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CAN WE INCREASE THE SOCIAL AND ACADEMIC MIX IN THE EDUCATION SYSTEM? THE IMPACT OF ALLOCATION PROCEDURES ON LYCÉE STUDENTS IN THE PARIS REGION

Abstract

Over the past ten years, the spread of the centralised and algorithm-based Affelnet system for the allocation of students and the introduction of greater flexibility in school choice have profoundly changed the allocation of students to senior high schools (lycées) in France. This IPP Note confirms that the procedures introduced in French education administration, through the *academies* (education administrative units), to manage the post-junior high school (collège) allocation of students have a determining influence on the academic and social composition of public lycées. While the social segregation of lycées (according to the socio-professional positions of parents) is generally higher in Paris than in the schools of Créteil and Versailles, the very broad catchment areas for Parisian lycées and the introduction of a specific bonus in favour of scholarship students have both contributed to increasing the social mix in public general lycées in the capital. On the other hand, the weight given to marks in the Paris allocation schedule explains why academic segregation (according to students' final collège year marks) is much higher there than in the rest of the Île-de-France region. Within the limits imposed by geographical, social and behavioural constraints that condition their effects, the allocation procedures seem to be powerful levers for determining the social and academic mix in the education system. ■

- While for the academies of Créteil and Versailles, the geographic proximity criterion is decisive in the allocation for general lycées, the academy of Paris adopted, for the 2008 school year, a regulated system of school choice with very large school districts
- In Paris, the introduction of a "scholarship" bonus has promoted access for socially disadvantaged students to the most sought-after general lycées and contributed to a growth in the social mix in public lycées
- In contrast, the weight given to marks in the Paris allocation schedule explains why academic segregation in lycées there is clearly higher than in the academies of Créteil and Versailles

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The transition between collège (junior high school) and lycée (senior high school) is the first major step in the differentiation of academic paths in the French education system. This differentiation works in two ways: first comes the **orientation**, which divides the general path (*voie générale et technologique*) from the vocational one (*voie professionnelle*); the second step is the **allocation** (*In France, the centralised allocation system only concerns students who want to enrol in public high schools. Private high schools recruit their students through other procedures*), which organises the assignment of students to the different public senior high schools. While the orientation or streaming explains to a significant extent the differences in social and academic composition in lycées, we often ignore the central rôle played by the allocation procedures, though they constitute an essential tool for determining social and academic diversity within the education system. The study on which this article is based assesses the extent to which the allocation procedures introduced in the Île-de-France over the past decade have changed the composition of lycées in the region.

Post-collège allocation of students: a decade of reform

This assessment is carried out in a context of profound changes to the rules that govern the allocation of students after they have finished collège. Over the past ten years, **two major modifications were made concomitantly**: the generalisation of the Affelnet automatic allocation procedure¹ and the introduction of greater flexibility in school choice from the beginning of the 2007 school year. In the Affelnet procedure, families are asked to state their preferences within the general stream or the vocational stream, and the allocation is made using an algorithm that assigns students to a lycée depending on the number of points associated with each of their choices. With this organising tool, the three Île-de-France académies (Créteil, Paris and Versailles) have established a centralised allocation system that gives them

1. Affectation des ELèves par le NET (Allocation of students via the Internet).

2. The study on which this Note is based was carried out using exhaustive anonymous individual data on students in private and public schools in the Île-de-France. These data were made available by the rectors of the three académies of the region and by the Direction de l'évaluation, de la prospective et de la performance of the French Ministry of Education (MEN-DEPP).

much finer control of the distribution of students among secondary schools than was previously possible.

The main changes concern the general stream. **In the Île-de-France, there are two distinct models.** In the académies of Créteil and Versailles, the geographical proximity criterion remained decisive in the allocation process throughout the first decade of the century; student marks for the last year of collège and exceptions to the geographic proximity rules had only marginal effects on the allocation. In contrast, for the 2008 school year, the Paris académie introduced a regulated system of choice in four large sectors (which include between 11 and 17 lycées each), in which student rankings are chiefly determined by their continuous assessment marks for the last year of collège. Paris is also distinguished by its adoption of a policy of positive discrimination in favour of the most socially disadvantaged students, through the introduction of a **special bonus for scholarship students**.

