logit Model (2013-2017) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)				
		(1)	(2)	(3)
	Predicted Probability	11,53%	39,32%	49,15%
Student Family Caractheristics	Performance 2013 (Acceptable Level)	0.399***	0.098***	-0.497***
		(0.003)	(0.002)	(0.003)
	Performance 2013 (Elementary Level)	0.187***	0.046***	-0.233***
		(0.003)	(0.001)	(0.003)
	Average Years of Education Father	0.003***	0.001***	-0.004***
		(0.001)	(0.001)	(0.001)
	Average Years of Education Mother	0.003***	0.001***	-0.004***
		(0.001)	(0.001)	(0.001)
	Native People Father	0.1060	0.0260	-0.1320
		(0.217)	(0.054)	(0.27)
	Native People Mother	-37.160	-0.9110	46.270
		(117383.5)	(28772.06)	(146155.5)
	Number of Books in Household (11<x<50)	0.011***	0.003***	-0.014***
		(0.003)	(0.001)	(0.003)
	Number of Books in Household (x>51)	0.012***	0.003***	-0.015***
		(0.003)	(0.001)	(0.004)
	Household per capita income	0.001*	0.001*	-0.001*
		(0.001)	(0.001)	(0.001)
	Student's Gender	-0.048***	-0.012***	0.06***
	(1=Man; 0=Female)	(0.002)	(0.001)	(0.003)
	Student went toPre-kindergarten	-0.011***	-0.003***	0.014***
	(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
	Student went Kindergarten	-0.0010	-0.0010	0.0020
	(1=Yes; 0=No)	(0.008)	(0.002)	(0.01)
School Caractheristics	Public School	-0.036***	-0.009***	0.045***
	(1=Public School; 0=Other)	(0.009)	(0.003)	(0.011)
	Private Subsidized School	-0.019**	-0.005**	0.023**
	(1=Private Subsidized School; 0=Other)	(0.009)	(0.003)	(0.011)
	Private School	0	0	0
	(1=Private School; 0=Other)	(0)	(0)	(0)
	Student per course	0.002***	0.001***	-0.002***
		(0.001)	(0.001)	(0.001)
	Student by academic level	-0.0010	-0.0010	0.0010
		(0.001)	(0.001)	(0.001)
	Average Years of Education Father (Course)	0.0010	0.0010	-0.0010
		(0.002)	(0.001)	(0.002)
	Average Years of Education Mother (Course)	0.002*	0.001*	-0.003*
		(0.002)	(0.001)	(0.002)
	Household per capita income (Course)	0.0010	0.0010	-0.0010
		(0.001)	(0.001)	(0.001)
	Type of School	-0.024***	-0.006***	0.03***
	(1=Urban; 0=Rural)	(0.004)	(0.001)	(0.005)
	Low Income School	-0.029**	-0.007**	0.036**
		(0.012)	(0.003)	(0.015)
	Low Middle Income School	-0.024**	-0.006**	0.03**
		(0.011)	(0.003)	(0.014)
	Middle Income School	-0.010	-0.0030	0.0130
		(0.01)	(0.003)	(0.013)
	Upper Middle Income School	-0.0040	-0.0010	0.0050
		(0.009)	(0.003)	(0.011)
	Upper Income School	0	0	0
	N	94726	94726	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.1a – Marginal Effects Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Marginal Effects Ordered Logit Model (2013-2017) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)					
			(1)	(2)	(3)
		Predicted Probability	11,53%	39,32%	49,15%
Home Reading Habits	Reading Stories	Monthly	0.0060	0.0020	-0.0070
		(1=Yes; 0=No)	(0.009)	(0.003)	(0.011)
		Weekly	-0.0010	-0.0010	0.0010
		(1=Yes; 0=No)	(0.009)	(0.003)	(0.011)
		Daily	-0.0020	-0.0010	0.0020
		(1=Yes; 0=No)	(0.009)	(0.003)	(0.011)
		Never	-0.0010	-0.0010	0.0010
		(1=Yes; 0=No)	(0.009)	(0.003)	(0.012)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	-0.034***	-0.009***	0.042***
		(1=Yes; 0=No)	(0.007)	(0.002)	(0.009)
		Maximum Education Level Child (Finishes University)	0.03***	0.008***	-0.037***
		(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
	Reading Attitude	Reading Hours	0.002***	0.001***	-0.002***
			(0.001)	(0.001)	(0.001)
		Parents read by necessity	-0.008***	-0.002***	0.01***
		(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
		Parents talk about reading content	-0.0020	-0.0010	0.0020
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.005)
		Parents read in their free time	0.0020	0.0010	-0.0030
		(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
		Parents read only to get relevant information	-0.011***	-0.003***	0.014***
		(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
		Parents read because they consider it important	0.0040	0.0010	-0.0050
		(1=Yes; 0=No)	(0.003)	(0.001)	(0.004)
		Parents would like to have more time to read	0.0020	0.0010	-0.0030
		(1=Yes; 0=No)	(0.004)	(0.001)	(0.005)
		Parents enjoy reading	0.0060	0.0020	-0.0070
		(1=Yes; 0=No)	(0.005)	(0.002)	(0.006)
		N	94726	94726	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.1b – Marginal Effects Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

This effect is close to 4.2%. While if a student belongs to the acceptable performance level for this year, the belief that he or she will finish in some higher education institution corresponds to 3%. As for parents' preferences in reading, it is significant if parents only read out of necessity and to obtain relevant information. In general, it is observed that if parents have these reading patterns, it persistently influences the student's underachievement, increasing 1% and 1.4% the probability of belonging. An independent variable of this cohort is the number of hours that parents dedicate to reading. As is to be expected, while more the more hours parents spend on reading, the more likely it is that the student who is at an acceptable level will stay at that level by 8th grade. These findings confirm the importance of reading behaviors in the home and how they influence student performance. These results can be seen in Tables 5.5.2.1a and 5.5.2.1b.

		Marginal Effects Ordered Logit Model (2013-2017) (10-20-40-20-10 groups - Performance)				
		(1)	(2)	(3)	(4)	(5)
	Predicted Probability	6,25%	21,14%	52,98%	15,76%	3,86%
Student Family Caractheristics	Performance 2013 (10% Lowest)	0.345***	0.343***	-0.0030	-0.341***	-0.345***
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
	Performance 2013 (20% Lowest)	0.271***	0.27***	-0.0020	-0.269***	-0.271***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	Performance 2013 (40% Group)	0.176***	0.175***	-0.0020	-0.174***	-0.176***
		(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
	Performance 2013 (20% Highest)	0.073***	0.073***	-0.0010	-0.073***	-0.073***
		(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Average Years of Education Father	-0.002***	-0.002***	0.0010	0.002***	0.002***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Average Years of Education Mother	-0.002***	-0.002***	0.0010	0.002***	0.002***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Native People Father	0.0170	0.0160	-0.0010	-0.0160	-0.0170
		(0.127)	(0.127)	(0.001)	(0.125)	(0.127)
	Native People Mother	0.1820	0.1810	-0.0020	-0.180	-0.1820
		(0.117)	(0.117)	(0.002)	(0.116)	(0.117)
	Number of Books in Household (11<x<50)	-0.006***	-0.006***	0.0010	0.006***	0.006***
		(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Number of Books in Household (x>51)	-0.005***	-0.005***	0.0010	0.005***	0.005***
		(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Household per capita income	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Student's Gender	0.025***	0.025***	-0.0010	-0.025***	-0.025***
	(1=Man; 0=Female)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Student went toPre-kindergarten	0.006***	0.006***	-0.0010	-0.006***	-0.006***
	(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Student went Kindergarten	0.008**	0.008**	-0.0010	-0.008**	-0.008**
	(1=Yes; 0=No)	(0.004)	(0.004)	(0.001)	(0.004)	(0.004)
Home Reading Habits	Public School	0.021***	0.02***	-0.0010	-0.02***	-0.02***
	(1=Public School; 0=Other)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
	Private Subsidized School	0.011**	0.011**	-0.0010	-0.011**	-0.011**
	(1=Private Subsidized School; 0=Other)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
	Private School	0	0	0	0	0
	(1=Private School; 0=Other)	(0)	(0)	(0)	(0)	(0)
	Student per course	-0.001***	-0.001***	0.0010	0.001***	0.001***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Student by academic level	0.001**	0.001**	-0.0010	-0.001**	-0.001**
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Average Years of Education Father (Course)	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Average Years of Education Mother (Course)	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Household per capita income (Course)	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	Type of School	0.014***	0.014***	-0.0010	-0.014***	-0.014***
	(1=Urban; 0=Rural)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Low Income School	0.010	0.010	-0.0010	-0.010	-0.010
		(0.007)	(0.007)	(0.001)	(0.007)	(0.007)
	Low Middle Income School	0.013**	0.013**	-0.0010	-0.013**	-0.013**
		(0.006)	(0.006)	(0.001)	(0.006)	(0.006)
	Middle Income School	0.0060	0.0060	-0.0010	-0.0060	-0.0060
		(0.006)	(0.006)	(0.001)	(0.006)	(0.006)
	Upper Middle Income School	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
	Upper Income School	0	0	0	0	0
		(0)	(0)	(0)	(0)	(0)
	N	94726	94726	94726	94726	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.2a – Marginal Effects Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

