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The spatially uneven effects of a desegregation education policy

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Abstract

The spatial, institutional and social configurations of school supply and demand are crucial aspects in understanding the various mechanisms of production and reproduction of socio-spatial inequalities in education. The same policy instruments may have different effects depending on the characteristics of local education markets and the dynamics of supply and demand in each of them. This article investigates how a policy designed to reduce school segregation in the city of Barcelona resulted in uneven effects in different catchment areas of the city, which are socially and educationally diverse. By comparing the effects of the same policy strategy in different territories, the article identifies four mechanisms that mediate and occasionally prevent the effectiveness of the policy instruments or their implementation procedures. Identifying these mechanisms is an important and necessary task when reviewing the existing policy design and adapting it to the particularities of local education markets.

Keywords

School segregation, education policy, spatial inequalities, Spain, local education markets

Introduction

Literature on education markets has underlined the role of contextual aspects when assessing the dynamics of educational supply and demand. The local component of education markets has been understood as a decisive factor in the evaluation of 'real markets' (Junemann and Ball, 2015) or 'lived markets' (Félouzis et al., 2013; Taylor, 2009), as an alternative approach to the rather abstract and theoretical assertions regarding the way in which market mechanisms operate. 'Lived' markets situate the behaviour of parents, schools and other agents within the 'real' world, characterize the

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uniqueness of the local and account for the spatial and institutional heterogeneity of education markets (Taylor, 2001). 'Local education markets (LEMs)' (Lubienski, 2006b) or 'educational landscapes' (Boterman et al., 2019) are the most common terms used in the literature to refer to those spatial configurations that result from historical, institutional and individual factors.

The consideration of LEMs is crucial in understanding how the different mechanisms of production and reproduction of socio-spatial inequalities operate (Zancajo and Bonal, 2022). The combination of specific school admissions policies, the characteristics of residential segregation and the specific rationalities of educational demand are key to understanding questions such as the hierarchies of school supply, how schools differentiate themselves from their 'competitors' and how families establish choice sets or the structure of vertical and horizontal inequalities.

However, the importance of LEM configurations, when attempting to understand how education inequalities are reproduced, is in sharp contrast with policy designs that do not account for the diversity of education markets. Public policies seldom introduce flexible and variable designs to respond to the particularities of specific territories. While they may be based on solid evidence, have clear objectives and dedicate the necessary means for an effective implementation, they rarely incorporate flexibility to adapt to the specific needs of different contexts (Astbury and Leeuw, 2010). As a result, success or policy failures may be immediately associated with aspects of policy design or implementation, ignoring the way in which similar strategies may produce unintended and (sometimes) unexpected effects, depending on the local institutional and socio-spatial configurations.

This paper illustrates how the specific configuration and characteristics of different LEMs in the city of Barcelona mediate and alter the expected effects of an ambitious policy to tackle school segregation in the city. Based on an evaluation of the *Shock Plan Against School Segregation* (SP), implemented by the *Consorci d'Educació de Barcelona* (CEB), which is the local education authority, this paper reflects on how the characteristics of different catchment areas (understood as different LEM configurations) alter the effectiveness of the measures included in the plan. The paper presents evidence relating to the factors that, associated with different LEM characteristics, facilitate or hinder the main goal of the SP, which is to achieve a balanced distribution of disadvantaged students (who are the beneficiaries of the policy) among schools within the same catchment area.

The paper is structured as follows. In the following section we review the available evidence regarding the importance of contextual and local factors in order to understand both school segregation dynamics and the unequal impact of public policies when tackling school segregation in different contexts. The next section describes the key aspects of Barcelona's education market and school admissions policy, as well as the characteristics of the SP implemented in the city from 2019. The following section describes the data and methods used to assess the differential effects of the SP. The results of our analysis identify four main mechanisms that mediate the effects of the SP on different LEMs. The final section concludes and highlights the relevance of this type of research in terms of increasing the effectiveness of desegregation education policies.

Local education markets and school segregation dynamics

The theoretical weight that geography and the sociology of education have lent to local factors, so as to understand social and education inequalities, has not always translated into empirical evidence. Many studies on school segregation and socio-spatial inequality dynamics have tended to use the aggregate data of cities or countries (Bonal and Bellei, 2018; Boterman, 2018; Valenzuela et al., 2014). These analyses may explain the interaction between school admission models, residential segregation and the diversity of school supply in relation to the interpretation

of socio-spatial inequality dynamics. However, they tell us little about the way in which these interactions operate in particular territories. There are salient exceptions to this general approach. Some studies include territorial analyses to observe how school supply hierarchies, the relationship between residential and school segregation or school choice patterns and mobility differ, depending on the geography of educational opportunities and the other characteristics of LEMs (Boterman, 2021; Oberti, 2007; Scandurra et al., 2021; Yoon and Lubienski, 2017). However, these are more the exception rather than the norm in studies of the unequal, spatial effects of education markets.

Several reasons justify the relevance of the local context as a means of understanding the dynamics of socio-spatial inequalities in education. Firstly, the geography of educational opportunities is unequal. Research has shown that schooling options are not spatially distributed in a homogeneous way. The configuration of LEMs confirms a strong hierarchical ordering of urban spaces. The best performing and most attractive schools are frequently concentrated in the most affluent areas, while the most deprived neighbourhoods have limited access to quality educational resources. The diversity and quality of school supply to which lower-income families and ethnic minorities have access, is of a lower social composition and lower performance. Studies have shown the spatial inequalities of school supply in the UK (Burgess et al., 2011, 2015), Sweden (Fjellman et al., 2019), New York (Lee and Lubienski, 2021); Amsterdam (Boterman, 2020); Paris (Oberti, 2007), Santiago de Chile (Elacqua et al., 2011) or Barcelona (Scandurra et al., 2021). The inequalities are not only vertical but also horizontal, as wealthier areas usually have a higher diversity of pedagogical models (Bonal et al., 2017; Lubienski, 2006a). The existence of an unequal geography of school supply is key to understanding how educational actors (both providers and choosers) react on different sites. Therefore, education markets need to be observed in context 'because the outcomes generated by education markets will be determined by both the formal properties and the informal arrangements of and within the market' (Lauder and Hughes, 1999: 84).

