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Bilingual school choice and socio-economic segregation: An analysis for Spain based on PISA 2015

ABSTRACT: In the academic year of 2004-2005, the Spanish region of Madrid began to implement a bilingual educational programme (MBP hereinafter) in state schools. One of the objectives of this programme, was to make the study of a foreign language (English) accessible to students from economically disadvantaged families who cannot afford private foreign language classes. Our study aims to evaluate whether students from a disadvantaged socio-economic background really do have the same probability of participating in the MBP as their more privileged peers. The analysis use the PISA 2015 database which corresponds to the representative sample of the Community of Madrid in Spain, with added administrative information supplied by the Madrid Regional Ministry of Education concerning the identification of bilingual and non-bilingual schools. Using these data, we estimate a logit model directed at identifying which factors explain the choice by students of whether to attend a bilingual state school. The results obtained reveal that the probability of attending a bilingual school is higher for students belonging to belonging to socio-economically and culturally better-off households. This suggests that the MBP could be fostering segregation within the state education sector in Madrid.

Keywords: bilingual education, school choice, socio-economic segregation, PISA 2015, Spain.

1. Introduction

The spread of bilingual programmes that have become commonplace in many European countries in the last two decades constitutes one of the most ambitious educational projects to have been implemented in the last twenty years in the old continent. Most of these programmes take the form of Content and Language Integrated Learning (hereinafter CLIL). These courses are learning programmes in which pupils are taught different subjects in at least two languages (the mother tongue-L1-and a foreign language-L2) in order to foster both content and language learning simultaneously (Eurydice, 2006). Such programmes constitute a model of bilingual education aimed at increasing the level of exposure to the foreign language without devoting excessive time to its teaching[1].

The majority of studies on CLIL programmes have concentrated on evaluating their effects on the promotion of various educational competences, both those concerning the command of a foreign language and those related to diverse subjects in the school curriculum, such as Mathematics, Reading or Sciences (Cimermanová, 2020). The results of this literature are not conclusive. Some studies indicate a positive impact of CLIL courses on the subjects taught in a foreign language or in the fore language competence (Surmont et al. 2016 and Pérez Cañado, 2017, among others). Others find a negative effect on the outcomes of the subjects taught in the foreign language for students

[1] There are various interpretations of the term bilingual educational in the literature (Admiraal et al., 2006; Nikula and Marsh, 1998). One of these approaches considers bilingual education to be that in which children belonging to linguistic minorities receive their education (or part of it) in their mother tongue (L1), which differs from the official language of the country (L2). By contrast, another interpretation considers bilingualism to be those educational programmes in which some of the subjects of the school curriculum are taught in a foreign language (L2). This educational model (CLIL) is that which has been implemented in Spain and in various European countries in the last fifteen years.

belonging to families whose parents have a low educational level (Anghel et al. 2016). Other studies find no statistically significant impact on students' cognitive skills, in subjects taught either in English or in Spanish (Montalbán, 2016), or conclude an improvement in L2, with no effects on the subject taught using English (Admiraal et al. 2006; García-Centeno et al. 2020) or with no negative impact on these subjects (Dallinger et al. 2016). Fernández-Sanjurjo et al. (2018) focus on the influence of socio-economic status on students' performance in CLIL and find that students from less favoured socio-economic backgrounds obtain significant lower marks in Sciences (the subject taught in English in the majority of bilingual programmes in Spain) than those from more privileged households. Finally, reference should be made to the recent study of Feddermann et al. (2021), which demostrates that when controlling for selection and preparation effects, only a small and non-significant effect of CLIL occurred on the development of students' foreign language skills.

Against this background, there are very few studies of the effect of CLIL on the equity of access, that is to say, on the opportunities that students from different socio-economic backgrounds have of participating in this kind of bilingual programmes (see section 2). However, the analysis of this question is, from our point of view, very important in terms of educational equity, given the significant benefits that knowledge of English offers in the currently globalized economies and on the earnings of individuals (Casale and Posel, 2011; Wang et al. 2017; Williams, 2011).

As a result, the objective of the present study is to evaluate whether students with low socio-economic status (SES) are as likely to attent CLIL courses as their more privileged peers in a specific scenario, the Community of Madrid. This is a particularly interesting

region to analyse because its support for the implementation of CLIL bilingual programmes (Spanish-English) from 2004 onwards has been the most intensive in Spain.

Specifically, our study attempts to identify empirically, through a logistic model, the factors explaining why families choose bilingual schools for their children. This will help to establish whether the socio-economic and cultural background of households drives participation in the CLIL courses offered in Madrid. A positive relationship between a higher socio-economic background and the choice of a bilingual school may signal that the current design of the Madrid Bilingual Programme (MBP) could be contributing to "cream skimming" within the public education sector; in other words, it causes the most vulnerable pupils, in socio-economic terms, to be crowded out of state bilingual schools and fail to reap the long-term benefits of bilingual education. The consequences of such as scenario would be dramatic in terms of educational equity.

If this were the case, some MBP reforms would be required to surmount the problem, because as Burger (2019) states, social segregation in education systems may contribute to the intergenerational transmission of educational (dis)advantage and thus exacerbate the wider problems of socio-economic inequality. Thus, research into the factors driving the choice of a bilingual school is extremely important when evaluating the functioning of bilingual educational programmes and, therefore, the suitability of its extension to more regions or educational stages. However, as stated above, studies of this subject are so far very scarce. One of the purposes of the current paper is to contribute to filling this gap. A second contribution is the employment of two robust databases in the empirical approach: PISA 2015 and the 2017 Regional Assessment of Educational Competences of Madrid; this dual approach will allow the robustness of the estimations to be tested. Our findings indicate that the implementation of the MBP could be leading to "cream

skimming" and socio-economic segregation in the state education network of the Community of Madrid. This is due to the importance of students' socio-economic background in the explanation of their participation in the MBP. Our paper shows that the free supply of bilingual education (as in the MBP) is not, in itself, sufficient to equalise opportunities to access knowledge of a foreign language. The non-monetary costs (in terms of effort) associated with studying in a foreign language could be one of the most important barriers faced by children from disadvantaged families, because they are more susceptible to school failure. (Sirin, 2005).