Marginal Effects Ordered Logit Model (2013-2017) (10-20-40-20-10 groups - Performance)							
			(1)	(2)	(3)	(4)	(5)
		Predicted Probability	6,25%	21,14%	52,98%	15,76%	3,86%
Home Reading Habits	Reading Stories	Monthly	-0.0070	-0.0070	0.0010	0.0070	0.0070
		(1=Yes; 0=No)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
		Weekly	-0.0060	-0.0060	0.0010	0.0060	0.0060
		(1=Yes; 0=No)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
		Daily	-0.0040	-0.0040	0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
		Never	-0.0040	-0.0040	0.0010	0.0040	0.0040
		(1=Yes; 0=No)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	0.016***	0.016***	-0.0010	-0.016***	-0.016***
		(1=Yes; 0=No)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)
		Maximum Education Level Child (Finishes University)	-0.015***	-0.014***	0.0010	0.014***	0.015***
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
	Reading Attitude	Reading Hours	-0.001***	-0.001***	0.0010	0.001***	0.001***
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
		Parents read by necessity	0.0030	0.0030	-0.0010	-0.0030	-0.0030
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents talk about reading content	0.0010	0.0010	-0.0010	-0.0010	-0.0010
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents read in their free time	-0.0010	-0.0010	0.0010	0.0010	0.0010
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents read only to get relevant information	0.007***	0.007***	-0.0010	-0.007***	-0.007***
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents read because they consider it important	-0.003*	-0.003*	0.0010	0.003*	0.003*
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents would like to have more time to read	0.0010	0.0010	-0.0010	-0.0010	-0.0010
		(1=Yes; 0=No)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
		Parents enjoy reading	-0.005**	-0.005**	0.0010	0.005**	0.005**
		(1=Yes; 0=No)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)
		N	94726	94726	94726	94726	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.2b – Marginal Effects Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

As for the 10-20-40-20-10 distribution, it gives that the probability of belonging to the lowest-performing group of students in 8th-grade is almost 28 percentage points higher than if the student belonged to the best academic performance in 4th-grade. In turn, the probability projected by the model of following in the same performance level in 8th-grade is only 6.25%, which ratifies what was found in our mobility matrices for this cohort. When analyzing the overall probability for the different performance states, 6% is at 10% low, 21% at 20% low, 53% in the middle of the group, 15% at 20% high, and only 4% at 10% high. These results allow us to confirm the persistence of the reading results, since it is observed that it is highly probable that the student will remain in the performance quintile, without observing progress or deterioration in his/her performance.

The student's familiar behavior and school characteristics give the same results as in the previous specification. Only the statistical significance for family cultural capital variables and per capita income is amplified. Finally, the incorporation of reading habits, parental preferences about reading, and expectations about the highest educational level present similar conclusions as in the previous distribution, but with reduced statistical significance. These results can be seen in tables 5.5.2.2a and 5.5.2.2b

5.5.3. COMPARATIVE COHORT ANALYSIS

Analyzing the two data cohorts together, we can summarize the main results:

- The significant predictions for the estimated specifications are the previous or initial performance of the cohorts. In particular, the greater persistence of students is observed when distributed by test score performance. In particular, for 2012-2016, it is observed that a large part of the students in the sample reach 6th grade with average reading skills or skills that would allow them to perform correctly at that educational level. However, by 2013-2017 it is observed that students reach the last year of primary education with the same skills presented in 6th grade. Therefore, it is possible to observe the trend of decreasing performance over the years, according to the proposed model. Although the student cohorts are different, and this implies that the characteristics are different among them if we can estimate the general trend. Therefore, at the end of 8th grade, we can see a deterioration of student performance for 6th grade. In particular, there would be a redistribution of students between elementary and undergraduate levels. The model predicts that there would be a higher probability that these students would migrate towards insufficient levels. One of the possible reasons for this mobility is that the Ministry of Education adjusts the metric between test score performance between 6th grade and 8th grade, where the insufficient level for 8th grade is similar to the elementary level of 6th grade in terms of expected reading targets. Therefore, one would expect most 8th graders to have a reading skills gap; that is, they are in 8th grade but have average skills equivalent to 6th grade. Gallego, Figueroa & Rodriguez (2019) point out that this trend would be present in a large part of the school system, being observed more actively in public and Private subsidized schools.
- Families' cultural capital, parents' educational years, parents' reading habits and reading preferences are relevant to students' future performance. The trajectory of these variables enhances the probability of belonging to high-performance levels for students. It is observed that the higher the reading habits and interactions in the home, the more likely it is that the student will perform well and remain so at the end of the years studied. On the contrary, if families or parents only see reading as a necessary activity in some activities, students' performance would drop, and they are more likely to be at insufficient performance levels. These effects would be more relevant to the 2012-2016 cohort, which would imply that the earlier a student is exposed to these family behaviors, the more likely he or she would be to improve performance. However, as students advance in their academic stage, it is observed that these values are not relevant to explain their performance at the end of primary education. Therefore, it confirms that the younger the students are exposed to reading, the more likely they are to perform better. Also, preschool attendance is relevant to being in high-performance groups. Contreras, Herrera & Leyton (2007) note that in Chile, preschool attendance is correlated with high socioeconomic groups and that these students perform better than average.

6. NATIONAL READING PLAN 2015-2020

This section aims to analyze the results obtained in the previous section in the National Reading Plan 2015-2020. In particular, it seeks to analyze whether the policies proposed by this plan are consistent with mobility patterns and, like this, can promote students' movement towards better-performing groups. It is decided to compare with this public policy since it is a continuation of previous efforts to promote a reading culture in Chile, and because the cohorts studied, allow to have a vision before the implementation of the policy, and thus project the success of this public policy.

The National Reading Plan 2015-2020 recognizes reading as an essential tool for acquiring knowledge and learning that strengthens human development and access to sociocultural diversity. Furthermore, it understands reading as an enabling factor for the active participation of different communities in today's society, since it affects both educational progress and the economic development of countries and emphasizes the value of reading as an expression of political will (MINEDUC, 2015). The general objective presented by the program is to favor the exercise of the right to reading, in all formats and supports, promoting and making visible the citizen participation in the implementation of the National Reading Plan and the Regional Reading Plans. To this end, it seeks to achieve coordination between public entities linked to education and culture (MINEDUC, 2015).

The results relate they obtained in this research to the national reading plan, the strategic lines presented in the plan for 2015-2020 will be followed. The strategic lines are the principal axes of the national reading plan. In these axes, different sectors and agents involved in reading are committed to addressing the population in its diversity, achieve higher coverage, and guarantee the continuity of the plan over time. There are four of them: Access, Training, Studies, and Communication. However, only Access and Training can be shared with this research.

6.1. STRATEGICS OBJECTIVES: READING ACCESS

Reading access is one of the strategic objectives, which implies the formulation of actions and programs that guarantee access to reading for all the country's inhabitants. The plan considers strengthening libraries and multiplying reading spaces. This access implies generating opportunities for effective encounters between people, reading materials, and authors to develop closeness and reading habits in the population. It also seeks to expand reading materials and facilitate the management of reading spaces (MINEDUC, 2015).

According to the results obtained in the different study cohorts, one of the main predictors of student performance is the cultural capital presented by their family group. Considering that the research used the number of books available in the home, the implementation of more reading spaces outside the student's home is considered a positive aspect, but it would not be enhancing the results in the same way as an increase in the number of books in the home. One of the direct actions of this strategic objective considers the delivery and replacement of classroom libraries, made up of 30 titles, to all pre-kindergarten to 2nd-grade classrooms in the country's public schools.

Thex 2012-2016 cohort, there is no statistical significance to the question. ¿Do you accompany your child to the library? In any of the time frequencies researched. This result is striking given the Chilean educational context but is consistent with the background of the students analyzed. Since the cohort only considers students who have not repeated any course, they would be considered auspicious for the educational system, regardless of reading performance. The cohort, 75% of the students are at least at an elementary level for their reading skills. Finally, it

is expected that these results only represent this population of students, biasing the overall results. This bias would hide the Chilean educational reality, where school performance depends on a large percentage on the socio-economic distribution (Valenzuela, 2009; Valenzuela and Sevilla, 2011). Therefore, the results obtained would be biased towards observing students with better reading performance and a greater probability of belonging to middle or higher social groups.

Considering this context, the increase in reading spaces would seem insufficient to promote reading performance. According to the results obtained, the strategy that is suggested to be implemented is the promotion of reading spaces towards the parents of the students so that the students see that their parents are heading towards a better reading behavior and to be able to imitate them. Besides, it is suggested that public policy efforts be concentrated on increasing reading spaces for preschool students since attendance at this type of education is one of the most relevant factors in the persistence of student reading performance. It would be expected that a medium-term strategy that considered these development factors together would have positive effects on Chilean students. Although it is recognized that Chilean educational persistence is very high and biased towards the socio-economic status of households, at least for new students entering the Chilean education system, they would have the option of improving their reading performance.

6.2. STRATEGICS OBJECTIVES: READING TRAINING

Reading training is the second of the strategic objectives. This objective considers that the promotion of reading often responds to requests for meetings in which mediators play a fundamental role in facilitating, promoting, and developing the habit of reading in diverse publics. This indicator proposes intermediary actions to facilitate the approach to written materials and to encourage the interest in reading. Among the strategies, it is recognized that training for teachers and families in reading techniques would be one of the efforts of the plan (MINEDUC, 2015). In particular, public policy is committed to the creation of reading mediators. A reading mediator is defined as a bridge or link between books and early readers, who encourages and facilitates dialogue among early readers (Cerrillo, 2007; Lluch, 2003; Petit, 1999). These reading mediators are fundamental for the transmission of reading habits to children and young people who are far from it. Besides, the accompaniment of persons who demonstrate a love for reading and a willingness to share this passion in the formation of readers becomes fundamental for new readers (Petit, 1999).