To what extent did the allocation procedures adopted in the Île-de-France change the social and academic mix in the region's lycées in the period 2002-12?²

Greater social and academic segregation in Paris than in Créteil and Versailles

The lycées in the Île-de-France are characterised by a high level of social segregation: in 2012, half of the region's students from socially advantaged backgrounds were educated in lycées whose total populations, according to the académies, include between ten and twenty per cent of the population of students from socially disadvantaged backgrounds.

This social differentiation varies between académies: according to our calculations, (see [Box 1](#)), **social segregation in Paris lycées is 50 per cent higher than in those of Créteil and 15 per cent higher than in those of Versailles.** This segregation can be broken down into the part that is explained by differences between the three main categories of establishments (general public schools, general private schools and vocational public schools), and the part that is explained by differences within each of these categories (see [Figure 1](#)).

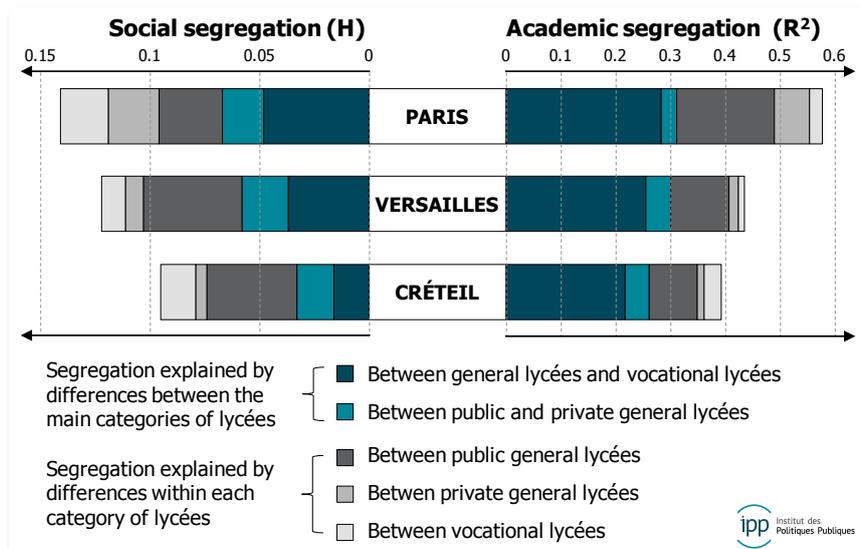
Box 1: Measuring social and academic segregation in the lycées

Social segregation in the lycées describes the uneven distribution of children from social groups across these education establishments. We measure it with the aid of the Multigroup Entropy Index (MEI; also known as Theil's H), which assesses spatial segregation among social groups, such as the difference between the social diversity (entropy) of each spatial unit (the lycées) and general social diversity (across the académie). The classification used is based on clusters proposed by the DEPP to define four mutually exclusive social groups according to the socio-professional status of a student's legal guardian: advantaged, quite advantaged, average and disadvantaged. The MEI can be broken down: it allows the measurement of the contribution of different sub-sets of schools to overall social segregation. The degree of social differentiation among schools can thus be measured as the sum of an element linked to the major category to which they belong (general lycées or vocational lycées, for example) and an element linked to the segmentation that occurs within each of these categories (within public general lycées, for example). We distinguish between three major categories of lycées: general public schools (*lycées généraux et technologiques publics*), general private schools (*lycées généraux et technologiques privés*), and vocational schools (*lycées professionnels*), which are almost all public. The index value is between 0 (no social segregation) and 1 (maximum social segregation).

Academic segregation describes the uneven distribution of students across schools according to their academic competence. Students' academic abilities are gauged by their results in the written exams for the brevet, taken at the end of collège (equiv. to the UK GCSE). Academic segmentation is then measured with the help of the coefficient of determination (R-square). This indicator measures the average difference (weighted by the size of the lycée) between the total spread of student marks in the académie and the spread of marks seen within each school, relative to their general spread within the académie. If all the students were randomly distributed among the schools, then the average level would be the same in each lycée, academic segregation between the schools would not exist and thus the indicator for this would be 0. On the other hand, if the lycées were perfectly stratified according to the level of the students (i.e., if each lycée took in only students with the same marks), then there would be maximum academic segregation and the indicator would be 1. In the same way as for social segregation, the indicator used to show academic segregation can be broken down in order to measure the contribution of the sub-sets of schools.

Note that although both measures of segregation (social and academic) follow a similar logic, their values are not directly comparable.