The rest of the paper has the following structure. Section 2 provides some theoretical and empirical background on school choice, which will be very useful to establish the principal hypothesis to be tested. The MBP is described in section 3. Section 4 presents the databases employed, develops the descriptive analysis and explains the methodological approach. Section 5 details the results obtained and, finally, section 6 presents the conclusions.

2. School choice and educational equity: some theoretical issues

Although, to our knowledge, the analysis of the patterns of choice between bilingual and monolingual schools has not been analysed in previous literature, the process of choosing between these two educational options can benefit from the prolific research on school choice developed following the seminal work of Milton Friedman (1955) on school vouchers. Although this literature has been principally concerned with the choice between public and private (profit and non-profit) schools (see Hoxby, 2007), this approach can be very useful to analyse the choice between monolingual and bilingual state schools. In both cases (the choice between state and private school or between CLIL and traditional

programmes), families and students must choose between two alternatives that are equivalent in economic terms (both are free of charge for the users) but offer a different educational model. Especially interesting for the objective of our paper are the contributions of this research strand to the analysis of the effects of school choice on the potential stratification of pupils across schools, one of the central questions in this field[2].

There are two conflicting positions on this issue. Advocates of school choice usually support their position on the basis that the introduction of such policies (vouchers, charter schools, open-enrolment programs, magnet schools) can provide better educational opportunities for economically and socially disadvantaged children. The argument is the following: "Parents who face economic disadvantages do not have access to the same opportunities for choosing from as many schools as can more advantaged parents. Therefore, school choice has the potential to extend the same educational opportunities to less advantaged students that more advantaged children already have: the opportunity to choose schools that parents believe would provide the best academic environment for their children" (Phillips, 2015, p.31). This argument, advanced in the context of the choice of private (profit and non-profit) *vs* state schools, can be extended to the choice between bilingual and monolingual schools, given the high economic cost of private language education[3]. Certainly, if bilingual schools are publicly funded, all children,

[2] The bulk of the research surrounding school choice has explored achievement effects (Cullen, Jacob and Levitt, 2006; Zimmer et al., 2009), but there is also an significant research examining the family attributes that influence the choice between school types (private *vs* public) and it is this literature that has special value for our study (Teske and Schneider, 2000; Lankford and Wycoff, 2001; Bifulco and Ladd, 2006; Lauen, 2007, Butler et al., 2013, among others).

[3] The cost for a standard intensive English course (20 hours/week) is 145 euros per week (https://www.olelanguages.com/ole-schools-prices.html). This could explain the results obtained in Azzolini et al. (2020), where parental education and parental socioeconomic status are strongly associated with students' English language competence, especially in countries, with languages very different from English. The authors state that in such countries, family resources are very important because English competences are more difficult to acquire elsewhere.

regardless of their socioeconomic background, are permitted access to foreign language instruction, which should contribute to improve opportunities for educational equality.

But in opposition to this argumentation, several studies have demonstrated the difficulties of giving practical effect to the above-mentioned potential advantages of school choice regarding educational equity, and have warned of the strong probability that the consequences of these policies are counterproductive (Levin, 1998; Lankford and Wyckoff, 2001; Beets. 2005; among others). This is because market-based models of school choice must cope with differential barriers to school choice participation (access to transportation and access to information about school choice processes and options), and differential motivations for school choice[4] which disproportionately burden low-income and minority families (Phillips et al., 2015).

Consequently, opponents of school choice assert that although school choice can *a priori* expand schooling options to all families, it does not guarantee that all families engage in the school choice process. Several empirical studies have demonstrated that, in educational systems which have implemented measures to increase freedom of choice, the "choosers" have mainly been economically better-off families, while the relatively disadvantaged have tended to maintain their children in the educational centre originally allocated to them. A newly published meta-analysis and systematic review of the effects of family socioeconomic status on school choice has concluded that through the implementation of school choice policy, the higher SES parents (especially those with higher educational levels) can not only “buy” the best quality “commodities” (schools)

[4] Parents of all economic backgrounds often exercise school choice as a way to send their children to schools where they can be educated alongside other students who share their family backgrounds.

for their children, but also choose “flight together”, resulting in segregation and stratification. (Jheng et al., 2022).

One explanation for this socioeconomic cream-skimming is that the high costs of obtaining information about the quality of schools particularly affect families with relatively low socioeconomic and/or educational levels and, thus, it is very likely that these are self-excluded from the process of choice (Butler et al.,2013).

Transferring the discourse above to the scenario of choice between state bilingual and monolingual schools would mean that pupils belonging to well-off families will transfer to the state CLIL schools in order to reap the benefits of bilingual education, while pupils from poorer families will remain grouped together in the state monolingual schools. If this hypothesis is correct, a socio-economic stratification between state bilingual and monolingual schools will occur.

To our knowledge there are few studies aimed at testing this hypothesis in the specific field of bilingual education. The research papers by Bruton (2011, 2013), which critically review various studies of the effects of the CLIL approach, have noted that, in schools with optional CLIL streams, it was the parents of higher socio-economic status who opted to place their children in CLIL programmes. In turn, Apsel (2012) argues that CLIL streams in Germany are in fact doubly selective, not only are pupils selected on entry but there are exits allowing them to leave their CLIL education. German students have the statutory right to leave the CLIL stream at the beginning of each school year, in order to follow their curriculum in German.

Broca (2016) is the only research, to our knowledge, that analyses empirically (although descriptively), the composition of the student body in bilingual schools in Spain. This paper describes a survey intended to profile CLIL and non-CLIL student cohorts on entry into state secondary schools in the Autonomous Community of Andalusia, in Southern Spain. The key research question was whether the profile of students in the CLIL groups was significantly different from their non-CLIL counterparts at the beginning of their studies. The analysis concludes that in the CLIL group there are very few students who either failed the previous year or only obtained a 'pass' overall, in English or in Spanish. The group with the highest percentage of 'excellent' marks is the CLIL in English grouping. The non-CLIL group is much more diverse, but 50 per cent fell within either the 'fail' or merely the 'pass' categories in English, with the largest group being 'fail'. However, there is also a significant percentage of students with high marks. This led the author to conclude that CLIL programmes appear to exclude weaker students rather than select the ablest.