According to the results obtained in this research, strengthening the training and preparation of reading mediators is vital to promoting students' reading performance. For both cohorts, the results obtained regarding the reading attitude of parents in the home directly impact the probability of belonging to high-performance groups. In particular, if parents have a negative attitude towards reading, the results observed in students are that they are more likely to belong to lower-achieving reading groups and have a lower reading level than they should have at their academic level. Although efforts to implement this policy are not 100% directed toward family groups, achieving the preparation of reading mediators in schools would replace the time that students spend with some adult figures that can promote reading habits. To focus this policy, even more, it is recommended to focus on promoting reading mediators for preschool education, since this would enhance the effects of attending this type of school. Finally, it would be expected that the implementation of these strategies would be successful in the medium to long term since reading facilitators' training is not trivial, and observing the results in possible cohorts would take even more time (Sonnenschein & Sun, 2017)

7. CONCLUSION AND RECOMMENDATION

In this research, an effort has been made to answer the two types of analysis that the comparative literature considers for academic performance trajectories at an individual level, following the methodology proposed by Valenzuela, Allende, Sevilla, and Egaña (2013). In particular, new student cohorts and the inclusion of 2nd-grade students were incorporated; and limiting the effect only for the SIMCE reading test. As for the questions to be solved with this research, it is possible to modify or how persistent the students' educational trajectories are for the Chilean case and to identify protective and risk factors that affect these individual educational trajectories.

The results present an essential set of restrictions, and therefore their results should be considered with caution, recognizing the need to continue to carry out complementary research that allows for a more precise and comprehensive set of findings obtained in this work. Among the main limitations of our work is that we do not have a cohort with educational results for 2nd grade, 4th-grade 6th grade, and 8th grade, but we use two different cohorts, and there may be relevant changes between them, which are affecting the observed results and the conclusions inferred from them. Additionally, it implied the implementation of similar econometric strategies for the cohorts, but with nuances due to data availability.

The study did not consider the psychosocial variables or non-cognitive abilities of the students themselves. These factors are mentioned as relevant in the comparative literature by Valenzuela, Allende, Sevilla, and Egaña (2013). Nor has it been corrected for different selection biases, which mainly affect the number of students we observe again over time, and the possible effects observed on students who repeat some school level have been omitted. The main reason for the omission of repeating students is that they would present characteristics to be studied that are much more differentiating than students who pass the course, which would imply a more exhaustive investigation, and therefore, a reason for studying a complete thesis.

Regarding the trajectories of the academic performance of Chilean students, the results of the study show that there are very high levels of persistence in the relative position of the academic performance of students, being consistent between both cohorts. However, the mobility of academic performance decreases over the years. Therefore, it is evident that the possibility of changing performance groups is greater the smaller the students are.

An interesting fact to highlight from this research is that although there is the probability of change of performance group. It is more likely that this movement is in the groups close to those belonging; that is, if a student is in the 5th decile of performance, it is more likely that he or she progresses or regresses one performance level than that his or her mobility increases or regresses in two or more performance levels. This behavior is observed only in the 10-20-40-20-10 and decile group distributions.

As a result of these mobility patterns, students' academic performance is achieved in the first years of schooling, since, to a small extent, this result would condition their future, which is highly consistent with countries where similar studies exist. These results would be in line with those presented by Valenzuela, Allende, Sevilla, and Egaña (2013). However, this work's innovation is to include a lower educational year than in their study, thus confirming the relevance of broadening the spectrum of policies beyond these first years of schooling and preschool education to narrow the gaps exposed in this work.

It is important to note that this study compares student mobility according to test score performance (A-E-I). Based on these performance criteria, it can be seen that for groups with insufficient and acceptable levels of performance, the persistence of staying in those performance levels is quite high, reaching approximately 65% of probabilities. While if a student is at elementary levels, it is more likely that he or she will migrate to acceptable levels of performance than that he or she will regress over the years. This result gives the intuition of mobility; however, it is contrasted with the model's predictions for the 2013-2017 cohort, where it is predicted that students at the end of 8th grade will be concentrated in underachievement levels.

Concerning the analysis of factors associated with educational performance trajectories in the reading test, we conclude that the performance achieved by each student in 2nd grade or 4th grade is the most relevant variable to explain performance in 6th or 8th grade, reflecting that initial conditions in school life are indeed determining factors in the future schooling of each child. These results allow us to relate the conclusions of Valenzuela, Allende, Sevilla, and Egaña (2013), since they observe the same patterns of results up to the second year of high school. Additionally, the persistence in the results in underperforming students in public schools is observed for all students in the cohort. This persistence suggests that the schools' characteristics are just as relevant as the socio-cultural context of the families, especially for the Chilean educational context. Therefore, generating conditions that foster equality of opportunity in performance trajectories, through equal access to schools that have better conditions and performance, would lead to greater equality of opportunity to achieve positive trajectories.

One of the essential conclusions of this research is the incorporation of the reading habits and preferences of parents, and how these impact on the probability of distribution within achievement groups. It is observed that parents who have more significant reading habits, either enjoying reading activity or spending more time reading, would make their children more likely to observe them at acceptable or high achievement levels, depending on the distribution. On the contrary, those parents who see only reading as something exclusively necessary for some events in daily life, do not favor the school performance of students. The results obtained in parent-child interaction in reading skills are also highlighted. In particular, the younger the students are, and the parents read stories with them and discuss the readings at a frequency of at least once a week, the more likely they are to stay in a high-performance group, as compared to just parents reading with their children. These results are further enhanced if parents begin reading with their children as early as pre-kindergarten. Finally, it is observed that if parents have low educational expectations for their children. If they believe that they will only finish high school, it is more likely that their children will be in low or insufficient performance groups; otherwise, with parents who bet that their children will finish some degree of higher education, it is more likely that the students will be in higher performance levels.

When analyzing the National Reading Plan 2015-2020 program, which aims to improve reading outcomes in the Chilean population and the educational trajectories of students, It is recognized that the proposed public policy has the incentives well directed, in terms of strategic objectives. However, it is recognized that the program lacks concrete and direct proposal for improving student results. Despite this research, it is suggested that greater emphasis be placed on the creation of reading mediators and greater exposure of families to cultural capital, through greater incorporation of books in the home. In turn, this research does not provide direct results of student attendance at libraries and its possible effect on primary education performance.

Based on the study results, it is possible to propose a set of strategies and policies that support the generation of trajectories of better educational performance. To this end, it is recommended that the following actions be prioritized:

- Gives high priority to the achievement of high school performance levels in the first years of education, since this is the best protection against inequity and low achievement in subsequent education levels.
- Implement reading commitments that involve homes and preschool institutions to promote reading behavior and habits among students, since the evidence is clear that these two variables are related to better student reading performance.
- Promote several hours of compulsory reading in the first educational levels, in charge of reading mediators, in order to expose students to more excellent quality in reading, and with this to initiate reading habits in students.
- To create reading performance indices in preschool education to detect possible gaps that may arise in the system. While it is recognized that implementing evaluations of children at an early age is desirable, the difficulty lies in implementing didactic mechanisms that detect students' strengths and weaknesses.
- Create easily recognizable indicators for the student and family community, so that households and educational institutions can observe more clearly the reading performance of the establishment and individual, promoting that more significant development in these skills brings us closer to a society with a higher probability of obtaining more significant political, economic and social development.
- Promote policies aimed at increasing the percentage of students with high reading achievement from the first years of schooling and those that allow them to maintain this condition throughout their school lives. This condition will not only allow us to have a more equitable school system among the most talented students, regardless of their socioeconomic conditions. However, it will also make it possible to increase the low percentage of students who reach more advanced levels of educational performance in our school system, especially at the end of the primary education cycle.
- Expand research on this topic, given that this research is the second attempt to formalize and establish real relationships in educational mobility and reading skills for Chile. It also highlights the relevance of the design and evaluation of public policies to achieve quality education for all children.

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APPENDIX
3. DATA SECTION
3.1. SIMCE: EDUCATION CHILEAN TEST

2th Grade		
Acceptable	Elementary	Insufficient
For this level, students can establish what a literary or non-literary text on a familiar topic is about, sequence chronologically the events presented, make inferences about unfamiliar situations from obvious clues given in the text, locate explicit information, and reflect on the reading to give opinions or propose a solution to a problem by referring to relevant aspects of the text.	These students can establish, when evident, what a literary or non-literary text on a familiar topic is about, chronologically sequence the main events presented. Also, they make inferences about familiar situations from obvious clues given in the text, locate explicit information that appears in the body of a short text or that is easily visualized, and reflect on the reading to give opinions by alluding to details that have no further relevance in the text.	These students show little evidence that they understand appropriate texts. In simple words, they cannot read.

Table 3.1.1 – SIMCE Learning Standards for 2th grade of elementary school

4th Grade		
Acceptable	Elementary	Insufficient
Students show evidence of locating explicit information found in the body of a text; making interpretations and relationships to establish what a text is about, sequencing actions, making inferences, and determining the meaning of words and figurative language expressions; and reflecting on reading to solve simple tasks by applying information from the text and making opinions based on what read.	These students show evidence of locating explicit information that is easy to find. For example, they are making simple interpretations and relationships to establish what a text is about, like sequence actions, make inferences. Also, the students can determine the meaning of words and figurative language expressions; and reflecting on reading to solve simple tasks by apply easily identifiable information in the text and to make personal impressions about various aspects of what read.	Students at this level can locate explicit information that is easy to find, make simple interpretations and relationships, and reflect on reading.