Figure 1: Break-down of social and academic segregation in Île-de-France lycées in 2012



Sources: Bases Élèves Académiques et Bases du Diplôme national du brevet des académies d'Île-de-France.
 Note: In 2012, the indicators of social and academic segregation in Paris lycées (see Box1) were 0.14 and 0.58 respectively. In Paris, 34 per cent of the social segregation and 49 per cent of the academic segregation in lycées arise from the differences in social and academic composition among predominantly general lycées on the one hand, and predominantly vocational lycées on the other. These components correspond to the social and academic segregation that would persist if the differences in social and academic composition were abolished within both the general schools and the vocational schools, and there remained only average gaps in social composition between these two types of institutions.

In the three academies, the social differences in recruitment between the three main categories of lycées account for between one-third and one-half of the total social segregation: the division between general schools and vocational schools - which reflects the social differentiation created by the orientation at the end of third year - is itself responsible for seventeen per cent of the social segregation in the Créteil lycées and around one-third of those in Paris and Versailles; the differences in recruitment between public and private lycées explain almost one-fifth of the total segregation. That leaves more than half of the social segregation in Île-de-France lycées accounted for by disparities among lycées within the same category, chiefly the general public schools. We note, however, that the contribution of these lycées to social segregation is lower in Paris than in the rest of the region. As we see later, this contrast is explained in large part by the specificity of the Paris allocation scale.

Academic segregation in lycées, which refers to the distribution of students between schools on the basis of their level of academic competence, **has reached very high levels in all three academies** (see Figure 1). Our calculations indicate that the spread of the average level in the lycées, which is measured using average marks gained by their students in the exams for the diplôme national du brevet (national certificate exams, hereafter brevet), corresponds – according to the academies – to between 40 and 60 per cent of the general spread of student levels. As with social segregation, the Paris lycées are distinguished from the others in the region by a high level of academic segregation, 30 per cent higher than that in Versailles and 50 per cent higher than in Créteil.

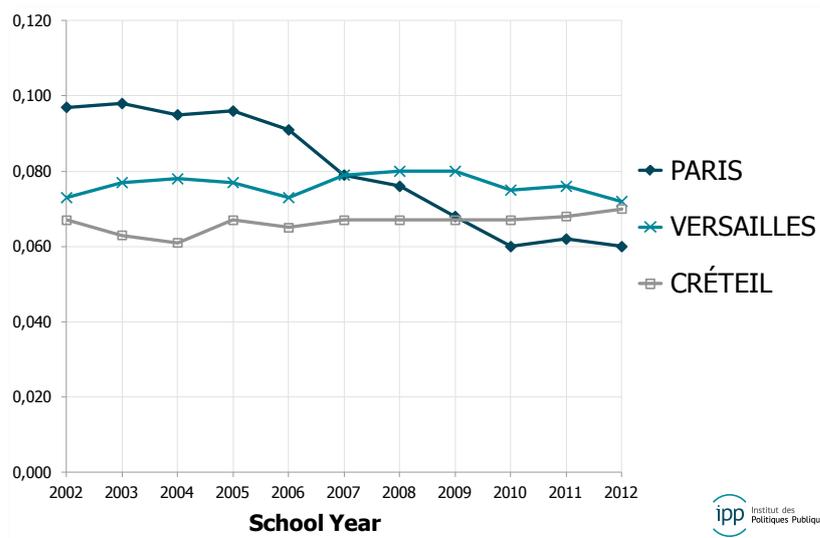
In the three areas, almost half of the academic segregation is explained by the average differences between general school students and those in the vocational schools. The higher rate of segregation in Paris lycées is explained almost wholly by its greater presence in the public general lycées, which reflects the prime rôle played by the marks gained in the brevet exams in the Paris allocation scale.

The scholarship bonus reduces social segregation in Paris

The most important change that occurred between 2002 and 2012 was the **reduction by more than one-third of social segregation in Paris general lycées**, in contrast with its relative stability in Créteil and Versailles in the same period (see Figure 2).

These divergent developments suggest that the changes made to the Paris allocation procedure have had significant effects on the social mix in public general high schools. The Paris academy is, indeed, the only one of the three regional academies to have introduced at the same time as the Affelnet procedure the “scholarship” bonus, which gives less socially advantaged students a markedly higher priority relative to the non-scholarship students applying for a place in the general stream.

Figure 2: Change in social segregation in first year at public general lycées (2002-2012)



Sources: Bases Élèves Académiques des académies d'Île-de-France (Academic student data base of the Île-de-France region).