Similarly, Van Mensel et al. (2020) conclude that CLIL courses in Francophone Belgium, although a priori open to all students, are particularly attractive to a socially privileged public. Results from a logistic regression indicate that there is indeed evidence of selection: the socio-economic status of the pupils appears to be the main predictor of whether students are in CLIL or non-CLIL streams, whereas other, more personal, variables such as non-verbal intelligence play a minor role.

Based on this contextual framework, our study is a new contribution to this underdeveloped field in the specific scenario of the MBP.

3. Institutional Background

Spain is one of the European countries with the greatest deficiencies in foreign language skills, as shown by the first European Survey on Language Competences (ESLC) of 2011 (Jones et al. 2012), the English Proficiency Index (EPI) 2020 or Eurostat. A variety of reasons may explain these results. Prominent among these is the teaching methodology employed for many years, which has insisted on grammatical content and reading and writing comprehension, and the limited exposure to the use of English in the Spanish social context (INEE, 2012).

However, in the last fifteen years there has been a significant about-turn in the position of the Spanish educational authorities, hitherto somewhat passive regarding the linguistic shortcomings of the population. The starting point of this new direction dates back to 1996, when the Spanish Ministry of Education and Science and the British Council signed an agreement whose objective was the implementation of a Bilingual Education Programme in state schools, developed from the first academic year of infant education onwards (Dobson et al. 2010). Since the 2004-2005 academic year, there has been a rapid extension of CLIL programmes in schools financed with public funds (state and grant-maintained schools) in a considerable number of Spanish regions[5]. The Autonomous Community of Madrid is one of the leaders in this new stage. Its support for the implementation of CLIL programmes (Spanish/English) has been the most intensive in the country.

[5] In 2017, eleven of the seventeen Spanish Autonomous Communities offered bilingual education programmes (Andalusia, Aragon, Asturias, the Canary Islands, Cantabria, Castile and León, Extremadura, Madrid, Murcia, Navarre, La Rioja). The calendar for implementation has been different in each territory, beginning in 2004 in Extremadura, Madrid and Murcia and finalising in 2017, when Ceuta and Melilla were incorporated into this trend (see http://www.ebspain.es/index.php/observatorio-eb-2).

The MBP in Madrid commenced in the 2004-2005 academic year in state schools providing primary education (first to sixth grade). This programme was gradually introduced in all schools, beginning in the first year of primary education, to then be extended to the remaining years, one academic year at a time[6]. Thus, the first twenty-six state MBP primary schools, which began to teach the bilingual programme in the 2004-2005 academic year, completed bilingualism in the 2009-2010 academic year, when "bilingual" children reached the sixth year and completed their primary education. The programme began in secondary schools (seventh to tenth grade) in the 2010-2011 academic year. Following its progressive implementation during the four years of compulsory secondary education, the MBP extended its bilingual programme to the two years of post-compulsory secondary education (eleventh and twelve grade) in the 2014-2015 academic year. In the 2015-2016 academic year, the first students to start the programme twelve years earlier (in the 2004-2005 academic year) reached the second year of non-compulsory secondary education, being the first students to undertake all their pre-university education (compulsory and non-compulsory) in a bilingual programme.

In the 2020-2021 academic year, the MBP covered 715 state schools (399 primary schools, 190 secondary schools, 9 vocational schools and 117 early education schools), in addition to 216 grant-maintained private schools[7]. Thus, over half of Madrid's schools participate in the MBP: 49.8% of state primary schools, 62.3% of state secondary schools, and 58.5% of private state-funded primary and secondary schools (see Table 1).

[6] Most of the MBP students in primary schools continue with the program in secondary bilingual schools.

[7] Official data provided by the Regional Ministry of Education and Youth, Madrid: https://www.comunidad.madrid/sites/default/files/doc/educacion/sgea_datosycifras_2020-21.pdf.

In 2020 there were almost 360,000 students on the MBP, with 115,857 in state primary schools, 86,937 in private state-funded primary schools, 83,250 in state secondary schools, 21,799 in private state-funded secondary schools, 23,034 in non-compulsory state secondary education, 12,543 in state pre-primary education, 14,869 in private state-funded pre-primary education and 604 in vocational training state schools (see Figure 1). The financing of bilingual teaching in the Community of Madrid has a consolidated and increasing budget that, in the 2019-2020 academic year, amounted to 42,604 million euros.

In line with the legislation[8], all primary education state schools in the MBP must teach entirely in English at least three subjects from the school curriculum (with the exception of Mathematics and Spanish, which must be taught in Spanish). In addition, the teaching of English is reinforced by devoting to it five hours weekly of tuition (monolingual schools have only three hours per week).

In compulsory secondary education, state schools follow the same structure as in primary education in the selection of schools, the progressive implementation in successive academic years, and teacher training. Students from monolingual primary schools must accredit a B1 level (B2 to access the third or fourth year of compulsory secondary education) of the CEFRL (Common European Framework of Reference for Languages) in order to enter a CLIL state secondary school.

[8] 5958/2010 Regional Act regulates the primary education in bilingual state schools and 972/2017 Regional Act regulates the secondary education in bilingual state schools.