Table 3.1.2 – SIMCE Learning Standards for 4th grade of elementary school

6th Grade		
Acceptable	Elementary	Insufficient
Students can reach an overall understanding of a whole text or a section of it when several ideas appear that compete in importance. They excel at integrating information present in different parts of the text or drawing conclusions about any aspect of a text; sequencing chronologically the events or steps presented; making direct inferences from connections, both visible and suggested, in texts that present situations, vocabulary or themes that may be unfamiliar to them. As a result, they can interpret unfamiliar figurative language expressions from textual markers; locate explicit information when several developed ideas or complementary information appear. Finally, they reflect on reading to express informed opinions that integrate various ideas from the text or previous knowledge; applying the information to solve tasks of medium complexity, and evaluating the contribution of information or graphic resources to the purpose of the text.	Students achieve a global understanding of a complete text or a section of it when the subject is evident or unique, managing to integrate close, highlighted or repeated ideas in the text, or to establish conclusions on central aspects of the text. They can also sequence chronologically the events and steps presented when they are distinguishable. Also, they make direct inferences from obvious connections in texts that present situations, vocabulary or topics familiar to them; interpret familiar figurative language expressions; locate explicit information that is easy to locate, and reflect on reading to express opinions based on ideas in the text, and apply information to solve simple tasks.	Those students can achieve an overall understanding of a full text or a section of it, make suggested direct inferences, locate explicit information that is easy to locate, and reflect on reading to express an informed opinion or to apply information.

Table 3.1.3 – SIMCE Learning Standards for 6th grade of elementary school

8th Grade		
Acceptable	Elementary	Insufficient
Students achieve a comprehensive understanding of what is read in a full text or a section of it, in which several critical competing ideas appear. They also succeed in chronologically sequencing the events presented in a text with complex syntax. They can recognize causes or potential consequences in the reading, besides locating explicit information in any part of the text, making direct inferences. Finally, they can interpret figurative language based on suggested clues and reflect on reading in order to make evaluations based on what they have read.	These students can demonstrate some understanding of what read in a full text or a section of it when this is relatively evident. They also manage to chronologically sequence the events set out in a text of medium complexity syntax, recognizing obvious causes or consequences. Students can locate explicit information in the body of the text, making direct inferences suggested in the text and interpreting familiar figurative language expressions, which allows them to reflect on the reading in order to make evaluations based on personal impressions.	Those students show little evidence that by reading various types of texts. They can only achieve an overall understanding of what read in a full text or a section of it. They can locate explicit information that appears in the body of a text, making direct inferences that suggested; and reflect on the reading to make assessments based on personal impressions.

Table 3.1.4 – SIMCE Learning Standards for 8th grade of elementary school

5. ANALYSIS AND DISCUSSION
5.3. TRANSITION MATRICES

Description	2016/2017 (j)
2012/2013 (i)	Group distribution i of the year 2012/2013 according to the year of origin 2016/2017
	Group distribution j of the year 2016/2017 according to the year of origin 2012/2013
	Student numbers from each grid

Table 5.3.1.1 – Interpretation Description about Transition Matrices

5.3.1. 2012-2016 ANALYSIS

		2016										
	Deciles	1	2	3	4	5	6	7	8	9	10	Total
2012	1	**36,53**	24,11	15,13	9,99	6,67	3,66	2,14	0,95	0,66	0,15	100
		32,28	20,13	12,71	9,20	5,94	3,74	2,35	1,23	0,76	0,20	88,54
		5614	3137	1928	1299	865	536	314	152	104	30	13979
	2	24,36	**21,15**	16,53	13,19	9,13	6,81	4,41	2,53	1,21	0,65	100
		22,29	**19,02**	14,89	12,64	10,33	7,42	5,03	3,03	1,58	0,79	97,03
		4257	**3242**	2481	1987	1521	1157	741	430	228	134	16178
	3	13,68	15,88	**16,00**	14,79	12,69	10,64	7,47	4,93	2,94	0,97	100
		14,73	16,50	**15,27**	14,67	12,22	10,12	7,17	4,83	3,23	1,03	99,77
		2747	2762	**2611**	2395	2054	1774	1212	798	527	193	17073
	4	9,97	13,14	14,53	**14,49**	13,61	12,22	9,37	6,85	4,26	1,57	100
		10,43	12,81	14,58	**13,89**	13,59	12,30	9,74	7,35	5,06	2,08	101,83
		2059	2332	2560	**2439**	2364	2205	1664	1219	834	370	18046
	5	6,81	9,47	12,09	12,59	**13,69**	13,13	12,10	9,86	6,77	3,50	100
		7,13	10,47	12,79	12,93	**13,32**	13,10	12,44	10,09	7,60	4,08	103,95
		1426	1813	2219	2222	**2389**	2398	2173	1746	1307	777	18470
	6	4,66	6,68	9,29	10,98	12,40	**13,22**	14,52	12,15	9,93	6,15	100
		5,03	7,57	9,92	11,36	12,88	**13,51**	14,55	12,27	10,72	6,68	104,49
		959	1247	1646	1866	2140	**2347**	2473	2051	1809	1269	17807
	7	2,81	4,61	7,23	8,81	11,08	13,06	**13,93**	14,79	13,56	10,12	100
		3,29	5,57	8,11	9,78	11,11	13,51	**14,09**	14,98	13,78	10,39	104,63
		620	913	1347	1591	1935	2396	**2450**	2572	2464	2073	18361
	8	1,86	2,98	4,65	6,41	8,47	10,68	13,23	**16,57**	17,98	17,18	100
		2,22	3,90	5,41	6,97	9,41	11,22	13,34	**15,93**	17,43	16,01	101,84
		436	649	936	1220	1649	2096	2476	**3005**	3401	3541	19409
	9	1,23	2,21	3,32	4,65	6,09	8,05	11,66	16,52	**20,99**	25,27	100
		1,59	2,64	3,96	5,39	6,83	9,22	12,40	16,48	**19,83**	24,12	102,47
		269	401	588	787	1029	1431	1923	2602	**3367**	4595	16992
	10	0,98	0,88	1,79	2,68	4,02	5,50	8,69	14,23	22,72	**38,50**	100
		1,02	1,40	2,35	3,17	4,35	5,83	8,88	13,81	20,01	**34,62**	95,46
		186	188	333	456	662	932	1395	2197	3497	**6733**	16579
	Total	102,90	101,12	100,58	98,59	97,85	96,98	97,53	99,38	101,02	104,06	**100**
		100	100	100	100	100	100	100	100	100	100	**100**
		18573	16684	16649	16262	16608	17272	16821	16772	17538	19715	**172894**

Table 5.3.1.2 – Transition Matrix for deciles between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: group distribution j of the year 2016 according to the year of origin 2012; third line: Student numbers from each grid)

		2016			
	3th Group	30	40	30	Total
2012	30	**60,44**	34,54	5,02	100,00
		57,17	25,02	5,18	87,37
		29286	15847	2531	47664
	40	25,37	**49,79**	24,84	100,00
		34,96	**50,57**	33,82	119,35
		19151	**35082**	18514	72747
	30	6,93	30,98	**62,09**	100,00
		7,87	24,41	**61,00**	93,28
		3994	16079	**32957**	53030
	Total	92,75	115,31	91,94	**100**
		100,00	100,00	100,00	**100**
		52431	67008	54002	**173441**

Table 5.3.1.3 – Transition Matrix for 3rd group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: group distribution j of the year 2016 according to the year of origin 2012; third line: Student numbers from each grid)

		2016			
	Performance	Insufficient	Elemental	Acceptable	Total
2012	Insufficient	**63,20**	29,15	7,66	100,00
		47,41	20,35	4,09	71,84
		24396	12656	3522	40574
	Elemental	29,33	**40,54**	30,12	100,00
		39,00	**46,35**	23,99	109,34
		15776	**24256**	18360	58392
	Acceptable	9,18	24,98	**65,84**	100,00
		13,59	33,31	**71,92**	118,82
		5224	16298	**48073**	69595
	Total	101,71	94,68	103,62	**100**
		100,00	100,00	100,00	**100**
		45396	53210	69955	**168561**

Table 5.3.1.4 – Transition Matrix for Test Score Standards group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: group distribution j of the year 2016 according to the year of origin 2012; third line: Student numbers from each grid)

		2016					
	5th Group	10	20	40	20	10	Total
2012	10	**42,80**	34,05	20,90	1,99	0,26	100,00
		26,61	13,67	3,81	0,53	0,10	44,73
		5613	5067	3015	256	30	13981
	20	23,26	**32,19**	37,40	6,00	1,14	100,00
		40,47	**34,68**	18,56	5,00	1,44	100,16
		7242	**11358**	12832	1920	325	33677
	40	7,92	19,43	**46,54**	19,02	7,10	100,00
		28,30	43,00	**54,01**	41,05	22,23	188,59
		5065	14084	**35082**	14023	4491	72745
	20	2,31	7,44	34,06	**32,08**	24,12	100,00
		3,66	7,41	18,88	**37,20**	42,63	109,78
		707	2580	12633	**12387**	8143	36450
	10	1,25	3,57	20,68	31,98	**42,52**	100,00
		0,95	1,24	4,73	16,22	**33,60**	56,75
		186	521	3446	5694	**6733**	16580
	Total	77,54	96,68	159,58	91,07	75,14	**100**
		100,00	100,00	100,00	100,00	100,00	**100**
		18813	33610	67008	34280	19722	**173433**

Table 5.3.1.5 – Transition Matrix for 5th group between 2012 and 2016
(First line: group distribution i of the year 2012 according to the year of origin 2016; second line: group distribution j of the year 2016 according to the year of origin 2012; third line: Student numbers from each grid)

2012					
Decil	N	Mean	SD	Min	Max
1	10303	169,92	18,96	90,59	192,99
2	10301	205,23	6,47	193,00	215,49
3	10299	224,00	4,69	215,50	231,89
4	10305	239,16	4,06	231,90	245,98
5	10301	252,59	3,71	245,99	259,26
6	10318	265,55	3,58	259,27	272,43
7	10351	278,33	3,22	272,44	285,03
8	10276	292,03	3,44	285,04	298,16
9	10416	308,04	5,72	298,17	315,59
10	10140	333,63	11,43	315,64	348,46