Note: In 2002, the indicator of social segregation (see Box1) in the mainly general public schools (first year students) was 0.097 in the schools of Paris, 0.073 in Versailles schools and 0.067 in Créteil schools.

The Créteil and Versailles academies have also included a bonus for scholarship students in their allocation procedures since the beginning of the 2007 school year, but its advantage is much less than in Paris, given that students applying for a school within their geographical sector still have priority over the scholarship students who live outside the area. In this context, it is not surprising that the introduction of the Affelnet procedure in Paris has contributed more to reducing the degree of social segregation in the general lycées there than in the rest of the Île-de-France region³.

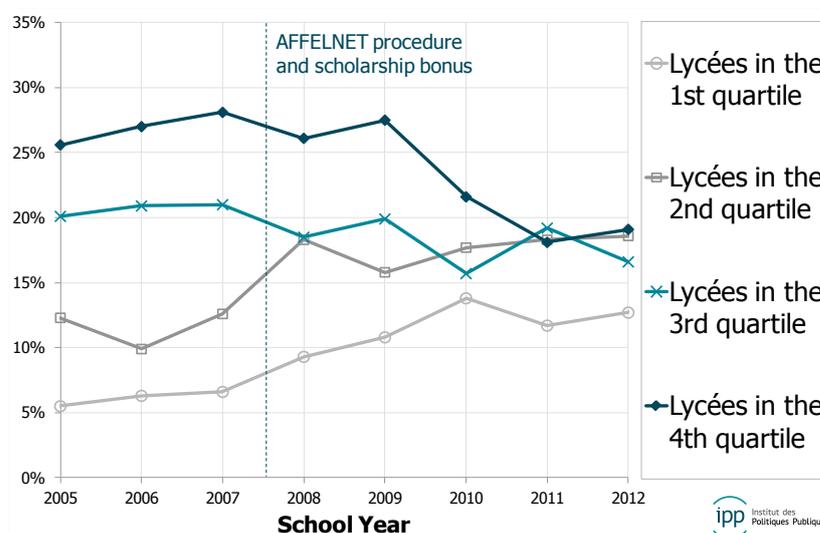
Analysis of the change in proportion of scholarship students in general lycées in the capital in relation to the average level of students educated in these schools shows that **the scholarship bonus has profoundly affected the allocation of students from disadvantaged backgrounds** (see Figure 3).

While between 2005 and 2007, only five to seven per cent of scholarship holders in the "best" lycées (defined as the one-quarter of lycées whose students obtained the best results in the brevet exams), the distribution of scholarships among the different lycées began to even out from 2008, to the point where, at the beginning of the 2012 school year, the portion of scholarship students was only nineteen per cent in the "less good" schools compared with thirteen per cent in the "best".

The introduction of the scholarship bonus in the Paris academy has therefore increased access for scholarship students to the most sought-after general lycées. In contrast, the distribution of scholarship students in the Créteil and Versailles academies barely changed between 2005 and 2012: they remained under-represented in the "best" lycées and over-represented in the "less good" schools.

3. In Paris, the 2007 reduction in social segregation in public general lycées cannot be attributed directly to the adoption of Affelnet, which was used for the first time at the beginning of the 2008 academic year. It is explained, rather, by the introduction of more favourable treatment of preferences expressed by students from disadvantaged social backgrounds under national provisions for the introduction of greater flexibility in the choice of school for the 2007 academic year.

Figure 3: Portion of scholarship holders in general lycées (in first year) in relation to academic levels (2005-2012)



Sources: Bases Élèves Académiques et Bases du Diplôme national du brevet de l'académie de Paris (Academic student data base and Data base of the national certificate for the Paris academy).

Note: The public general lycées of Paris are classified into four groups according to the average results that their first year students obtained in the brevet exams. In 2005, the top 25 per cent of the "best" schools (1st quartile) comprised only 5.5 per cent of scholarship holders, compared with 25.6 per cent in the bottom 25 per cent of the "less good" schools (4th quartile).

The impact of allocation procedures on the social and academic mix in public general and technological lycées

Analysis of family allocation preferences and their treatment in the Affelnet system allows us to understand better the rôle that allocation procedures play in the production of inequalities in the education system.