Secondly, the local context is crucial to understanding providers' logics of action (van Zanten, 2009). One of the most interesting findings of the role of LEMs lies in their capacity to alter the expected benefits of market-driven reforms, based on choice, competition and diversity. Socio-demographic contexts act as mediating factors that create various kinds of incentives and logics of competition and exclusionary practices in different LEMs (Lubienski et al., 2009). Educational providers react to market incentives with different strategies, depending on their position in the educational marketplace. Their competitive and marketing strategies differ in relation to the context in which they operate and their targeted audiences (Zancajo, 2018).

Thirdly, educational demand is not independent of the configuration of LEMs. Demand rationalities of school choice do not only differ with regard to the social position of the chooser. Preferences and restrictions of choice take place in specific LEMs. LEMs shape school choice because families do not construct choice rationalities in an abstract space, but in a very real one. The spatial configuration of LEMs is a decisive aspect of a parents' choice set, when they choose a school for their children for the first time. Similar decision-makers may behave very differently, depending on the particular characteristics of a LEM. Hence, choosing a public or private school, a school with a higher or lower percentage of migrant students or a high-performing school not only depends on the socioeconomic characteristics of the chooser, but also on the particularities of the educational supply near the home of the chooser (Benito et al., 2014; Boterman, 2021).

Finally, as many studies in the sociology of education have shown, there are various mechanisms by which class segmentation in the educational market has a spatial manifestation. Middle-class parents activate their spatial capital to avoid socially stigmatized schools, while working-class or ethnic minority children typically enroll in less desirable schools (Barthon and Monfroy, 2010; Reay and Lucey, 2004). The possibilities and dispositions that different parents have to activate

spatial mobility and choose prestigious schools are unevenly distributed. Both objective conditions and subjective dispositions contribute to reproducing patterns of school segregation in different urban contexts (Broccolichi and van Zanten, 2000; Reay, 2001).

The relevance of contextual factors and territorial variability has been largely ignored in public policies and the acknowledgement of the importance of the local context contrasts with policy designs that may suffer from a high degree of generalization and low capacity, in terms of adapting to local circumstances. Public policies, implemented in complex systems, are characterized by difficulties of control and prediction, which may explain a significant number of policy failures (Mueller, 2020). Education is of course no exception as an increasingly complex system (Viennet and Pont, 2017). However, beyond complexity, the unexpected effects linked to the specific configuration of LEMs may explain what works, for whom and under which circumstances (Pawson and Tilley, 1997; Verger et al., 2016). The same policies, implemented in different contexts, may produce different and unequal effects since geographical, institutional and individual factors may intervene in an unforeseen or unexpected way. Predicting how structural factors or actors' responses may alter the foreseen effects of specific policies is a complex task, but policy evaluations may reveal which aspects, linked to policy design and implementation, act as barriers to achieving the expected results in specific contexts.

The use of policies to tackle school segregation is a very good example regarding complexity and unpredictability. In systems with free or controlled school choice, the success of desegregation strategies may be highly dependent on the translation of these policies into real education markets and the actors' responses to specific policy incentives. For example, while a change in the limits and size of school catchment areas may potentially benefit a higher level of social heterogeneity between schools and reduce school segregation (Saporito, 2017), the effectiveness of this change will largely depend on the specific school supply within catchment areas and the actors' responses to policy change (Bonal and Zancajo, 2018).

In the case of Barcelona's SP, the key to reducing socio-spatial inequalities is based on an earlier identification of socially disadvantaged students and their balanced distribution among schools within each catchment area. There are few examples of similar policies in Europe, Flanders being a notable exception (Cantillon, 2017). An evaluation of the implementation effects of this policy may offer an insight into which factors, associated with specific LEMs, mediate between policy regulations and actors' responses.

Socio-spatial inequalities in Barcelona and the Shock Plan to tackle school segregation

The education market of Barcelona has two interesting characteristics that make the study of socio-spatial inequalities particularly interesting. Firstly, there are many private schools, most of them publicly subsidized. The private subsidized sector enrols 54% of primary and lower secondary students in the city, while 44% go to public schools; only 2% of students are enrolled in independent private schools (CEB, 2021). These numbers are significantly different from those in other regions of Catalonia or Spain, where only 35% and 28.2% of students are enrolled in private subsidized schools, respectively (Ministerio de Educación y Formación Profesional, 2019). Secondly, the city is divided into 29 catchment areas or school districts for pre-school and primary education (26 catchment areas for secondary education). All residents have priority access to all public and subsidized private schools within their catchment area. However, in 2012, the CEB, the local education authority in charge of the city's educational planning, changed the school admissions system to increase school choice. Following the reform, families could have priority access to a greater number of schools than those included in the catchment areas. The new system also

allowed priority access to a minimum number of public and private subsidized schools (six per school sector) close to an individual's place of residence, and all schools within a radius of less than 500 metres from any particular home.