Table 5.3.1.6 – Statistics Descriptive for decile performance in 2012

2016					
Decil	N	Mean	SD	Min	Max
1	11640	164,23	14,60	119,90	184,57
2	11643	197,37	7,03	184,58	208,91
3	11638	218,44	5,22	208,92	227,22
4	11640	235,33	4,63	227,23	243,27
5	11646	250,74	4,23	243,28	257,99
6	11637	264,85	3,90	258,00	271,44
7	11640	278,33	3,99	271,45	285,2
8	11638	292,69	4,35	285,21	300,42
9	11640	309,44	5,50	300,43	319,31
10	11634	336,45	12,04	319,32	373,49

Table 5.3.1.7 – Statistics Descriptive for decile performance in 2016

2012					
Quintile	N	Mean	SD	Min	Max
10% Lowest	10303	169,92	18,96	90,59	192,99
20%	20600	214,62	10,96	193,00	231,89
40%	41275	258,93	15,05	231,90	285,03
20%	20692	300,09	9,30	285,04	315,59
10% Highest	10140	333,63	11,43	315,64	348,46

Table 5.3.1.7 – Statistics Descriptive for quintile performance in 2012

2016					
Quintile	N	Mean	SD	Min	Max
10% Lowest	11640	164,23	14,60	119,90	184,57
20%	23281	207,90	12,22	184,58	227,22
40%	46563	257,31	16,55	227,23	285,2
20%	23278	301,06	9,73	285,21	319,31
10% Highest	11634	336,45	12,04	319,32	373,49

Table 5.3.1.8 – Statistics Descriptive for quintile performance in 2016

2012

Performance	N	Mean	SD	Min	Max
Acceptable	46712	298,79	23,16	265,00	348,46
Elementary	35990	241,55	14,25	215,00	264,99
Insufficient	20308	187,17	22,55	90,59	214,99

Table 5.3.1.8 – Statistics Descriptive for test score performance in 2012

2016

Performance	N	Mean	SD	Min	Max
Acceptable	40162	308,84	21,13	279,00	373,49
Elementary	37226	256,80	13,17	233,00	278,99
Insufficient	39008	197,20	25,68	119,90	232,99

Table 5.3.1.9 – Statistics Descriptive for test score performance in 2016

5.3.2. 2013-2017 TRANSITION MATRICES

		2017										
	Deciles	1	2	3	4	5	6	7	8	9	10	Total
2013	1	**42,87**	23,88	14,48	8,26	5,32	2,57	1,77	0,53	0,20	0,10	100
		32,77	14,37	7,36	3,60	2,06	1,12	0,63	0,24	0,16	0,16	62,46
		7291	3377	1665	780	449	216	133	42	19	12	13984
	2	29,56	**23,98**	17,08	12,24	8,15	4,51	2,48	1,30	0,40	0,29	100
		21,80	**17,55**	12,26	7,73	4,47	2,57	1,46	1,01	0,60	0,33	69,79
		5084	**4019**	2535	1481	858	456	243	140	56	31	14903
	3	21,20	21,45	**18,03**	14,02	10,67	7,16	3,99	1,91	1,13	0,44	100
		15,16	16,58	**14,23**	10,57	7,77	5,35	3,60	1,92	1,08	0,53	76,79
		3597	3756	**2864**	1892	1311	834	486	237	125	49	15151
	4	15,81	18,31	17,33	**15,29**	12,11	8,77	5,78	3,70	2,08	0,82	100
		10,52	15,08	14,67	**12,64**	10,60	8,13	5,31	3,67	2,21	0,91	83,74
		2683	3494	3019	**2300**	1746	1218	757	485	259	94	16055
	5	10,76	15,02	16,01	15,17	**14,27**	11,23	8,30	5,51	2,72	1,01	100
		6,98	11,77	14,20	14,36	**12,89**	10,97	8,17	5,81	3,75	1,56	90,46
		1943	2977	3090	2676	**2287**	1756	1239	820	424	149	17361
	6	7,68	11,96	14,11	14,71	14,70	**12,60**	10,61	7,34	4,53	1,77	100
		4,76	9,21	12,19	14,35	14,67	**13,76**	11,45	9,30	7,02	3,47	100,19
		1442	2487	2849	2814	2658	**2238**	1783	1285	804	315	18675
	7	4,80	7,58	10,81	13,11	14,30	14,51	**13,52**	10,76	7,10	3,50	100
		3,52	6,98	10,32	12,90	15,44	15,21	**14,84**	12,54	10,24	6,32	108,32
		1078	1893	2510	2762	2957	2794	**2541**	2009	1348	663	20555
	8	3,23	5,02	7,93	10,04	12,23	13,91	15,18	**14,22**	11,45	6,78	100
		2,25	4,29	7,74	10,93	13,47	16,40	17,79	**18,13**	16,38	12,58	119,97
		762	1288	1999	2396	2761	3062	3193	**3002**	2361	1414	22238
	9	1,97	2,88	4,40	6,99	8,95	12,25	14,83	16,99	**17,17**	13,57	100
		1,42	2,79	4,66	8,01	11,34	15,34	18,99	23,11	**24,66**	24,77	135,11
		502	833	1222	1815	2290	2952	3459	3939	**3802**	3016	23830
	10	0,93	1,27	1,80	2,71	4,41	6,78	10,11	15,53	22,86	**33,61**	100
		0,81	1,37	2,37	4,93	7,30	11,15	17,74	24,26	33,88	**49,37**	153,17
		308	455	655	1034	1515	2202	3234	4623	6316	**8689**	29031
	Total	138,82	131,35	121,97	112,54	105,10	94,28	86,58	77,81	69,66	61,89	**100**
		100	100	100	100	100	100	100	100	100	100	**100**
		24690	24579	22408	19950	18832	17728	17068	16582	15514	14432	**191783**

Table 5.3.2.1 – Transition Matrix for deciles between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: group distribution j of the year 2017 according to the year of origin 2013; third line: Student numbers from each grid)

		2017			
	3rd Group	30	40	30	Total
2013	30	**70,38**	27,46	2,16	100,00
		51,80	13,56	2,15	67,51
		34203	9140	711	44054
	40	35,58	**50,66**	13,76	100,00
		39,30	**49,63**	23,53	112,46
		29481	**34540**	8656	72677
	30	8,94	37,31	**53,75**	100,00
		8,90	36,81	**74,32**	120,03
		8030	29922	**37169**	75121
	Total	114,90	115,42	69,67	**100**
		100,00	100,00	100,00	**100**
		71714	73602	46536	**191852**

Table 5.3.2.2 – Transition Matrix for 3rd group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: group distribution j of the year 2017 according to the year of origin 2013; third line: Student numbers from each grid)

		2017			
	Performance	Insufficient	Elemental	Acceptable	Total
2013	Insufficient	**66,60**	26,49	6,92	100,00
		64,42	29,82	7,38	101,61
		24396	12656	3522	40574
	Elemental	31,24	**40,14**	28,62	100,00
		28,45	**46,41**	34,70	109,56
		15776	**24256**	18360	58392
	Acceptable	10,73	26,21	**63,06**	100,00
		7,13	23,77	**57,93**	88,83
		5224	16298	**48073**	69595
	Total	108,57	92,84	98,59	**100**
		100,00	100,00	100,00	**100**
		45396	53210	69955	**168561**

Table 5.3.2.3 – Transition Matrix for Test Score Standards group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: group distribution j of the year 2017 according to the year of origin 2013; third line: Student numbers from each grid)

		2017					
	5th Group	10	20	40	20	10	Total
2013	10	**57,14**	34,81	7,70	0,28	0,08	100,00
		23,72	10,08	2,27	0,18	0,05	36,30
		7291	5042	1578	61	12	13984
	20	30,98	**45,96**	21,31	1,55	0,21	100,00
		31,96	**24,10**	9,12	1,35	0,41	66,94
		8686	**13183**	7561	558	80	30068
	40	10,57	34,38	**44,77**	8,85	1,43	100,00
		34,61	48,48	**44,50**	20,36	6,74	154,69
		7150	22331	**34540**	7435	1221	72677
	20	2,98	13,84	48,47	**26,12**	8,59	100,00
		7,70	14,17	32,18	**40,62**	27,69	122,35
		1265	5347	21937	**13111**	4430	46090
	10	1,32	5,30	34,40	36,29	**22,69**	100,00
		2,02	3,17	11,93	37,49	**65,11**	119,72
		308	1110	7985	10939	**8689**	82900
	Total	102,99	134,29	156,64	73,08	32,99	**100**
		100,00	100,00	100,00	100,00	100,00	**100**
		24700	47013	73601	32104	14432	**191850**

Table 5.3.2.4 – Transition Matrix for 5th group between 2013 and 2017
(First line: group distribution i of the year 2013 according to the year of origin 2017; second line: group distribution j of the year 2017 according to the year of origin 2013; third line: Student numbers from each grid)

2013					
Decil	N	Mean	SD	Min	Max
1	11657	177,37	17,37	118,42	200,51
2	11652	214,59	7,54	200,52	226,72
3	11648	236,34	5,30	226,73	245,11
4	11657	252,64	4,24	245,12	259,78
5	11649	266,51	3,76	259,79	272,88
6	11653	279,07	3,56	272,89	285,21
7	11649	291,53	3,71	285,22	298,08
8	11657	305,05	4,14	298,09	312,57
9	11643	321,37	5,61	312,59	330,96
10	11649	347,50	11,62	330,97	378,17

