

General Index

Agradecimientos	1
General Index.....	7
Index of Tables.....	9
Index of Figures.....	11
INTRODUCTION	13
INTRODUCCIÓN	17
INTRODUCCIÓ	22
CHAPTER 1	27
1.1 Introduction	28
1.2 Literature Review.....	30
1.3 Data and Methodological Approach.....	35
1.3.1 Data: PISA 2015	35
1.3.2 Descriptive Analysis.....	37
1.3.3 Missing- data Imputation.....	40
1.3.4 Methodological Approach	42
1.4 Results.....	44
1.5 Final Considerations	51
1.6 Appendix.....	54
CHAPTER 2	71
2.1 Introduction	72
2.2 Literature Review.....	74
2.3 Data and Variables.....	77
2.3.1 Institutional Background	77
2.3.2 Dataset	78
2.3.3 Variables.....	79
2.4 Empirical Strategy.....	81
2.4.1 Missing Values.....	81
2.4.2 OLS and IV Regression.....	83
2.4.3 Quantile IV Regression.....	87
2.4.4 Propensity Score Matching.....	88
2.5 Results.....	91

2.5.1 OLS and IV Estimates	91
2.5.2 Quantile Regression Estimates	94
2.5.6 Propensity Score Matching	97
2.6 Final Considerations	98
2.7 Appendix.....	101
CHAPTER 3	115
3.1 Introduction	116
3.2 Literature Review.....	117
3.3 Data and Methodological Approach.....	121
3.3.1 Data: Individualized Evaluations for Madrid.....	121
3.3.2 Variables and Descriptive Analysis.....	121
3.3.3 Missing Values and Imputation.....	127
3.3.4 Methodology.....	129
3.4 Results.....	132
3.5 Final Considerations.....	138
3.6 Appendix.....	141
CONCLUSIONS.....	147
CONCLUSIONES	159
CONCLUSIONS.....	173
Bibliographical References.....	187
Introduction	187
Chapter 1	188
Chapter 2	194
Chapter 3	199
Conclusions.....	203

Index of Tables

CHAPTER 1

Exploring The Relationship Between Information And Communication Technologies (ICT) And Academic Performance: A Multilevel Analysis For Spain

Table 1: Descriptive statistics of the ICT variables and dependent variables	38
Table 2: Results of the multilevel regression models	45
Table 3: Results of the quantile regression models	47
Table A.1: Definition of ICT variables used in the empirical analysis	54
Table A.2: Definition of categorical control variables	55
Table A.3: Descriptive statistics control variables	56
Table A.4: Full results of the multilevel models (without imputed missing values)	58
Table A.5: Full results of the multilevel models (with imputed values)	60
Table A.6: Results of the separate multilevel models for each explanatory ICT variable	62
Table A.7: Results of the multilevel model with a composite index	64
Table A.8: Mean of the dependent variable by competences and percentiles of performance	66
Table A.9: Tests of coefficient equality across and between quantiles	66

CHAPTER 2

Can ICT Help Us To Improve Education? Causal Effects Of The Use Of ICT At Schools On Academic Performance In Madrid (Spain)

Table 1: OLS main estimates of use of ICT and students' academic performance	92
Table 2: IV main estimates of the impact of the use of ICT on students' academic performance	93
Table 3: Quantile instrumental variable regression main estimates of the impact of the use of ICT on students' academic performance by competences	95
Table 4: PSM estimates of the impact of the use of ICT on students' academic performance	97
Table A.1: Descriptive statistics and percentages of missing values (Subsample containing complete cases for English)	101
Table A.2: Descriptive statistics and percentages of missing values (Subsample containing complete cases for Spanish)	101
Table A.3: Descriptive statistics and percentages of missing values (Subsample containing complete cases for social and civic competence)	102
Table A.4: Descriptive statistics and percentages of missing values (Subsample containing complete cases for Academic Mathematics)	102

Table A.5: T-test results (Comparison of mean values between the complete cases and the sample of students included in our final estimates)	103
Table A.6: Durbin and Wu-Hausman tests for endogeneity, first-stage F-test for relevance, and Sargan's and Basman's chi-squared tests for exogeneity	105
Table A.7: % Bias, Rubin's B and Rubin's B (Balancing property)	106
Table A.8: OLS estimates of use of ICT and students' academic performance	107
Table A.9: IV estimates of use of ICT and students' academic performance	108
Table A.10: Percentiles values of the students' scores by competences	108
Table A.11: Quantile IV Regression of use of ICT and students' academic performance (English)	109
Table A.12: Quantile IV Regression of use of ICT and students' academic performance (Spanish)	110
Table A.13: Quantile IV Regression of use of ICT and students' academic performance (social and civic competence)	111
Table A.14: Quantile IV Regression of use of ICT and students' academic performance (academic mathematics)	112
Table A.15: Estimates of ATT with and without simulated confounder (sensitivity analysis)	113

CHAPTER 3

Technology In The Classroom: Factors Influencing Teachers' Use Of ICT

Table 1: Descriptive statistics (3rd year of primary education)	124
Table 2: Descriptive statistics (6th year of primary education)	125
Table 3 :Descriptive statistics (4th year of secondary education)	126
Table 4: Determinants of ICT use in the classroom (multilevel logistic models)	134
Table 5: Determinants of ICT use in the classroom (multilevel logistic models with ordinal variables entered as categorical variables)	135
Table 5: Determinants of ICT use in the classroom (multilevel logistic models with ordinal variables entered as categorical variables) (<i>continuation</i>)	136
Table A.1: Definition of dependent and independent variables	141
Table A.2: Determinants of ICT use in the classroom (complete case analysis)	143
Table A.3: Determinants of ICT use in the classroom (complete case analysis with % missing <5%)	144
Table A.4: Determinants of ICT use in the classroom (multilevel probit models)	145

Index of Figures

CHAPTER 1

Exploring The Relationship Between Information And Communication Technologies (ICT) And Academic Performance: A Multilevel Analysis For Spain

Figure A.1: Kernel Density Estimates (original vs imputed variables)57

CHAPTER 2

Can ICT Help Us To Improve Education? Causal Effects Of The Use Of ICT At Schools On Academic Performance In Madrid (Spain)

Figure 1: Distribution of responses to the variable “Use of ICT in the classroom”80

Figure 2: Distribution of responses to the variable “ICT training of teacher”81

Figure A.1: Propensity score histogram for the treated and not-treated groups106