While this reform equalized families' choice sets by levelling the minimum number of schools to which all families might have priority access, it increased school segregation for the most disadvantaged students in the city (Bonal et al., 2019, 2021). School segregation of migrant and socially disadvantaged students has remained high during the last decade, with significant inequalities not only between catchment areas or between school sectors, but also within them (Síndic de Greuges, 2016). This is the context in which the CEB launched a SP to tackle school segregation in the city.

The *Shock Plan Against Segregation and for Equal Opportunities and Educational Success* (SP) has two goals. Firstly, it aims to reduce the concentration of socially disadvantaged students by ensuring a more equitable distribution among schools in the city of Barcelona, including both public and private subsidized schools. Each school must reserve a number of places for vulnerable students, which must be a proportional quota of the total number of vulnerable students living in the reference catchment area. Secondly, the SP ensures free access to school activities and educational services for beneficiaries, as well as access to books and materials, and other supplementary educational activities. Free school meals are also granted to beneficiaries, and, in the case of private subsidized schools, monthly school fees are covered.[1]

The SP's theory of change is based on evidence that the school choice sets of vulnerable families are not only limited by economic barriers but also by the exclusion of a number of schools that are perceived as 'not-possible' schools or are regarded by them as inadequate schools. Thus, the SP aims to provide school choice to the beneficiaries by offering them free education. Its effectiveness largely depends on the capacity of the CEB to identify vulnerable students as potential beneficiaries, as well as its capacity to convince families to enrol in one of the established reserved schools. The participation of all schools in the area is a prerequisite. Both public and private subsidized schools are formally obliged to accept all SP beneficiaries, who have access to the places reserved by the CEB. Schools receive economic compensation for enrolling SP beneficiaries, on the assumption that the costs of providing educational services to these students are higher (as they may require more personalized attention, for example).

The SP was introduced in the academic year 2019/2020 and has gradually increased its coverage, starting with the first grade of preschool education (3 years-old, P3)[2] and lower secondary (12 years-old, ESO1) in 2019/2020 and adding a new school grade every year. Therefore, in 2020/2021 the SP covered four grades (first and second grades of preschool and secondary education: P3, P4, ESO1 and ESO2 are their acronyms in Spanish).

The balanced distribution of socially disadvantaged students is based on the early identification of vulnerable students before the enrolment process starts. Social services collaborate with local education services in this early detection phase. Once vulnerable children have been detected, the CEB contacts their families and informs them of the existence of the SP and the place reserved for their child should they wish to participate in the programme. The pre-allocation of places is proportional to the number of potential beneficiaries in each catchment area. In this way, a balanced distribution of vulnerable children among all public and private subsidized schools in each catchment area is ensured. Those students registering on the system after the regular enrolment process has been closed, must present a late application to the CEB. The CEB assesses the child's risk of vulnerability and offers the child a school place, following the same procedure used for all students at the beginning of the academic course, that is taking into account the balanced distribution of vulnerable students among the schools in the catchment area.

However, while most beneficiaries of the SP for primary and secondary education are identified during the pre-registration process (P3 and ESO1), other students are only detected once they have

already been enrolled in a school. These students are also beneficiaries of the SP, but their late identification impedes their balanced distribution within the schools of the catchment area.

Criteria used to identify vulnerable students include the following aspects:

- Families benefiting from Barcelona City Council's Social Emergency Fund (for the 2019/2020 academic year) and the Covid Fund (2020/2021 academic year), as a proxy for students in extreme poverty.
- Free school meal beneficiaries.
- Students classified as 'students with socioeconomic needs'.

Identification with any of these three vulnerability criteria renders students SP beneficiaries. Table 1 shows the evolution of students classified as vulnerable in the city of Barcelona, from 2018/2019 (1 year prior to the implementation of the SP) until 2019/2020 and 2020/2021 (the first 2 years of the SP implementation). Data show a slight increase in the percentage of vulnerable students in the first grade of preschool education in 2020/2021 (in comparison to previous years) but a general reduction in absolute numbers, due to a falling birth rate. In the case of secondary education, both the total and the proportion of vulnerable students have increased significantly during the 2 years of the SP implementation.

The SP covers around 60%–70% of vulnerable students, with a higher coverage in secondary education.[3] It should be noted that the enrolment process for the 2020/2021 academic year took place in the context of the COVID-19 pandemic, which reduced both pre-registration (which was done online) and enrolment rates in non-compulsory education levels.

Taking account of the overall city and after 2 years of implementation, indicators of school segregation (measured through dissimilarity index) for vulnerable students and students benefitting from the SP, show disparate results for P3 and ESO1. In the case of P3, aggregate data show a significant reduction in the segregation of vulnerable students between 2018/2019 (0.53) and 2019/2020 (0.48) and a very slight rise in 2020/2021 (0.49), while the distribution of the SP beneficiaries slightly improves in 2020/2021 (from 0.47 to 0.46). In the case of secondary education students, segregation rates decline significantly both for vulnerable students (from 0.53 to 0.39) and, in particular, for SP students (from 0.47 to 0.38).

In both P3 and ESO1, the school segregation rates of students benefitting from the SP are slightly lower than those observed for all vulnerable students (which also include non-beneficiaries). The increase in the number of beneficiaries and an improved ability to identify vulnerable students 'on time' (before the academic year starts) are key factors of the SP's effectiveness.

The SP aims to reduce school segregation within the 29 existing catchment areas for primary education and the 26 catchment areas for secondary education. Our analysis identifies the key factors that facilitate or limit the effectiveness of the SP in different catchment areas. To do so, we first identify the key differences in catchment areas, based on their social composition, geographical isolation, average school composition and concentration of vulnerability. Secondly, we analyse which salient aspects of catchment areas, shape the unequal effects of the SP.