Table 5.3.2.5 – Statistics Descriptive for decile performance in 2013

2017					
Decil	N	Mean	SD	Min	Max
1	10784	162,43	16,11	97,59	182,99
2	10779	194,79	6,33	183,00	204,97
3	10782	213,35	4,65	204,98	221,08
4	10773	228,27	4,11	221,09	235,19
5	10780	242,03	3,88	235,20	248,81
6	10778	255,53	3,92	248,82	262,33
7	10780	269,40	4,14	262,34	276,66
8	10780	284,39	4,56	276,67	292,59
9	10779	302,29	5,92	292,60	313,06
10	10778	332,33	15,29	313,07	376,21

Table 5.3.2.6 – Statistics Descriptive for decile performance in 2017

2013					
Quintile	N	Mean	SD	Min	Max
10% Lowest	11657	177,37	17,37	118,42	200,51
20%	23300	225,46	12,68	200,52	245,11
40%	46608	272,44	14,95	245,12	298,08
20%	23300	313,20	9,53	298,09	330,96
10% Highest	11649	347,50	11,62	330,97	378,17

Table 5.3.2.7 – Statistics Descriptive for quintile performance in 2013

2017					
Quintile	N	Mean	SD	Min	Max
10% Lowest	10784	162,43	16,11	97,59	182,99
20%	21561	204,07	10,81	183,00	221,08
40%	43111	248,81	15,82	221,09	276,66
20%	21559	293,34	10,39	276,67	313,06
10% Highest	10778	332,33	15,29	313,07	376,21

Table 5.3.2.8 – Statistics Descriptive for quintile performance in 2017

2013					
Performance	N	Mean	SD	Min	Max
Acceptable	47775	315,58	22,28	284,00	378,17
Elementary	36669	263,67	12,25	241,00	283,99
Insufficient	32070	206,39	25,99	118,42	240,99

Table 5.3.2.9 – Statistics Descriptive for test score performance in 2013

2017					
Performance	N	Mean	SD	Min	Max
Acceptable	21917	316,90	19,08	292,00	376,21
Elementary	35229	266,65	13,45	244,00	291,00
Insufficient	49289	204,64	27,81	97,59	243,00

Table 5.3.2.10 – Statistics Descriptive for test score performance in 2017

5.5. ORDERER LOGISTIC ANALYSIS

Statistics Descriptive - Database (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)		2012-2016		2013-2017	
		Mean	SD	Mean	SD
Student Family Caractheristics	Performance 2012 (Acceptable Level)	0,43	0,50	0,38	0,48
	Performance 2012 (Elementary Level)	0,36	0,48	0,32	0,47
	Performance 2012 (Insufficient Level)	0,21	0,41	0,30	0,46
	Average Years of Education Father	11,53	3,72	11,55	3,84
	Average Years of Education Mother	11,43	3,55	11,50	3,62
	Native People Father	0,05	0,22	0,00	0,01
	Native People Mother	0,07	0,25	0,00	0,01
	Number of Books in Household (11<x<50)	0,40	0,49	0,22	0,41
	Number of Books in Household (x>51)	0,25	0,43	0,54	0,50
	Household per capita income (Divided by 100)	1822	2162	1979	2221
	Student's Gender (1=Man; 0=Female)	0,49	0,50	0,51	0,50
	Student went toPre-kindergarten (1=Yes; 0=No)	0,93	0,25	0,87	0,34
	Student went Kindergarten (1=Yes; 0=No)	0,98	0,13	0,98	0,14
School Caractheristics	Public School (1=Public School; 0=Other)	0,39	0,49	0,39	0,49
	Private Subsidized School (1=Private Subsidized School; 0=Other)	0,54	0,50	0,53	0,50
	Private School (1=Private School; 0=Other)	0,06	0,25	0,08	0,27
	Student per course	15,65	7,52	15,31	6,94
	Student by academic level	38,16	35,78	38,83	35,61
	Average Years of Education Father (Course)	11,71	2,58	11,69	2,71
	Average Years of Education Mother (Course)	11,71	2,43	11,71	2,51
	Household per capita income (Course) (Divided by 100)	5662	4612	6134	4905
	Type of School (1=Urban; 0=Rural)	0,87	0,33	0,90	0,30
	Low Income School	0,10	0,29	0,09	0,29
	Low Middle Income School	0,29	0,45	0,32	0,46
	Middle Income School	0,37	0,48	0,34	0,47
	Upper Middle Income School	0,17	0,38	0,16	0,37
	Upper Income School	0,08	0,27	0,09	0,28
	N	83649		94726	

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1a – Statistics Descriptive – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Statistics Descriptive - Database (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)			2012-2016 Mean	2012-2016 SD	2013-2017 Mean	2013-2017 SD
Home Reading Habits	Reading Stories	Annual (1=Yes; 0=No)	0,13	0,33	-	-
		Monthly (1=Yes; 0=No)	0,38	0,48	0,14	0,35
		Weekly (1=Yes; 0=No)	0,28	0,45	0,39	0,49
		Daily (1=Yes; 0=No)	0,06	0,23	0,28	0,45
		Never (1=Yes; 0=No)	0,06	0,23	0,16	0,37
	Accompany the student to read	Annual (1=Yes; 0=No)	0,05	0,22	-	-
		Monthly (1=Yes; 0=No)	0,23	0,42	-	-
		Weekly (1=Yes; 0=No)	0,40	0,49	-	-
		Daily (1=Yes; 0=No)	0,19	0,39	-	-
	Visiting the library	Annual (1=Yes; 0=No)	0,35	0,48	-	-
		Monthly (1=Yes; 0=No)	0,25	0,43	-	-
		Weekly (1=Yes; 0=No)	0,04	0,20	-	-
		Daily (1=Yes; 0=No)	0,01	0,12	-	-
	Discussing the Readings	Annual (1=Yes; 0=No)	0,04	0,20	-	-
		Monthly (1=Yes; 0=No)	0,21	0,41	-	-
		Weekly (1=Yes; 0=No)	0,39	0,49	-	-
		Daily (1=Yes; 0=No)	0,18	0,39	-	-
	When did you start reading with the student?	Since he learned to speak (1=Yes; 0=No)	0,29	0,45	-	-
		Since Pre-Kindergarden (1=Yes; 0=No)	0,38	0,49	-	-
		Since 1th Grade (1=Yes; 0=No)	0,11	0,31	-	-
		Since he learned to read (1=Yes; 0=No)	0,10	0,30	-	-
Parental Preferences	Educational Expectations	Maximum Education Level Child (Finishes High School) (1=Yes; 0=No)	0,03	0,18	0,03	0,18
		Maximum Education Level Child (Finishes University) (1=Yes; 0=No)	0,69	0,46	0,73	0,45
	Reading Attitude	Reading Hours	-	-	3,23	3,81
		Parents read by necessity (1=Yes; 0=No)	0,56	0,50	0,48	0,50
		Parents talk about reading content (1=Yes; 0=No)	0,80	0,40	0,85	0,35
		Parents read in their free time (1=Yes; 0=No)	0,44	0,50	0,57	0,49
		Parents read only to get relevant information (1=Yes; 0=No)	0,58	0,49	0,54	0,50
		Parents read because they consider it important (1=Yes; 0=No)	0,71	0,45	0,79	0,40
		Parents would like to have more time to read (1=Yes; 0=No)	0,82	0,38	0,84	0,36
		Parents enjoy reading (1=Yes; 0=No)	0,83	0,37	0,87	0,33
		N		83649		94726

Table 5.5.1b – Statistics Descriptive – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

	Statistics Descriptive - Database (10-20-40-20-10 groups - Performance)	2012-2016 Mean	2012-2016 SD	2013-2017 Mean	2013-2017 SD
Student Family Caractheristics	Performance 2012 (10% Lowest)	0,11	0,32	0,12	0,32
	Performance 2012 (20% Lowest)	0,22	0,41	0,22	0,41
	Performance 2012 (40% Group)	0,40	0,49	0,40	0,49
	Performance 2012 (20% Highest)	0,19	0,39	0,18	0,38
	Performance 2012 (10% Highest)	0,09	0,28	0,08	0,28
	Average Years of Education Father	11,53	3,72	11,55	3,84
	Average Years of Education Mother	11,43	3,55	11,50	3,62
	Native People Father	0,05	0,22	0,00	0,01
	Native People Mother	0,07	0,25	0,00	0,01
	Number of Books in Household (11<x<50)	0,40	0,49	0,22	0,41
	Number of Books in Household (x>51)	0,25	0,43	0,54	0,50
	Household per capita income	1822	2162	1979	2221
	Student's Gender (1=Man; 0=Female)	0,49	0,50	0,51	0,50
	Student went toPre-kindergarten (1=Yes; 0=No)	0,93	0,25	0,87	0,34
	Student went Kindergarten (1=Yes; 0=No)	0,98	0,13	0,98	0,14
School Caractheristics	Public School (1=Public School; 0=Other)	0,39	0,49	0,39	0,49
	Private Subsidized School (1=Private Subsidized School; 0=Other)	0,54	0,50	0,53	0,50
	Private School (1=Private School; 0=Other)	0,06	0,25	0,08	0,27
	Student per course	15,65	7,52	15,31	6,94
	Student by academic level	38,16	35,78	38,83	35,61
	Average Years of Education Father (Course)	11,71	2,58	11,69	2,71
	Average Years of Education Mother (Course)	11,71	2,43	11,71	2,51
	Household per capita income (Course)	5662	4612	6134	4905
	Type of School (1=Urban; 0=Rural)	0,87	0,33	0,90	0,30
	Low Income School	0,10	0,29	0,09	0,29
	Low Middle Income School	0,29	0,45	0,32	0,46
	Middle Income School	0,37	0,48	0,34	0,47
	Upper Middle Income School	0,17	0,38	0,16	0,37
	Upper Income School	0,08	0,27	0,09	0,28
	N	83649		94726	

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2a – Statistics Descriptive – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