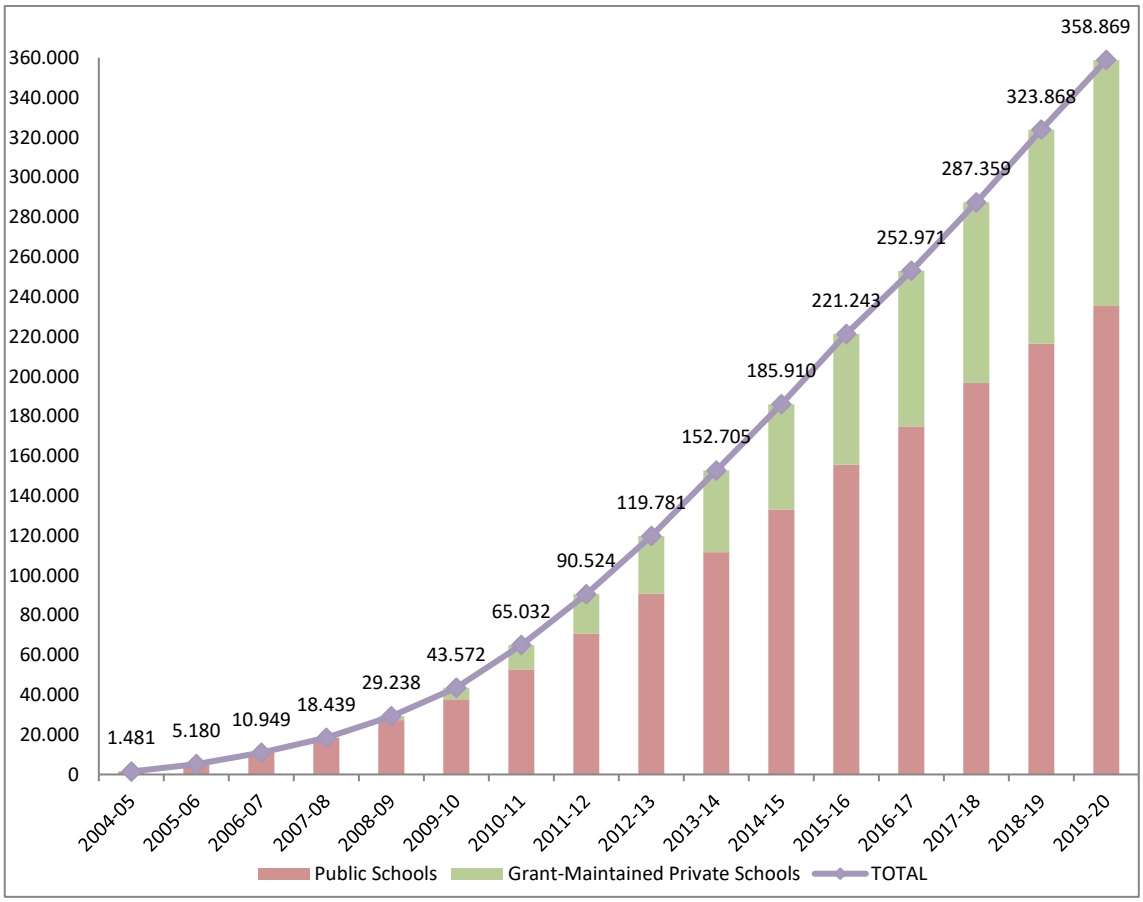
Table 1. Evolution of number of schools in the MBP

Academic Year	State Schools					Private state-funded Schools	TOTAL
	State Primary Schools	State Secondary Schools	State Vocational Training Centres	State Infant Schools	TOTAL State Schools		
2004-05	26				26	-	26
2005-06	80				80	-	80
2006-07	122				122	-	122
2007-08	147				147	-	147
2008-09	180				180	25	205
2009-10	206				206	45	251
2010-11	242	32			274	71	345
2011-12	276	64			340	96	436
2012-13	298	81			379	122	501
2013-14	318	91			409	141	550
2014-15	336	98			434	163	597
2015-16	353	110			463	181	644
2016-17	360	134	4		498	193	691
2017-18	369	152	5	35	561	204	765
2018-19	384	171	9	62	626	210	836
2019-20	399	181	9	99	688	216	904
2020-21	399	190	9	117	715	216	931

Source: Regional Ministry of Education and Youth, Madrid: https://www.comunidad.madrid/sites/default/files/doc/educacion/sgea_datosycifras_2019-20.pdf

For a state school to participate in the MBP, it must present an educational programme to the Regional Ministry of Education with majority support from the teaching staff and the Academic Council of the centre and a minimum number of teachers with the credentials necessary to teach in English, the C1 level (CEFRL). The Regional Ministry of Education makes the final choice between the MBP candidates, evaluating the criteria above and balancing the geographical distribution of the MBP schools in the Region of Madrid.

Fig. 1. Evolution of MBP students

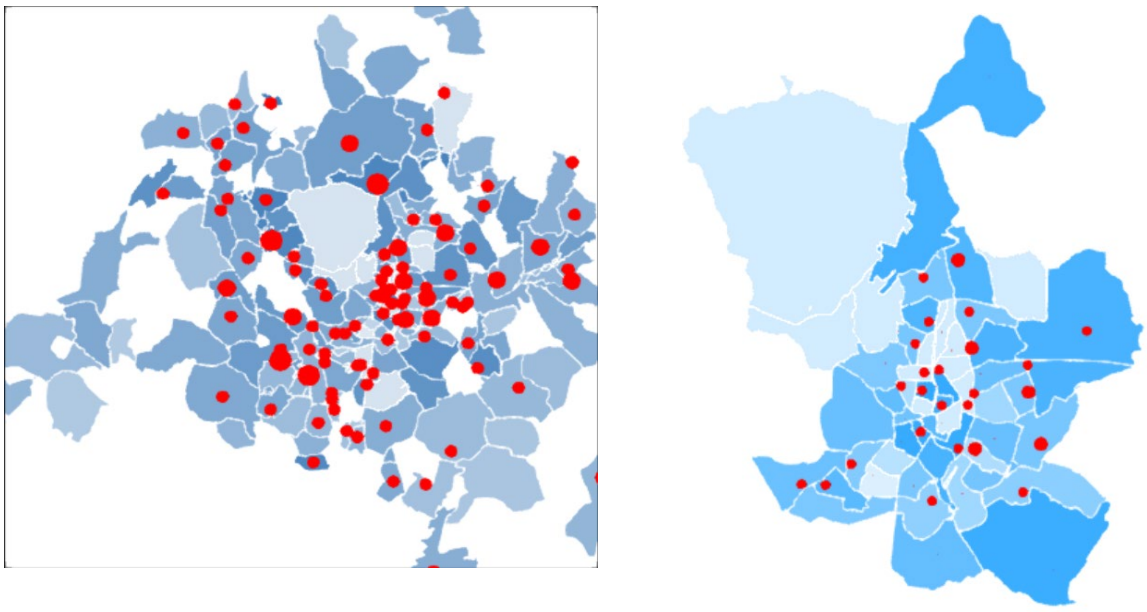


Source: Regional Ministry of Education and Youth, Madrid: https://www.comunidad.madrid/sites/default/files/doc/educacion/sgea_datosycifras_2020-21.pdf

The geographical characteristics of the Community of Madrid, where most of its population lives in urban environments with several educational centers, has allowed a balanced implementation of the MBP schools throughout the territory; this facilitates the possibility of choosing between a bilingual or a non-bilingual school, which account for approximately 50% each, except in some localities with few inhabitants. The map in figure 2 shows that CLIL schools are distributed throughout all areas of the Community

of Madrid and the city of Madrid, their implementation being unrelated to socioeconomic levels, that is, bilingual schools are not concentrated in the areas of higher socioeconomic status.