Data and methods

In this paper, we focus on the evidence obtained from registration data, available for Barcelona's 29 primary education catchment areas. Data used for the analysis come from different datasets. Firstly, we accessed the official student register of the Department of Education of the Catalan

Table 1. Vulnerable students and beneficiaries of the SP in Barcelona, by year and grade.

	18–19		19–20				20–21			
School level	Vulnerable students (*N*)	% Vulnerable students/total	Vulnerable students (*N*)	% Vulnerable students/total	SP students (*N*)	SP/vulnerable students (%)	Vulnerable students (*N*)	% Vulnerable students/total	SP students (*N*)	SP/vulnerable students (%)
P3 (3 years-old)	1265	9.7	1272	9.9	853	67.1	1233	10.2	716	58.1
P4 (4 years-old)	1277	9.7	1417	10.6			1554	12.3	898	57.8
ESO1 (12 years old)	1454	10.1	1662	11.5	1.196	72.0	1860	12.7	1.368	73.5
ESO2 (13 years old)	1467	10.1	1449	9.9			1828	12.8	1.145	62.7

Source. Authors' own compilation based on CEB registers.

Government and the register of Vulnerable Students of the Local Authority. These datasets contained three types of relevant information for our analysis: (1) individual characteristics (student identification number, date of birth, country of birth, gender and address), (2) information regarding students' educational situation (date of incorporation into the Catalan education system, student with special needs, SP beneficiary, school code and grade) and (3) data on students' place of residence and their social situation (FSM beneficiaries, Social Fund recipients and student geolocation). This information could be merged with census data in order to gain access to information relating to parental education attainment and cultural origin.

Secondly, we accessed a schools' database containing information on school codes, school sectors (public, private subsidized or private independent), district, school catchment area, number of students, number of applicants, school vacancies, indicators of social composition in schools, student-classroom ratios, proportion of late arrivals and as well as dropouts during the school year. A school composition index was constructed to compare the differences between schools. The index relies on four underlying variables: the proportion of FSM receivers, the proportion of Emergency Social Fund receivers, the proportion of students with foreign parents and the proportion of students with parents having received, at most, lower-secondary education (ISCED 2). These indicators are combined using an iterated, principal-factor method and the resulting factor is max/min transformed and changed in sign. The indicator ranges between 0 and 1. Higher values of the index mean a better social composition of the school and all data were available for students from 3 to 16 years old, broken down into educational level and academic year from 2018/2019 to 2020/2021.

Finally, data on the socioeconomic characteristics of catchment areas were obtained from the open data source of the National Institute of Statistics (INE). Disaggregated data by census tracts in relation to family disposable income were used to characterize the average income of catchment areas.

The effects of the SP are expected to be more relevant over the mid- and long-term. Our evaluation was carried out after 2 years of its implementation, with the aim of identifying critical aspects of the programme design and the implementation process. The evaluation allowed us to identify which factors condition the effectiveness of the SP in the short-term in different catchment areas. This article provides evidence on two main research questions regarding the uneven effects of the SP:

RQ1: Do the effects of the SP, which aims to tackle school segregation, differ among LEMs (catchment areas)?

RQ2: Which social/structural and educational characteristics of the catchment areas limit the effectiveness of the SP?

To answer these questions, we first clustered Barcelona's 29 primary education catchment areas[4] according to their social and educational characteristics. Catchment areas were classified according to their average income, percentage of students benefitting from the emergency social fund and percentage of students enrolled in public schools. The first two variables were recorded in percentiles (<25, 26–74 and 75>) and the third variable was dichotomized using the mean as a reference.

From the intersection of the three variables, five 'standard zones' emerged. Group 1 ('vulnerable areas') includes the lowest income educational areas, with a strong presence of Social Fund beneficiaries and a high enrolment in public schools. Group 2 ('heterogenous areas') is made up of middle-income educational areas, with percentages of Social Fund beneficiaries above the city average and high enrolment in public schools. Group 3 ('average areas') includes middle-income areas, an average number of Social Fund beneficiaries and an average proportion of enrolment in

public schools. Group 4 ('upper class areas') includes the highest-income areas of the city, with a low number of beneficiaries of the Social Fund and limited enrolment in public schools. Finally, group 5 ('middle-class gentrified areas') includes middle- and high-income areas, with a low number of Social Fund beneficiaries but a high number of and high enrolment in public schools.

In order to explore the variability of the SP effects on different LEMs, we selected at least one catchment area per group. A second selection criterion identified adjacent catchment areas, with the objective of analysing the potential mobility dynamics between them. The final sample included seven catchment areas, one per group with the exception of group 1 ('vulnerable areas') and group 3 ('average areas'), which included two catchment areas. In the case of group 1, it was particularly interesting to observe the differential effects in more or less isolated LEMs (ZE and ZF). As regards group 3, we also included two catchment areas (ZA and ZD) to ensure the criterion of adjacent zones.

Our analysis focuses on preschool and primary education, where the SP has been proven to have weaker and more disparate effects. We assess the impact of the SP in these seven catchment areas (ZA, ZB, ZC, ZD, ZE, ZF and ZG) and this allows us to better understand which factors, associated with different LEMs, constrain their potential effectiveness. Following Astbury and Leeuw (2010) we unpick the various mechanisms that explain the dissimilar impacts of SP in these catchment areas. Therefore, this paper goes beyond the general evaluation of the SP and aims to analyse why and how this programme highlights a different level of success in different contexts (Birckmayer and Weiss, 2000; Capano and Howlett, 2021).

The uneven effects of the desegregation policy in different LEMs

To assess whether the SP has been able to reduce school segregation in the various catchment areas, we compare the dissimilarity indexes between vulnerable students in 2018/2019 (the year prior to the SP implementation) and the SP beneficiaries for each of the 2 years of implementation (2019/2020 and 2020/2021). Figure 1 shows the differential SP effectiveness in the selected school catchment areas.