		Statistics Descriptive - Database (10-20-40-20-10 groups - Performance)	2012-2016 Mean	2012-2016 SD	2013-2017 Mean	2013-2017 SD
Home Reading Habits	Reading Stories	Annual (1=Yes; 0=No)	0,13	0,33	-	-
		Monthly (1=Yes; 0=No)	0,38	0,48	0,14	0,35
		Weekly (1=Yes; 0=No)	0,28	0,45	0,39	0,49
		Daily (1=Yes; 0=No)	0,06	0,23	0,28	0,45
		Never (1=Yes; 0=No)	0,06	0,23	0,16	0,37
	Accompany the student to read	Annual (1=Yes; 0=No)	0,05	0,22	-	-
		Monthly (1=Yes; 0=No)	0,23	0,42	-	-
		Weekly (1=Yes; 0=No)	0,40	0,49	-	-
		Daily (1=Yes; 0=No)	0,19	0,39	-	-
	Visiting the library	Annual (1=Yes; 0=No)	0,35	0,48	-	-
		Monthly (1=Yes; 0=No)	0,25	0,43	-	-
		Weekly (1=Yes; 0=No)	0,04	0,20	-	-
		Daily (1=Yes; 0=No)	0,01	0,12	-	-
	Discussing the Readings	Annual (1=Yes; 0=No)	0,04	0,20	-	-
		Monthly (1=Yes; 0=No)	0,21	0,41	-	-
		Weekly (1=Yes; 0=No)	0,39	0,49	-	-
		Daily (1=Yes; 0=No)	0,18	0,39	-	-
	When did you start reading with the student?	Since he learned to speak (1=Yes; 0=No)	0,29	0,45	-	-
		Since Pre-Kindergarden (1=Yes; 0=No)	0,38	0,49	-	-
		Since 1th Grade (1=Yes; 0=No)	0,11	0,31	-	-
		Since he learned to read (1=Yes; 0=No)	0,10	0,30	-	-
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School) (1=Yes; 0=No)	0,03	0,18	0,03	0,18
		Maximum Education Level Child (Finishes University) (1=Yes; 0=No)	0,69	0,46	0,73	0,45
	Reading Attitude	Reading Hours	-	-	3,23	3,81
		Parents read by necessity (1=Yes; 0=No)	0,56	0,50	0,48	0,50
		Parents talk about reading content (1=Yes; 0=No)	0,80	0,40	0,85	0,35
		Parents read in their free time (1=Yes; 0=No)	0,44	0,50	0,57	0,49
		Parents read only to get relevant information (1=Yes; 0=No)	0,58	0,49	0,54	0,50
		Parents read because they consider it important (1=Yes; 0=No)	0,71	0,45	0,79	0,40
		Parents would like to have more time to read (1=Yes; 0=No)	0,82	0,38	0,84	0,36
		Parents enjoy reading (1=Yes; 0=No)	0,83	0,37	0,87	0,33
		N	83649		94726	

Table 5.5.2b – Statistics Descriptive – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

5.5.1. 2012-2016 DATA PANEL

Results Ordered Logit Model (2012-2016) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)		
Student Family Caractheristics	Performance 2012 (Acceptable Level)	-2.712***
		(0.022)
	Performance 2012 (Elementary Level)	-1.223***
		(0.021)
	Performance 2012 (Insufficient Level)	0
		(0)
	Average Years of Education Father	-0.016***
		(0.003)
	Average Years of Education Mother	-0.012***
		(0.003)
	Native People Father	-0.103***
		(0.029)
	Native People Mother	-0.118***
		(0.033)
	Number of Books in Household (11<x<50)	-0.0240
		(0.017)
	Number of Books in Household (x>51)	-0.131***
		(0.021)
	Household per capita income	-0.001***
		(0)
	Student's Gender	0.211***
	(1=Man; 0=Female)	(0.014)
	Student went toPre-kindergarten	0.11***
	(1=Yes; 0=No)	(0.031)
	Student went Kindergarten	0.283***
	(1=Yes; 0=No)	(0.062)
School Caractheristics	Public School	0.334***
	(1=Public School; 0=Other)	(0.071)
	Private Subsidized School	0.155**
	(1=Private Subsidized School; 0=Other)	(0.068)
	Private School	0
	(1=Private School; 0=Other)	(0)
	Student per course	-0.014***
		(0.001)
	Student by academic level	-0.0010
		(0)
	Average Years of Education Father (Course)	0.0060
		(0.008)
	Average Years of Education Mother (Course)	-0.018**
		(0.008)
	Household per capita income (Course)	-0.001***
		(0.000)
	Type of School	0.36***
	(1=Urban; 0=Rural)	(0.026)
	Low Income School	-0.120
		(0.093)
	Low Middle Income School	0.0940
		(0.084)
	Middle Income School	0.0530
		(0.077)
	Upper Middle Income School	-0.0070
		(0.068)
	Upper Income School	0
		(0)
	N	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.1a – Results Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Results Ordered Logit Model (2012-2016) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)			
Home Reading Habits	Reading Stories	Annual	0.0320
		(1=Yes; 0=No)	(0.034)
		Monthly	0.068**
		(1=Yes; 0=No)	(0.031)
		Weekly	0.0340
		(1=Yes; 0=No)	(0.032)
		Daily	0.060
		(1=Yes; 0=No)	(0.043)
	Accompany the student to read	Annual	-0.121**
		(1=Yes; 0=No)	(0.048)
		Monthly	-0.0550
		(1=Yes; 0=No)	(0.036)
		Weekly	0.0380
		(1=Yes; 0=No)	(0.035)
		Daily	0.065*
		(1=Yes; 0=No)	(0.038)
	Visiting the library	Annual	-0.0110
		(1=Yes; 0=No)	(0.02)
		Monthly	0.0210
		(1=Yes; 0=No)	(0.022)
		Weekly	0.0270
		(1=Yes; 0=No)	(0.039)
		Daily	0.0020
		(1=Yes; 0=No)	(0.068)
	Discussing the Readings	Annual	-0.0090
		(1=Yes; 0=No)	(0.049)
		Monthly	-0.082**
		(1=Yes; 0=No)	(0.034)
		Weekly	-0.091***
		(1=Yes; 0=No)	(0.032)
		Daily	-0.059*
		(1=Yes; 0=No)	(0.035)
	When did you start reading with the student?	Since he learned to speak	0.0020
		(1=Yes; 0=No)	(0.03)
		Since Pre-Kindergarden	-0.132***
		(1=Yes; 0=No)	(0.03)
		Since 1th Grade	0.075**
		(1=Yes; 0=No)	(0.034)
		Since he learned to read	0.010
		(1=Yes; 0=No)	(0.035)
Parental Preferences	Educational Expectations	Maximum Education Level Child (Finishes High School)	0.265***
		(1=Yes; 0=No)	(0.047)
		Maximum Education Level Child (Finishes University)	-0.155***
		(1=Yes; 0=No)	(0.019)
	Reading Attitude	Parents read by necessity	0.07***
		(1=Yes; 0=No)	(0.02)
		Parents talk about reading content	0.0160
		(1=Yes; 0=No)	(0.02)
		Parents read in their free time	-0.0240
		(1=Yes; 0=No)	(0.018)
		Parents read only to get relevant information	0.061***
		(1=Yes; 0=No)	(0.021)
		Parents read because they consider it important	-0.087***
		(1=Yes; 0=No)	(0.018)
		Parents would like to have more time to read	0.0110
		(1=Yes; 0=No)	(0.023)
		Parents enjoy reading	-0.079***
		(1=Yes; 0=No)	-0.025
		N	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.1b – Results Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

	Results Ordered Logit Model (2012-2016) (10-20-40-20-10 groups - Performance)	
Student Family Caractheristics	Performance 2012 (10% Lowest)	-3.988***
		(0.033)
	Performance 2012 (20% Lowest)	-3.108***
		(0.028)
	Performance 2012 (40% Group)	-1.945***
		(0.025)
	Performance 2012 (20% Highest)	-0.761***
		(0.026)
	Performance 2012 (10% Highest)	0
		(0)
	Average Years of Education Father	0.017***
		(0.003)
	Average Years of Education Mother	0.01***
		(0.003)
	Native People Father	0.087***
		(0.028)
	Native People Mother	0.121***
		(0.031)
	Number of Books in Household (11<x<50)	0.032**
		(0.016)
	Number of Books in Household (x>51)	0.114***
		(0.021)
	Household per capita income	0.001**
		(0.001)
	Student's Gender	-0.21***
	(1=Man; 0=Female)	(0.013)
	Student went toPre-kindergarten	-0.094***
	(1=Yes; 0=No)	(0.03)
	Student went Kindergarten	-0.268***
	(1=Yes; 0=No)	(0.06)
School Caractheristics	Public School	-0.37***
	(1=Public School; 0=Other)	(0.065)
	Private Subsidized School	-0.189***
	(1=Private Subsidized School; 0=Other)	(0.062)
	Private School	0
	(1=Private School; 0=Other)	(0)
	Student per course	0.014***
		(0.002)
	Student by academic level	0.0010
		(0.001)
	Average Years of Education Father (Course)	-0.015*
		(0.008)
	Average Years of Education Mother (Course)	0.017**
		(0.008)
	Household per capita income (Course)	0.001***
		(0.001)
	Type of School	-0.342***
	(1=Urban; 0=Rural)	(0.025)
	Low Income School	0.1030
		(0.086)
	Low Middle Income School	-0.0710
		(0.078)
	Middle Income School	-0.0280
		(0.071)
	Upper Middle Income School	0.0440
		(0.063)
	Upper Income School	0
		(0)
	N	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.2a – Results Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