Fig. 2. Maps of MBP schools and ESCS (index of economic, social and cultural status) Madrid Region and Madrid City



a) Madrid Region b) Madrid City

ESCS levels Number of MBP schools

Source: Evaluation of Competences of Madrid Region 2019.

Teachers qualified to teach subjects in English in the MBP receive a productivity bonus[9]. Conversation auxiliaries provide strong support for MBP staff. These auxiliaries are young graduates from English-speaking countries who reinforce the learning of foreign languages, promote cultural values and complement the work of classroom teachers.

[9] Infant and primary teachers (who provide over 15 teaching hours weekly) receive 131.13 euros monthly and secondary teachers (who provide over 10 teaching hours weekly) receive 167.84 euros monthly, approximately 5-6% of their annual salary.

Conversation auxiliaries dedicate 16 hours weekly to supporting foreign language teaching in the school to which they are assigned.

Lastly, the school principal is responsible for supervising the correct development of the MBP. In addition, bilingual schools possess extra resources, such as specific learning material, digital whiteboards, certificates of linguistic competence in English with international recognition for students, and participation in European programmes.

Another interesting point to note is that the MBP is not selective in economic terms, as it is implemented in schools maintained by public funds and is therefore free for families. That means that all students, independent of their family background, can gain access to the MBP in financially equal conditions (Marsh, 2002). However, even though no economic barrier exists to accessing MBP, it is a very demanding programme in academic terms, as it requires the learning of some subjects (such as Sciences) in a foreign language (L2) at the same time as acquiring knowledge of the second language. This could lead to processes of self-selection on the part of households: families of students with learning difficulties (usually from disadvantaged socio-economic backgrounds)[10] may choose to send their children to monolingual schools, with the objective of reducing the probability of school failure.

[10] Research on the influence of family background on academic achievement (measured by standardized test scores of basic skills) has a long history. The most representative study on family background and academic achievement was conducted by the American sociologist James Coleman. Coleman et al. (1966) found that the two most important factors producing differences in students' academic performance were intelligence and family background. Since then, scholars around the world have continued to conduct numerous studies on this subject. All of them concluding that the family is one of the most important learning environments that affect students' academic achievement. The relationship is strong and positive; on average, the higher a student's SES, the stronger his or her educational outcomes tend to be (see the meta-analysis carried out by Sirin, 2005).

If this is the case, the MBP could be contributing to creating (or widening) a gap between an elite of bilingual youths within the state education system (those who belong to more privileged socio-economic backgrounds), and those unable to confront the greater academic demands of the bilingual programme, namely those from the most disadvantaged economic and cultural strata (Fernández Sanjurjo et al., 2018).

This situation could be further exacerbated, as various studies have demonstrated, because students from a higher economic position are more likely to attend supplementary English classes outside school (Alejo and Piquer-Píriz, 2016), thereby favouring their command of L2 and, consequently, leading to better academic results in the bilingual stream.

4. Database and methodology

4.1 Database

This study has been developed based on the microdata published in the evaluation performed by the Programme for International Student Assessment (PISA) in 2015, undertaken triennially by the OECD. It evaluates the capability of 15-year-old students in applying the knowledge and skills taught and learnt in the classroom to concrete situations and practical contexts. The comprehensive information supplied by PISA covers different aspects of adolescent educational process. Furthermore, the PISA evaluation includes not only information on the scores obtained by students in diverse standardized tests regarding their linguistic, mathematical and scientific competences, but also their personal backgrounds and their family and academic contexts. It is precisely the latter information that is especially relevant for our study.

The PISA 2015 database we use is that corresponding to the representative sample of the Spanish Community of Madrid, with added administrative information supplied by the Regional Ministry of Madrid for the year of initiation of each school in the MBP. In 2015, only state schools had the programme active for all compulsory level education, and this is the subsample of schools we use in our study. The exclusion of private schools from the analysis has the advantage of making the construction of the database more homogeneous. In turn, it also means a reduction of the total working observations. The final database of the study comprises 1,055 students from 26 secondary schools, of which 10 were participants in the MBP[11]. The students attending these 10 schools began their bilingual education in the academic year 2006/2007.

4.2 Methodology

The specific characteristics of our database and our dependent variables have influenced the choice of the methodology employed to obtain the estimations. Because our outcome variable is a dichotomous measure indicating whether or not a student participated in an MBP school, it follows a Bernoulli distribution. Consequently, logistic regression models are employed to estimate the influence of schools, students and family backgrounds on students' propensity to choose this type of school. A logit model is a univariate binary model in whichthe dependent variable is y_i taking the vale as one or zero, and the independent variable is x_i (Cramer, 2003):

$$\Pr(y_i = 1) = F(x_i'b)$$

[11] Of the sixteen monolingual schools, seven had begun to apply the programme recently and, consequently, the policy did not affect their students in the database.

Where "b" is the parameter to be estimated, and F is the logistic distribution function that assumes values strictly between zero and one for all real numbers. The relationship between the predictor and the response variable is not a linear function in logistic regression. Instead, the logistic regression function is used, which is the logistic transformation:

$$P(y_i) = \frac{e^{(\propto+\beta_i x_i)}}{1 + e^{(\propto+\beta_i x_i)}}$$

Where $\alpha =$ the constant of the equation and β = the coefficient of the predictor variables. The logistic regressions coefficients showed the change (increases when $b_i > 0$, decreases when $b_i < 0$) in the predicted logged odds of having the characteristics of interest for a one-unit change in the independent variables.

Once the estimates of these models were performed by maximum likelihood, the coefficients $\hat{\beta}$ are obtained, but their magnitude is not directly interpretable as occurs in the general linear model. In the present case, we calculated the odds ratios. They are very useful due to their easy intuition, as they indicate how the probability of attending bilingual schools is altered when the value of the independent variable increases by one unit, the rest remaining constant. Thus, an odds ratio exceeding unity indicates that the probability of attending a bilingual school increases.

The estimations were obtained by means of the STATA REPEST, command developed by Avvisati and Keslair (2014), to analyse the PISA data. REPEST performs the estimations using the BRR (Balanced Repeated Replication) weights proposed by the OECD. The results obtained using this method are technically robust and meet the criteria

of the usual OECD studies (see OECD, 2017). Moreover, we have incorporated robust error at school level.