The design of the SP and the various socioeconomic and educational characteristics of the different catchment areas act as mediators of the effects of the SP, so as to achieve a balanced distribution of students. Based on our data, we identify four mechanisms which act as barriers to the potential distributive effects of the SP in different LEMs. These are residential segregation, underdetection of vulnerability, 'siblings' effect' and diversity of school supply. While all these factors influence the dynamics of the SP in all catchment areas, they carry a different weight on the basis of the socioeconomic and educational characteristics of LEMs. The following pages provide evidence as to how these factors alter the expected effects of the SP.

Residential segregation as a framework of possibilities

The SP design aims to balance the distribution of vulnerable students within (and not between) catchment areas. In recent years, the CEB has developed an education policy oriented to improve the quality of education in all city neighbourhoods and districts. This policy aims to reduce mobility linked to school choice, by providing valuable, quality education within close proximity. The relatively low levels of residential segregation in Barcelona compared to other European cities (Bonal et al., 2019), enables the development of a design of the SP, based on an intra-district reduction of school segregation, while at the same time, strengthening the quality of proximity schooling.

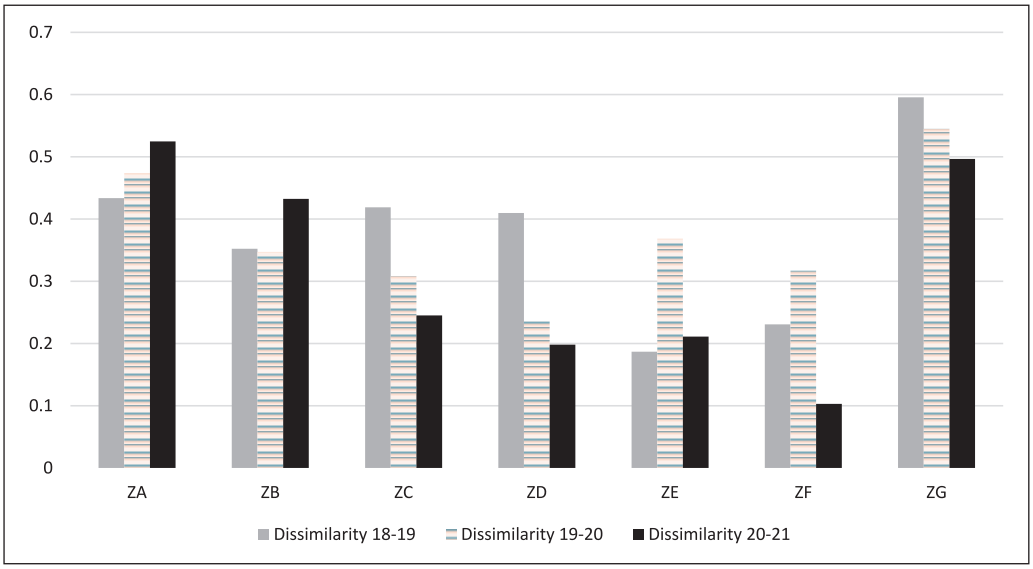

Figure 1. Dissimilarity indexes for vulnerable (2018–2019) and SP beneficiaries (2019–2020 and 2020–2021) by school catchment area, P3.
Source: Authors' own compilation based on CEB registers.

Despite these policy goals, there are notable socioeconomic differences between school catchment areas, which have an effect on the number of vulnerable students. While the city average of vulnerable students in pre-school education is close to 10%, the percentage of vulnerable students exceeds 50% in ZF and reaches 36% in ZE, both catchment areas being categorized within group 1 ('vulnerable areas'). At the opposite end of the scale, the proportion of vulnerable students is 6% in 'average areas' (ZA) and 4% in the 'middle-class gentrified areas' (ZG).

Differences in residential segregation between catchment areas are translated into significant differences in terms of the number of vulnerable students, and therefore, the potential number of SP beneficiaries. The design of the SP, based on the reservation of school places for vulnerable students, according to the social composition of each catchment area, inevitably poses certain limitations on the balanced distribution of vulnerable students.

To compensate for the unequal social composition of catchment areas, the SP included a correction mechanism regarding the average number of reserved places per class group between adjacent zones. That is, if differences between adjacent zones are too high, a correction factor is introduced to reduce this inequality. Despite this correction mechanism, differences in the resulting average number of reserved places for SP beneficiaries per group were still high, which ranged from two or three reserved places per class group in most catchment areas to five reserved places in ZE and seven in ZF.

Residential segregation also limits the potential of the SP within each catchment area, both in the most socially vulnerable and the least disadvantaged areas. With regard to the latter, the minimal number of vulnerable students and the high number of schools results in a significant number of schools with no SP beneficiaries. This is the case in ZG, a 'middle-class gentrified area', where, despite the balanced distribution of the small number of vulnerable students identified, there are several schools with no SP beneficiaries enrolled. Interestingly, as Figure 2 shows, the schools with a better school composition are those that receive fewer SP beneficiaries.