Thanks to data from the Affelnet procedure, we can measure the contribution of four distinct components to social and academic segregation in public general lycées⁴ (see [Box 2](#)):

- 1) courses that recruit individuals (for specific cross-academy training such as bilingual courses, double degrees in music and dance, for example) and select students on the basis of dossiers, which falls outside the automated allocation procedures;
- 2) the definition of geographic recruitment zones;
- 3) the stated preferences of students' families, and
- 4) allocation scales that determine student priority rankings.

The break-down of social and academic segregation in the first year of general lycée at the end of the allocation process for 2012 reveals a marked contrast between the Paris academy and those of Créteil and, Versailles (see [Figure 4](#)): although the

social segregation in the former is lower than in the latter two academies, the academic segregation is three times as high. Beyond this striking contrast, which is explained chiefly by the weighting of student marks in the Paris scale, we see that the different components have uneven influences on segregation in the three academies.

Individual student recruitment contributes more to social and academic segregation in general lycées in Paris than in Créteil and Versailles. This phenomenon alone accounts for more than one-quarter of the segregation seen at the beginning of the 2012 school year in Paris, compared with between five and thirteen per cent in Créteil and Versailles, due to the highest incidence of recruitment that takes place outside the Affelnet procedure in the capital (for Henri IV and Louis-le-Grand high schools and other cross-academy training) compared with the rest of the Île-de-France region.

Moreover, analysis of the Affelnet data reveals that **family preferences are strongly influenced by the social background and academic level of the students**, and that they play a significant rôle in the segmentation in the lycées: in 2012, these preferences explained almost fifty per cent of social segregation in general schools in Paris, about one-third in Versailles and one-sixth in Créteil.

4. This analysis is applied only to students in the first year of general high school because the allocation procedures for the vocational path are too complex to be treated with this kind of break-down.

Box 2: Components of social and academic segregation in general lycées

We can distinguish schematically four components that directly influence social and academic segregation in public general lycées:

1. **individual recruitment into some specific general courses** (for example, cross-academy training such as music and dance), which is based on student dossiers that fall outside the automated Affelnet procedures;
2. **the definition of geographic recruitment zones**;
3. **the expressed preferences of students' families**;
4. **the allocation scale**, which determines student rankings (after taking into account the geographic criteria).

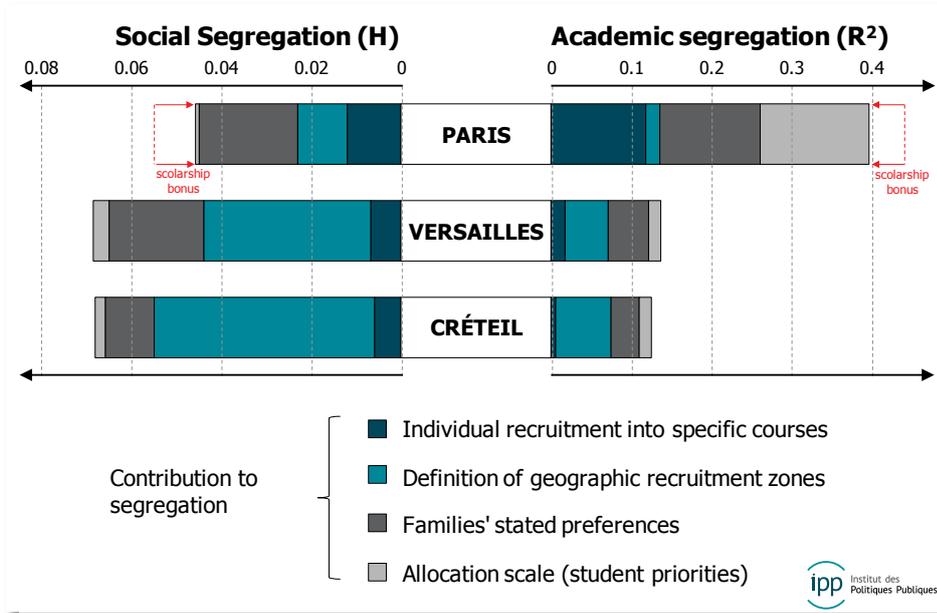
The contribution of each of these components to social and academic segregation was calculated by modifying the allocation scale sequentially, in order to simulate the allocation that would be seen with different configurations, again using anonymised files from the 2012 academic year. To measure the contribution of the first category, of individually recruited students, we calculated the level of segregation that would have prevailed if the allocation of the students admitted into this kind of training were frozen, while other students would be allocated in a random way in all the general lycées in their academy.