Results Ordered Logit Model (2012-2016) (10-20-40-20-10 groups - Performance)			
Home Reading Habits	Reading Stories	Annual	-0.0420
		(1=Yes; 0=No)	(0.032)
		Monthly	-0.0340
		(1=Yes; 0=No)	(0.029)
		Weekly	0.0080
		(1=Yes; 0=No)	(0.031)
		Daily	0.0410
		(1=Yes; 0=No)	(0.04)
	Accompany the student to read	Annual	0.084*
		(1=Yes; 0=No)	(0.046)
		Monthly	0.0180
		(1=Yes; 0=No)	(0.034)
		Weekly	-0.088***
		(1=Yes; 0=No)	(0.033)
		Daily	-0.111***
		(1=Yes; 0=No)	(0.036)
	Visiting the library	Annual	0.0180
		(1=Yes; 0=No)	(0.019)
		Monthly	-0.0020
		(1=Yes; 0=No)	(0.022)
		Weekly	0.0060
		(1=Yes; 0=No)	(0.037)
		Daily	0.0480
		(1=Yes; 0=No)	(0.064)
	Discussing the Readings	Annual	0.050
		(1=Yes; 0=No)	(0.046)
		Monthly	0.089***
		(1=Yes; 0=No)	(0.032)
		Weekly	0.084***
		(1=Yes; 0=No)	(0.031)
		Daily	0.040
		(1=Yes; 0=No)	(0.034)
	When did you start reading with the student?	Since he learned to speak	-0.0260
		(1=Yes; 0=No)	(0.029)
		Since Pre-Kindergarden	0.084***
		(1=Yes; 0=No)	(0.029)
		Since 1th Grade	-0.096***
		(1=Yes; 0=No)	(0.033)
		Since he learned to read	-0.0180
		(1=Yes; 0=No)	(0.033)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	-0.219***
		(1=Yes; 0=No)	(0.042)
		Maximum Education Level Child (Finishes University)	0.153***
		(1=Yes; 0=No)	(0.018)
	Reading Attitude	Parents read by necessity	-0.06***
		(1=Yes; 0=No)	(0.019)
		Parents talk about reading content	-0.0120
		(1=Yes; 0=No)	(0.019)
		Parents read in their free time	0.020
		(1=Yes; 0=No)	(0.017)
		Parents read only to get relevant information	-0.059***
		(1=Yes; 0=No)	(0.02)
		Parents read because they consider it important	0.093***
		(1=Yes; 0=No)	(0.017)
		Parents would like to have more time to read	-0.0050
		(1=Yes; 0=No)	(0.022)
		Parents enjoy reading	0.055**
		(1=Yes; 0=No)	(0.024)
		N	83649

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.1.2b – Results Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

5.5.2. 2013-2017 DATA PANEL

Results Ordered Logit Model (2013-2017) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)		
Student Family Caractheristics	Performance 2013 (Acceptable Level)	-2.979***
		(0.000)
	Performance 2013 (Elementary Level)	-1.396***
		(0.000)
	Performance 2013 (Insufficient Level)	0
		(0)
	Average Years of Education Father	-0.022***
		(0.000)
	Average Years of Education Mother	-0.019***
		(0.000)
	Native People Father	-0.7920
		(0.625)
	Native People Mother	27.750
		(1)
	Number of Books in Household (11<x<50)	-0.08***
		(0.000)
	Number of Books in Household (x>51)	-0.088***
		(0.000)
	Household per capita income	-0.001*
		(0.073)
	Student's Gender	0.356***
	(1=Man; 0=Female)	(0.000)
	Student went toPre-kindergarten	0.082***
	(1=Yes; 0=No)	(0.000)
	Student went Kindergarten	0.0070
	(1=Yes; 0=No)	(0.914)
School Caractheristics	Public School	0.266***
	(1=Public School; 0=Other)	(0.000)
	Private Subsidized School	0.135**
	(1=Private Subsidized School; 0=Other)	(0.03)
	Private School	0
	(1=Private School; 0=Other)	(0)
	Student per course	-0.011***
		(0.000)
	Student by academic level	0.0010
		(0.119)
	Average Years of Education Father (Course)	-0.0060
		(0.469)
	Average Years of Education Mother (Course)	-0.015*
		(0.093)
	Household per capita income (Course)	-0.0010
		(0.701)
	Type of School	0.175***
	(1=Urban; 0=Rural)	(0.000)
	Low Income School	0.212**
		(0.018)
	Low Middle Income School	0.178**
		(0.025)
	Middle Income School	0.0730
		(0.32)
	Upper Middle Income School	0.0290
		(0.652)
	Upper Income School	0
		(0)
	N	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.1a – Results Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Results Ordered Logit Model (2013-2017) (Acceptable=1, Elementary=2 and Insufficient=3 - Performance)			
Home Reading Habits	Reading Stories	Monthly	-0.0380
		(1=Yes; 0=No)	(0.562)
		Weekly	0.0050
		(1=Yes; 0=No)	(0.937)
		Daily	0.0120
		(1=Yes; 0=No)	(0.861)
		Never	0.0020
		(1=Yes; 0=No)	(0.986)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	0.249***
		(1=Yes; 0=No)	(0.000)
		Maximum Education Level Child (Finishes University)	-0.222***
		(1=Yes; 0=No)	(0.000)
	Reading Attitude	Reading Hours	-0.01***
			(0.000)
		Parents read by necessity	0.058***
		(1=Yes; 0=No)	(0.004)
		Parents talk about reading content	0.0080
		(1=Yes; 0=No)	(0.758)
		Parents read in their free time	-0.0140
		(1=Yes; 0=No)	(0.475)
		Parents read only to get relevant information	0.08***
		(1=Yes; 0=No)	(0.000)
		Parents read because they consider it important	-0.0290
		(1=Yes; 0=No)	(0.17)
		Parents would like to have more time to read	-0.0130
		(1=Yes; 0=No)	(0.645)
		Parents enjoy reading	-0.0380
		(1=Yes; 0=No)	(0.222)
		N	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.1b – Results Ordered Logit Model – SIMCE Score Standards (A-E-I)
(Balanced Data Panel - Including Imputations)

Results Ordered Logit Model (2013-2017) (10-20-40-20-10 groups - Performance)		
Student Family Caractheristics	Performance 2013 (10% Lowest)	-4,597***
		(0,032)
	Performance 2013 (20% Lowest)	-3,617***
		(0,028)
	Performance 2013 (40% Group)	-2,345***
		(0,024)
	Performance 2013 (20% Highest)	-0,974***
		(0.000)
	Performance 2013 (10% Highest)	0
		(0)
	Average Years of Education Father	0,019***
		(0,003)
	Average Years of Education Mother	0,016***
		(0,003)
	Native People Father	-0,215***
		(1,686)
	Native People Mother	-2,423***
		(1,553)
	Number of Books in Household (11<x<50)	0,072***
		(0,017)
	Number of Books in Household (x>51)	0,062***
		(0,017)
	Household per capita income	0,001***
		(0,001)
	Student's Gender	-0,332***
	(1=Man; 0=Female)	(0,013)
	Student went toPre-kindergarten	-0,077***
	(1=Yes; 0=No)	(0,02)
	Student went Kindergarten	-0,097***
	(1=Yes; 0=No)	(0,05)
Home Reading Habits	Public School	-0,267***
	(1=Public School; 0=Other)	(0,063)
	Private Subsidized School	-0,146***
	(1=Private Subsidized School; 0=Other)	(0,06)
	Private School	0
	(1=Private School; 0=Other)	(0)
	Student per course	0,011***
		(0,002)
	Student by academic level	-0,001***
		(0,001)
	Average Years of Education Father (Course)	0,007***
		(0,008)
	Average Years of Education Mother (Course)	0,009***
		(0,008)
	Household per capita income (Course)	0,001***
		(0,001)
	Type of School	-0,178***
	(1=Urban; 0=Rural)	(0,024)
	Low Income School	-0,125***
		(0,084)
	Low Middle Income School	-0,172***
		(0,075)
	Middle Income School	-0,07***
		(0,07)
	Upper Middle Income School	0,005***
		(0,061)
	Upper Income School	0
		(0)
	N	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.2a – Results Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)

Results Ordered Logit Model (2013-2017) (10-20-40-20-10 groups - Performance)			
Home Reading Habits	Reading Stories	Monthly	0,086***
		(1=Yes; 0=No)	(0,058)
		Weekly	0,07***
		(1=Yes; 0=No)	(0,057)
		Daily	0,053***
		(1=Yes; 0=No)	(0,059)
		Never	0,046***
		(1=Yes; 0=No)	(0,06)
Parental Preferences	Educational Expectation	Maximum Education Level Child (Finishes High School)	-0,207***
		(1=Yes; 0=No)	(0,039)
		Maximum Education Level Child (Finishes University)	0,188***
		(1=Yes; 0=No)	(0,017)
	Reading Attitude	Reading Hours	0,009***
			(0,002)
		Parents read by necessity	-0,029***
		(1=Yes; 0=No)	(0,018)
		Parents talk about reading content	-0,012***
		(1=Yes; 0=No)	(0,022)
		Parents read in their free time	0,008***
		(1=Yes; 0=No)	(0,018)
		Parents read only to get relevant information	-0,087***
		(1=Yes; 0=No)	(0,019)
		Parents read because they consider it important	0,034***
		(1=Yes; 0=No)	(0,019)
		Parents would like to have more time to read	-0,009***
		(1=Yes; 0=No)	(0,024)
		Parents enjoy reading	0,067***
		(1=Yes; 0=No)	(0,028)
		N	94726

Standard errors in parentheses

***p<0.01; **p<0.05;*: p<0.1

Table 5.5.2.2b – Results Ordered Logit Model – 10,20,40,20,10 Group Performance
(Balanced Data Panel - Including Imputations)