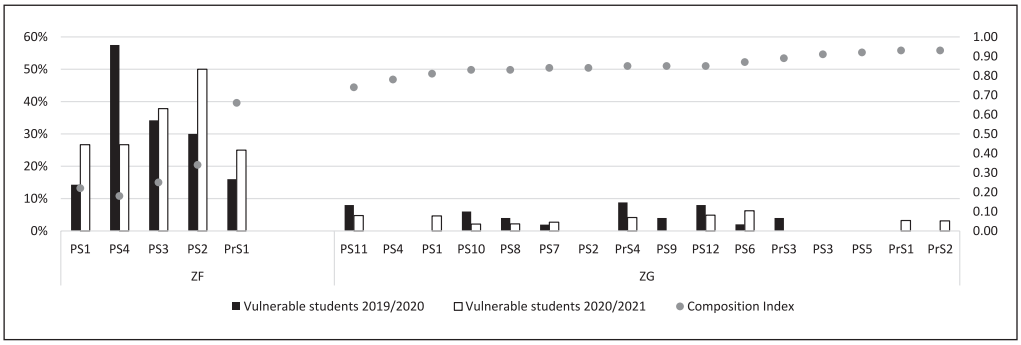

Figure 2. SP beneficiaries and school composition index, P3, Z20 and Z26[a].
Source: Authors' own compilation based on CEB registers.
[a]Schools' names have been anonymized. PS refers to Public Schools and PrS to Private Subsidised Schools.

At the other extreme, in areas of greater social isolation or ghettoization, the number of SP students in most schools is above the average. Deconcentrating vulnerability in these areas would require enrolling vulnerable students in schools far from their neighbourhood, and at the same time attracting non-vulnerable students from other catchment areas. None of these processes are simple. Attracting non-disadvantaged families to socially disadvantaged schools is not common, particularly if they do not live in the school catchment area. On the other hand, enrolling vulnerable students in schools outside their neighbourhood may increase the risk of school absenteeism. This is the case in ZF (Figure 2), a 'vulnerable area' where all schools are classified as socially disadvantaged schools (named 'high-complexity' schools in the Catalan education system) and are isolated from the other schools in adjacent catchment areas. All schools, and particularly public schools, have a higher percentage of SP beneficiaries compared to schools in ZG. However, inequalities between schools within the catchment area are also significant. This is caused by other factors, such as the 'siblings' effect' (included later in this section).

The under-detection of vulnerability and the concentration of 'false negatives'

The identification of vulnerable students and their inclusion as SP beneficiaries can be instigated throughout the whole school year. The identification of vulnerable students during the school year takes place once the student is already attending a school, which means that they cannot be reallocated to another school to improve the balanced distribution.

The later identification of vulnerable students is particularly prevalent in pre-school education, as it is the first time they enter the system and a lack of information regarding children's social and economic conditions makes it difficult to identify all potential beneficiaries. Almost 22% of SP students have been identified during the school year, although this percentage is higher in some catchment areas (ZA and ZG).

The higher concentration of 'false negatives' (students who initially enrolled as non-vulnerable but were subsequently identified as vulnerable) in some schools generates a significant imbalance in the school composition in certain catchment areas. For example, the later identification of vulnerable students and the impossibility of distributing them explains, in part, the imbalance observed in 'heterogenous areas' (ZB) and 'average areas' (ZC). In 2019/2020, there were 18 SP students enrolled in P3 within the 10 schools of ZB (Figure 3). Almost 30% of those students had been identified when the school year started and half of them attended the two schools with the highest

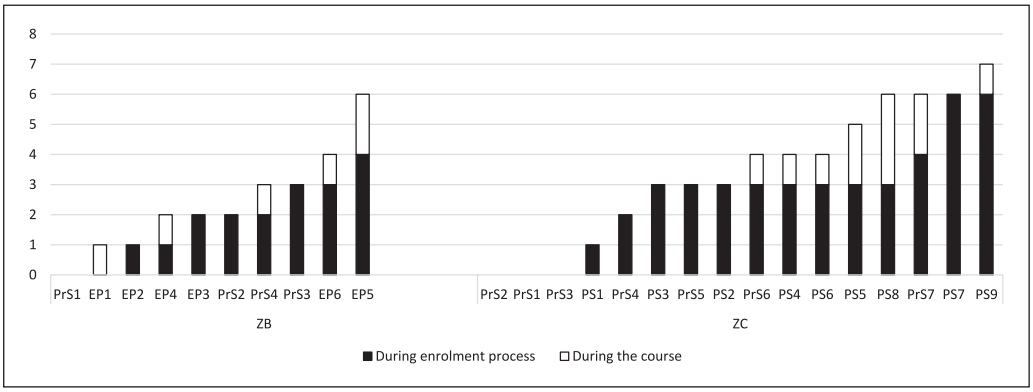

Figure 3. Beneficiaries of the SP, identified during the enrolment process or during the course in Z4 and Z6.
Source: Authors' own compilation based on CEB registers.

vulnerability level. Therefore, the newly identified cases in these schools reinforced the inequalities in the social composition of schools within the catchment area.

In the case of ZC, Figure 3 shows that 11 SP students were identified during the academic year, which accounted for 25% of the total number of SP students. None of the students, identified at a later stage, were enrolled in the 8 schools (out of 17) with the lowest attendance of SP students previously recorded. Therefore, the difference between schools with higher and lower vulnerability levels has increased.

The 'siblings' effect'

One of the most complex mechanisms for reducing school segregation involves the translation of reserved places for vulnerable students into effective, and therefore balanced, schooling. The translation of planned, reserved places into real schooling depends, among other factors, on families' school choices. In the case of the SP, vulnerable families are asked to enrol their children in less disadvantaged schools, in order to avoid their concentration in socially disadvantaged schools. The benefits of the SP are conditional to the acceptance of one of the reserved places in the school proposed by the CEB.

The reservation of places is linked to the number of vulnerable students, distributed among schools within each catchment area. However, the final distribution of students also depends on the siblings already enrolled. Regular access to schools is designed to ensure that all siblings attend the same school. Thus, when planning the distribution of new students, the younger siblings of students already enrolled in the school have priority access to the same school. Higher birth rates among vulnerable groups and the concentration of these groups in some schools increase this 'siblings' effect' and make it difficult to reduce school segregation in certain LEMs.