5. Results

5.1 Descriptive Analysis

The selection of the independent variables took into account the review of studies of the determinants of school choice (see section 2) and the exploratory statistical analysis of the variables in our database. In particular, the regressions include those variables that have statistically significant differences of means among those students who had attended a bilingual school and those who had not. Using these criteria as a base, four groups of independent variables were constituted: variables regarding the student (S), the school'resources according to the principal's perception (Pr), the student's progenitors (P) and the student's household (H). The first group includes the variables of gender, student immigration status, repetition in primary school, and student's personality traits (academic anxiety[12] and motivation[13]). Using these variables, we try to evaluate whether the choice of a MBP school is driven by student-related factors.

[12] PISA 2015 asked students to report whether they "strongly agree", "agree", "disagree" or "strongly disagree" with the following statements: "I often worry that it will be difficult for me to take a test"; "I worry I will get poor grades at school"; "I feel very anxious even if I am well prepared for a test"; "I get very tense when I study for a test"; and "I get nervous when I do not know how to solve a task at school". The PISA questions thus cover students test-related anxiety. Students' responses were used to construct the index of schoolwork-related anxiety, standardised to have a mean of 0 and a standard deviation of 1 across OECD countries (OECD, 2017).

[13] For the first time, PISA 2015 asked students to report whether they "strongly agree", "agree", "disagree" or "strongly disagree" with the following statements: "I want top grades in most or all of my courses"; "I want to be able to select from among the best opportunities available when I graduate"; "I want to be the best, whatever I do"; "I see myself as an ambitious person"; and "I want to be one of the best students in my class". Student responses to these five questions were used to construct the index of achievement motivation, which has a mean of 0 and a standard deviation of 1 across OECD countries (OECD, 2017).

The second group proxies the quality of school resources such as perceived by the school's Principal. Particularly, PISA constructs two variables from the principal's questionnaire that measure the shortage of teacher staff and educational material. Their inclusion in our model attempts to determine whether the choice of a bilingual school is influenced by the quality of school resources. The third group includes the variables of immigration status, and the educational and occupational level of the progenitors. These variables permit evaluation of the role of family socio-economic background in the choice of a bilingual school. Finally, the variables in the fourth group are the number of books at home, , the household cultural capital and the language spoken at home . We include these variables to test the importance of the student' cultural environment on the choice of a bilingual school. Their complete definition, as well as their descriptive values, is shown in Table 2.

As Table 2 shows, more than one third (39%) of state secondary schools in Madrid participated in the MBP [14]. With regard to the main student characteristics in the sample, 23% were first and second-generation immigrants and 13% had repeated one or more years at primary school.

Regarding the differences between bilingual and monolingual schools, the two last columns in table 2 show clear differences in terms of academic and socio-economic profiles of students. In bilingual state schools, there is a smaller immigrant population than in monolingual schools (18% against 27%), the rate of course repetition is also lower

[14] The official data of the percentage of bilingual state secondary schools in the MBP in the academic year 2014-2015 was 32.7%, close to the 39.0% of the PISA sample. This indicates that the PISA sample, even though it did not take into account the bilingual characteristics of the schools, was very accurate. Official Data from the Regional Ministry of Education and Youth, Madrid: https://www.comunidad.madrid/sites/default/files/doc/educacion/datos_y_cifras_2014-15.pdf

Table 2. Descriptive analysis (only state schools). PISA 2015

Variables	Total Average [a]	Standard Deviation	Min-Max	Bilingual average	Non-Bilingual average
Dependent					
Bilingual state school (MBP) [b]	39%		0 – 1		
Independent					
S1. Student Gender (Female=1)	48%		0 – 100	47%	48%
S2. Immigrant Student [c]	23%		0 – 100	**18%**	**27%**
S3. Repetition in primary school	13%		0 – 100	**9%**	**16%**
S4. Test anxiety of the student	0.41	0.81	-2.51 – 2.55	**0.39**	**0.42**
S5. Student motivation	-0.28	0.85	-3.09 – 1.85	**-0.31**	**-0.26**
PR1. Shortage of educational material according to the principal	0.26	1.03	-1.32 – 3.61	**0.56**	**0.07**
PR2. Shortage of teaching staff according to the principal	1.02	0.81	-0.93 – 2.28	**1.18**	**0.91**
P1. Immigrant father	27%		0 – 100	**22%**	**31%**
P2. Immigrant mother	28%		0 – 100	**22%**	**33%**
P3. Education mother					
Secondary education or lower (Low)	29%		0 - 100	**24%**	**32%**
Post-secondary education (Medium)	26%		0 - 100	27%	25%
Higher education (High)	45%		0 - 100	**49%**	**43%**
P4. Maximum educational level of parents[d]					
Secondary education or lower (Low)	18%		0 - 100	**15%**	**20%**
Post-secondary education (Medium)	24%		0 - 100	24%	24%
Higher education (High)	58%		0 - 100	**61%**	**56%**
P5. Maximum occupational level of parents (index)	49.11	22.477	11 – 89	**53.18**	**46.27**

H1. Books in household					
0-25 (Low)	23%		0 - 100	**16%**	**28%**
26-200 (Medium)	55%		0 - 1	**58%**	**54%**
More than 200 (High)	22%		0 - 1	**26%**	**18%**
H2. Household cultural capital of [e]					
Low	25%		0 - 100	**21%**	**28%**
Medium	45%		0 - 100	**43%**	**46%**
High	30%		0 - 100	**36%**	**26%**
H3. ESCS household index[f]	-0.42	1.109	-7.18 – 2.51	**-0.21**	**-0.61**
H4. Language spoken at home (not Spanish=1)	8%		0 – 1	7%	9%
N	1,055			419	636

a. Percentage in case of dummies.
b. Schools implementing the MBP.
c. Immigrant: first and second generation.
d. Reflects the highest level of education attained by either parent residing in the same household as the child.
e. This variable indicates household possession of: classical literature, poetry books, works of art, and books on art, music and design (Low=0/1 possessions; Medium: 2/3 possessions; High: 4 possessions).
Bold type indicates that the mean difference is statistically significant (t-test).

f. The Programme for International Student Assessment (PISA) index of economic, social and cultural status (ESCS) was created on the basis of the following variables: the International Socio-Economic Index of Occupational Status (ISEI); the highest level of education of the student's parents, converted into years of schooling; the PISA index of family wealth; the PISA index of home educational resources; and the PISA index of possessions related to "classical" culture in the family home.