This 'siblings' effect' was particularly significant during the first 2 years of implementation of the SP. In 2019/2020, 48% of SP beneficiaries in pre-school education (P3) had siblings enrolled in the school system and this figure reached 54% in the 2020/2021 school year. Nevertheless, the 'siblings' effect' is much lower in secondary education (10% in 2019/2020 and 14% in 2020/2021) due to the shorter duration of this educational cycle. Of course, the presence of siblings does not have an impact on all the school places reserved for SP beneficiaries, but it significantly affects the distributive possibilities in some areas.

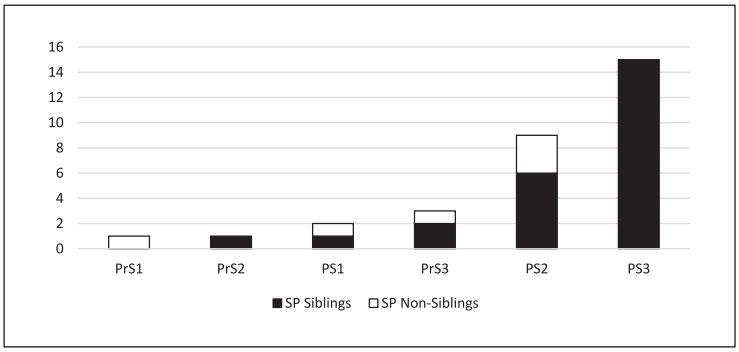

Figure 4. SP beneficiaries accessing to school as siblings or non-sibling, ZE, 2019/2020, P3.
Source: Authors' own compilation based on CEB registers.

Important differences arise from the analysis of school catchment areas. The 'siblings' effect' is significant in the most vulnerable catchment areas (ZE and ZF), where siblings account for a high proportion of SP students. The 'siblings' effect' also has a greater impact on public schools, which have a higher proportion of vulnerable students. This imbalance in the distribution of siblings is a major limitation of the effectiveness of the SP. For example, as Figure 4 shows, in the case of ZE, 80% of the SP beneficiaries already had older brothers or sisters in the school, and most of them (15 out of 25) attended the same school.

Diversity of school supply

In order to favour the enrolment of vulnerable students in private subsidized schools, the SP includes extra funding for the reserved places allocated to these schools. Over the last 2 years, the enrolment of vulnerable students in private schools has increased from 25% to 27.2%. In the case of the beneficiaries of the SP, 28% were allocated to private subsidized schools in 2019/2020 and 31% in 2020/2021. This growth of vulnerable and SP students in private subsidized schools is remarkable, as the enrolment of non-vulnerable students in public schools has increased during the same period.

In spite of this better equilibrium between the two sectors, the allocation of SP places is still far from a fully balanced distribution of beneficiaries within each catchment area. Figure 5 shows the differences in the average number of beneficiaries per classroom, comparing public and private subsidized schools for the seven catchment areas analysed. In addition, it identifies the public and the private subsidized schools with the maximum number of SP beneficiaries within each catchment area. In a perfectly balanced distribution, the four points in each catchment area should overlap. This is clearly not the case, as Figure 5 shows.

Figure 5 reveals interesting trends. Firstly, there is no clear relationship between the redistributive capacity within the catchment area and the share of private enrolment in that area. For example, both in ZA and ZE, around 40% of students are enrolled in private subsidized schools, but the redistribution of vulnerable students is better balanced in ZA. In the case of ZF and ZG both with a share of private enrolment under 20%, the differences between the two sectors are much higher in ZF.

Secondly, the differences between sectors are better understood when considering the levels of vulnerability in the area. The intersection between vulnerability and the diversity of school supply affects the SP capacity to distribute vulnerable students among schools within the catchment area.

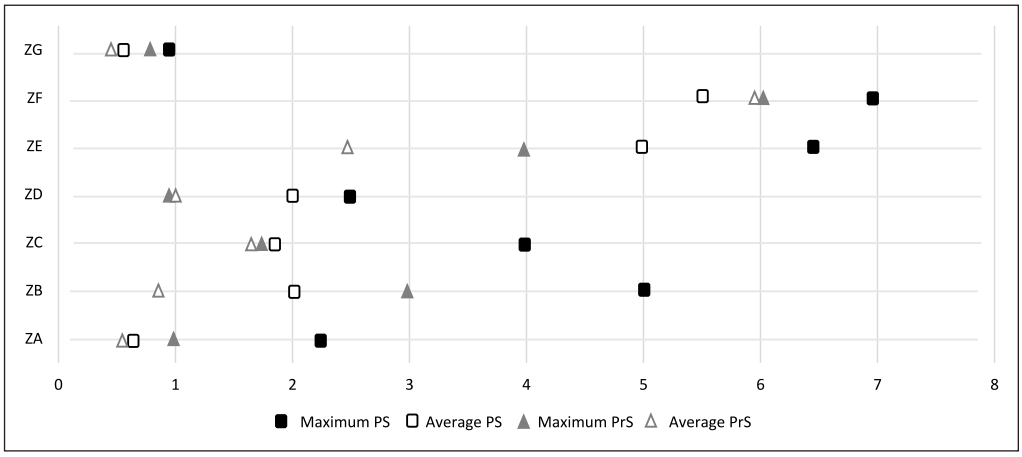

Figure 5. Average number and maximum number of SP beneficiaries by class group, for public and private subsidised schools and catchment area P3, 2020/2021.
Source: Authors' own compilation based on CEB registers.