(9% against 16%) and students report less schoolwork-related anxiety and higher levels of achievement motivation. Moreover, the education and occupational level of parents is higher than in non-bilingual schools. The number of students whose parents are immigrants is also lower in bilingual schools. Finally, other household aspects such as the number of books at home, the index of cultural capital and the ESCS index, indicate a composition difference in the student profile of those attending the two types of state schools in Madrid.

Concerning the school resources, bilingual school 'principals assert they have a greater shortage of educational material and teaching staff.

5.2 Robust Logistic Results

Table 3 presents the results of the logistic regressions of two models, each of which includes different variables and shows the factors influencing the decision to attend a bilingual school in the Community of Madrid. These models were defined following the typical factors taken into account in the literature about individual, parental and family variables that determine school choice. The models avoid adding variables with a high correlation index[15]. Model A includes the aforementioned variables regarding the student, the student's progenitors and the student's household. Model B adds information about the school 'resources and student's personality traits. Each model comprises two columns: the first refers to the coefficient of the parameters obtained and the second incorporates the odds ratios. As already mentioned, our model only includes students attending state secondary schools, so the dichotomy proposed is a bilingual state secondary school in contrast to a monolingual state secondary school. The results in Table 3 indicate that the variables approximating household characteristics display a clear influence on the choice to attend a bilingual school.

[15] We checked whether our model was affected by a multicollinearity problem by computing the Variation Inflation Factor (VIF) and the condition index. The results led us to rule out the existence of this problem in the specification of our models. The results of this analysis are available upon request.

Table 3. Determinants to attend a bilingual state school (logit model estimations from PISA 2015 data)

Variables	Model A		Model B	
	Coeff.	Odds Ratios	Coeff.	Odds Ratios
S1. Student gender (Female =1)	-0.052 (0.582)		-0.050 (0.652)	
S2. Immigrant student	-0.352 (0.260)		-0.171 (0.632)	
S3. Repetition in primary school	-0.366 (0.214)		**-0.522** **(0.046)**	**0.593**
S4. Test anxiety of the student			-0.008 (0.946)	
S5. Student motivation			-0.183 (0.148)	
PR1. Shortage of educational material according to the principal			0.526 (0.299)	
PR2. Shortage of teaching staff according to the principal			0.390 (0.520)	
P1. Immigrant father	0.134 (0.697)		0.134 (0.720)	
P4. Maximum education level of parents (Low)	Category of reference			
P4. Maximum education level of parents (Medium)	0.114 (0.593)		0.155 (0.471)	
P4. Maximum education level of parents (High)	-0.075 (0.771)		0.005 (0.987)	
P5. Maximum occupational level of parents	**0.012** **(0.030)**	**1.013**	**0.013** **(0.038)**	**1.013**
H2. Household cultural capital (Low)	Category of reference			
H2. Household cultural capital (Medium)	0.197 (0.366)		0.106 (0.559)	
H2. Household cultural capital (High)	**0.488** **(0.066)**	**1.629**	**0.437** **(0.042)**	**1.548**
N	800		799	
% Correct predictions (*)	59.88%		68.34%	

Database: PISA 2015. P-values in parentheses. (*) estimated with a logit estimation. We have performed other models with different combinations of independent variables (Immigration mother, Education mother, Books in household, and ESCS index), obtaining similar results in terms of the objectives of this analysis.

Thus, the maximum occupational level of the parents, with an odds ratio of 1.013 in models A and B, reflects that there is a 1.3% greater probability of attending a bilingual school for each additional percentage point in the occupational category of the parents. Since this category ranges from 11 to 89, the differences between the categories could exceed 50 points, which would mean an increase of 75% in the probability of attending a bilingual school.

Elevated family cultural capital also reflects an increased probability of participating in the MBP. The odds ratio of 1.629 and 1.548 in models A and B, respectively, reflects that there is a 54-62% greater probability of attending a bilingual school if the household cultural capital is high. In addition, the phenomenon of repetition of students, significant in model B, has a negative relationship with bilingual choice, which points to an academic barrier to the choice of a bilingual school. Specifically, students who have repeated one or more academic years have a 59.3% more probability of not attending a bilingual school. The more demanding curricula in bilingual schools may affect this result.

The previous results, analysed together, highlight the importance of the general socio-economic situation of students in accessing the MBP. Teenagers from more privileged socio-economic and cultural backgrounds are more likely to study in a bilingual state school. This result suggests that the extension of the programmes of educational bilingualism implemented in the Community of Madrid in the last fifteen years, far from favouring the participation in these programmes of students who cannot afford private foreign language classes (one of the objectives sought in their implementation), could actually be contributing to generating stratification within the network of state schools. The most socio-economically advantaged students have abandoned monolingual state

schools to be concentrated mainly in bilingual schools. It is important to emphasise, however, that this segmentation is not due to the design of the MBP, since its functioning does not incorporate any criterion of economic or cultural selection of the participants.

There are certainly no economic criteria for the exclusion of students from bilingual streams in the Spanish education system; students may choose to enter a bilingual programme as long as their school offers the CLIL. Thus, implicit self-selection (academic and socio-economic) by Spanish students of whether to attend a bilingual programme could be the most plausible explanation of the stratification observed in our estimations.

As a check robustness, we replicate the estimation using a census evaluation funded by the Regional Government of Madrid. The following section explains the results obtained.

5.3 Robustness Check Analysis

The Community of Madrid has for many years contracted external evaluations as a way of analysing the education system. In 2016, the evaluations established in the national LOMCE (Organic Law on the Improvement of the Quality of Education) began to be applied in Madrid (the Regional Assessment of Educational Competences). The evaluations in the third and sixth grades were performed in the 2015-2016 academic year, and from the 2016-2017 academic year onwards the evaluation of the tenth grade (the final year of compulsory secondary education in Spain) was added. These tests have a census character, and thus all schools and students of those educational levels participate in them.

The data analysed for our robustness check correspond to the first LOMCE evaluation of students in their tenth year of education (2016-17 academic year). The assessment consists of a series of surveys of all students, families, directors and teachers. The final database includes 29,012 observations from 303 schools (90 of which were implementing the MBP). Using this database, we use a logistic estimation approach with the aim of identifying the determinants of deciding to attend a bilingual school. Table 4 shows the results, which indicate, as did PISA, the importance of the family´s socio-economic background in their participation in the MBP: students belonging to families with an elevated socio-economic and cultural background are more likely to participate.

6. Conclusions

The Community of Madrid has implemented one of the most important educational innovations in Spain in the last fifteen years, namely the introduction of bilingual educational programmes in schools maintained by state funds. In only a few years, the programme of Spanish-English bilingualism has extended to reach more than 50% of all publicly financed primary and secondary schools in Madrid.

An intervention of these characteristics necessarily generates numerous doubts concerning its consequences in terms of both the efficiency and the equity of the education system.

A serious concern surrounding the implementation of such programmes, which are increasingly popular throughout Europe, is that they may induce a selection bias in the student population, whether through selection mechanisms of the schools themselves or self-selection of students (and/or their parents). If this is true, such a selection bias could

be contributing to an elitist education model, which runs counter to the aims of the programme (Van Mensel et al., 2020).

In order to test this concern for the specific MBP programme implemented in Madrid`s state schools, this paper has researched a number of background variables of CLIL learners,comparing them to their non-CLIL counterparts. In particular, our study has analysed the factors determining the choice of a bilingual state school instead of a monolingual state centre. The models estimated show that the probability of choosing a bilingual school is higher for students with a more advantaged socio-economic and cultural position. That is to say, bilingual school selection is not status-blind (Horn, 2013). This result is similar to those of Apsel (2012) for Germany and Van Mensel et al. (2020) for Francophone Belgium.

In the case of Madrid our results cannot be imputed to the design of the MBP itself as the Programme has been implanted in schools that are maintained by public funds and are therefore free for families. Although residential stratification exists in Madrid, our map in figure 2 shows that CLIL schools are distributed throughout all areas of the Community and city of Madrid, without their implementation being related to socioeconomic levels.

A plausible explanation of the positive relationship between choice of a bilingual state school and the students' socio-economic and cultural position is that of self-selection: the increased difficulty some students have in studying certain subjects in a second language may lead such children to self-exclusion from the potential benefits of studying in a foreign language. Given that many studies have demonstrated that academic difficulties

are associated with less favoured socio-economic background[16], self-exclusion from bilingual programmes would only perpetuate, and even widen, initial educational inequalities. Peer effects would reinforce this, because the concentration of more academically select students in bilingual state schools would deprive educationally disadvantaged students (grouped in monolingual schools) of the positive externalities generated by the best students[17].

What our paper shows is that the free supply of bilingual education (as in the MBP) is not, in itself, sufficient to equalise opportunities to access knowledge of a foreign language. The non-monetary costs associated with studying in a foreign language could be one of the most important barriers to children from a disadvantaged socio-economic background, who are more likely to suffer school failure.

Families who are more advantaged socio-economically, however, appear to fully perceive the benefits (economic and non-economic) that knowledge of a second language, especially English, may have for their children future, and, consequently, assign a greater value to learning a foreign language. This is merely a hypothesis, but if it is correct, the implementation of bilingual education programmes, such as the MBP, should include a commitment to raising awareness of these benefits in the most vulnerable segments of the

[16] Two excellent reviews of the causes of school dropout are those by Rumberger and Lim (2008) and Hunt (2008).

[17] Several papers have attempted to identify the effects of peers on student outcomes. Although this problem has many methodological difficulties, some studies have shown, in an especially convincing way, that peers indeed matter and that higher achieving schoolmates can improve others, but these effects are likely to be reciprocal, since less able students may be a hindrance to their less academic peers. These results lead Horn (2013) to conclude that a system that selects students into homogeneous groups could result in peer effects increasing differences between schools, and thus increase inequalities of outcome.

population, and should offer incentives to stimulate the demand from such groups (the testing of this hypothesis is beyond the scope of this paper).

Table 4. Determinants to attend a bilingual state school (logit model estimations from LOMCE evaluation data)

Variables	Model A		Model B	
	Coeff.	Odds Ratios	Coeff.	Odds Ratios
S1. Female	-0.053 (0.158)		0.063 (0.119)	
S2. Immigrant student	-0.042 (0.609)		0.037 (0.669)	
S3. Repetition in primary school	**-0.211 (0.005)**	**0.810**	**-0.200 (0.013)**	**0.818**
S4. Test anxiety of the student			-0.033 (0.204)	
S5. Motivation of the student			-0.029 (0.226)	
PR1. Shortage of educational material according to the principal			**0.252 (0.000)**	**1.286**
PR2. Shortage of educational staff according to the principal			0.005 (0.827)	
P1. Immigrant father	-0.077 (0.398)		-0.073 (0.451)	
P4. Maximum education level of parents (Low)	Category of reference			
P4. Maximum education level of parents (Medium)	-0.011 (0.852)		-0.060 (0.350)	
P4. Maximum education level of parents (High)	**0.234 (0.000)**	**1.264**	**0.158 (0.017)**	**1.171**
P5. Maximum occupational level of parents	**0.030 (0.000)**	**1.030**	**0.029 (0. 000)**	**1.029**
H1. Books in household	**0.115 (0.000)**	**1.122**	**0.115 (0.000)**	**1.122**
N	12,214		12,044	
% Correct predictions (*)	61.49%		62.27%	

Database: Regional Assessment of Competences of Madrid (RACM). P-value in parentheses.
Descriptive analysis available upon request.

Thus, apart from supplying bilingual education, educational authorities must also promote policies geared towards raising the demand for bilingual education by the most disadvantaged students. Socio-economic and cultural sorting, which the MBP introduces within the state education system, can only be inverted in this way. Finally, it is important to underline that such interventions should include other policies permitting the minimisation of the risk of school failure by increasing the study of a foreign language (such as the supply of programmes of academic support aimed at educationally disadvantaged children who choice bilingual education). To conclude, we wish to emphasise that our results provide some evidence regarding possible self-exclusion from the MBP of disadvantaged students. This requires further and more detailed research, aimed at mitigating the negative effects of the MBP as regards equity.

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