Therefore, in highly vulnerable zones (ZE or ZF), the distance between public and private subsidized schools is considerable, while in both the 'upper-class' (ZA) and 'middle-class gentrified (ZG) areas', there is a better distribution between sectors, with a lower proportion of beneficiaries in all of the schools.

ZF is a special case. It is an area of high vulnerability and social isolation. This geographical isolation constrains mobility outside the area and explains why both public and private subsidized schools have a high number of vulnerable students. In contrast, the 'vulnerable area', ZE, is closer to the other catchment areas (such as ZD) with a high number of vacancies, which facilitate enrolment outside the catchment area and accentuate school segregation between sectors: public schools enrol a significantly higher number of vulnerable students than private subsidized schools.

Finally, the figure shows that public schools are always those that have the maximum number of beneficiaries per classroom. The accumulation of the effects observed in this analysis is clearly salient in public schools, which face more difficulties in terms of neutralizing the weight of mechanisms, such as the 'siblings' effect' or late detection.

Conclusion

Research into the education markets has outlined the relevance of institutional, social and spatial configurations, when interpreting the uneven effects of supply and demand on education inequalities. School segregation clearly illustrates the importance of contextual factors in understanding the mechanisms of reproduction of socio-spatial inequalities (Zancajo and Bonal, 2022). Multiple combinations of school admission policies, spatial inequalities, schools' characteristics and school choice rationalities activate different mechanisms by which school segregation is reproduced. Understanding how these mechanisms operate in different areas is crucial to making desegregation policies effective.

With the exception of the US, desegregation education policies have not been the focus of public policy agendas. The *Shock Plan Against School Segregation*, launched by Barcelona's local education authority is certainly of great value in this context of policy absence. It confronts a highly relevant social and educational problem within the growing global context of socio-spatial

inequalities in urban settings (Arbaci, 2019; Tammaru et al., 2015). Tackling school segregation can also be considered a courageous policy endeavour in the context of a dominant expansion of market-driven education policies, particularly in developed countries (OECD, 2019). As desegregation strategies tend to constitute a reduction in freedom of choice, they can be very unpopular, particularly among the middle classes.

However, even when policy strategies are capable of overcoming political and social resistance to change, the particularities of LEMs may alter the expected effects, as defined by the policy's theory of change. As this article has shown, the former is clearly the case after 2 years of implementation of the SP in Barcelona. The unevenly balanced distribution of socioeconomically vulnerable students among catchment areas is largely associated with some of the salient characteristics of these areas as LEMs. Interestingly, some mechanisms that alter the expected effects of the SP are related to the structural urban characteristics of the neighbourhoods. A high or low concentration of social vulnerability in certain neighbourhoods may limit the redistributive capacity of the plan because schools are either already 'saturated' with vulnerable students or because the number of students eligible for redistribution is too low to involve all schools in the catchment area. Likewise, the geographically uneven distribution of private subsidized schools in the city neighbourhoods and their lower co-responsibility to enrol socioeconomically vulnerable students may explain the significant difficulties of achieving a balanced distribution in those neighbourhoods with a high proportion of private subsidized schools. On the other hand, other mechanisms that prevent the effectiveness of the SP are related to existing policy designs or to specific procedures linked to policy implementation. This is the case with regard to the 'siblings' effect' mechanism or the under-detection of vulnerable students, which unevenly affect different catchment areas.

These contextual differences in the mechanisms are highly relevant from a policy perspective. Facing the obstacles related to structural factors may require a more ambitious and long-term strategy, should the goal be educational desegregation. This may also encourage policymakers to re-think some aspects of the policy design. For instance, the limited redistributive capacity of the SP in more isolated territories (either considerably poor or considerably rich) may be compensated by a more ambitious redistributive strategy, not circumscribed to the limits of the catchment area. In the case of the limits imposed by aspects of institutional design or implementation procedures, corrective measures can be applied to improve the positive effects of the SP. Exempting schools with a high number of socially vulnerable siblings from the obligation to reserve places for beneficiaries of the SP can be an effective strategy to avoid their concentration in these schools. On the other hand, the limited identification of socially vulnerable students in specific areas can be compensated by increasing the resources of social services and improving the effectiveness of the detection procedures.

Realist policy evaluations are central to acquiring specific knowledge relating to the mechanisms that facilitate or prevent the foreseen effects of the policy. The unavoidable variable and uneven effects of desegregation education policies need to be assessed before introducing corrective measures in the design of policy instruments or implementation strategies. These changes require that policymakers introduce flexibility in the strategies to be developed in different LEMs. This may require having a consistent narrative regarding the reasons of differential policy strategies in different areas, which may not be easy in the context of critical resistance to policy innovation coming from different sectors. However, if alternative policy strategies are not implemented in different territories, the risk of policy failure may become too great and may increase the dissatisfaction of educational stakeholders.

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Notes

1. Despite the fact that compulsory education is formally free, subsidized private schools charge families for specific educational services. This is due to insufficient public funding for subsidized private schools and the inclusion of additional educational services offered by this school sector, such as one extra teaching hour per day (Zancajo et al., 2022).
2. In Spain, compulsory education starts at the age of six, when children begin primary education. However, most applications are submitted at the age of three, since the system provides universal, pre-primary education; from the ages of 3- to 6-years old, education is offered in primary schools.
3. The percentage of SP beneficiaries does not strictly reflect the 'level of acceptance' of the policy among potential beneficiaries, as there are vulnerable students, who are identified at a later stage that may not be included as SP beneficiaries. The acceptance of the school proposed by the CEB at the beginning of the school year is close to 90% (personal communication from CEB staff).
4. Catchment areas have been anonymised.

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