The contribution of school zoning to social and academic segmentation was then measured by the contrast with previously prevailing conditions, by freezing the allocation of students admitted via individual recruitment, but randomly distributing the other students among the lycées for which they qualify for a zoning priority.

The contribution of family preferences to social segregation in lycées was measured by replacing the random allocation with an allocation based on the preferences expressed in the Affelnet procedure for 2012. To understand the specific rôle of family preferences in the development of inequalities among schools, independent of the allocation scale, the actual priority rankings that benefit the students were replaced by random rankings.

Finally, the contribution to social and academic segregation made by the allocation scales was simulated by taking into account the priority rankings created according to each academy's scale, as well as the wishes of the families, which revealed the student allocation seen at the end of the 2012 Affelnet process. In order to gauge the specific contribution of the scholarship bonus in the Paris academy, we carried out two simulations: the first based on the actual scale used in Paris, and a second that simulated the allocation that would be seen were this bonus eliminated.

Figure 4: Contribution of the Affelnet procedure to social and academic segregation in lycées (in first year at general schools) at the beginning of the 2012 school year



Sources: Bases Éléves Académiques et Bases du Diplôme national du brevet des académies d'Île-de-France.

Note: At the beginning of the 2012 school year, the indicators of social and academic segregation (see Box 1) at general lycées in Paris (first year only) were 0.046 and 0.39. In Paris, 24 per cent of social segmentation and four per cent of academic segmentation were explained by differences in social and academic composition among the four main recruitment zones.

The allocation rules used by all three academies also have an influence on the social and academic composition of the region's general lycées, through the choice of criteria for ranking students (zoning bonuses, student marks, scholarship bonus, etc.) and their relative weight. **The definition of recruitment zones is a more important factor in segregation in Créteil and Versailles (where the majority of students must choose between one to three lycées) than in Paris**, where each district has between eleven and seventeen lycées. Zoning alone explains more than half of the social segregation in Créteil lycées and almost three-quarters in Versailles, compared with only one-quarter in Paris. The taking into account of student marks at the end of junior high school in the Paris scale accounts for more than one-third of the academic segregation in its general and technological lycées, while they are only weakly influential in Créteil and Versailles.

Finally, detailed analysis of the allocation procedure shows **the importance of the policy of positive discrimination introduced in Paris**, which makes a significant positive contribution to the social mix in lycées there. According to our calculations, the elimination of the "scholarship" bonus would increase social segregation in public general lycées in Paris by around twenty per cent and academic segregation by around ten per cent. Another way to measure the impact of this policy would be to estimate the extent to which it allows scholarship students access to general lycées similar to those that other students attend.

Our simulations suggest that this bonus significantly reduces the gap between the average level of the lycées attended by both scholarship and non-scholarship students, as can be measured by the average national certificate exam marks of students in the different lycées. While in Créteil and Versailles, the academic level of schools attended by non-scholarship students is between eight and nine per cent higher than that of schools attended by scholarship students, the gap is only two per cent in Paris. It would be fifteen per cent if the scholarship bonus were abolished.

In conclusion

These results show that **allocation procedures constitute powerful levers for managing the social and academic mix in public lycées**, even if they must include geographic, social and behavioural restrictions that condition their effects.

However, **a complete assessment of allocation procedures requires analysis of their consequences for student success**. The effects of the social and academic mix on academic performance are still not well known, nor is their more general impact on the choices and behaviour of students. Although at present insufficient time has passed to assess the effects of the scholarship bonus on the long-term success of students from disadvantaged backgrounds, the longitudinal follow-up of the cohorts that entered senior high school around the time of the 2008 reform should provide some valuable answers to these questions.

As well as its effects on student performance, the goal of social and academic balance in the education system can also be justified on the basis of equity criteria. In this regard, **we can envisage three roads to the improvement of existing procedures**, if the objective is to achieve greater social and academic homogeneity.

First, to reproduce the Parisian system, we can envisage the adoption of a **"double quota" system** (a quota of places with priority for scholarship students and a quota of places without priority for scholarship holders). This system, which was adopted in Belgium beginning with the 2013 academic year in Flemish schools, would create a better balance in social composition of lycées than the existing formula.

Second, the Paris allocation system leads, for the non-scholar-

-ship students, to significant stratification of schools in relation to student academic levels, which is only partially compensated for by the scholarship bonus. **Reducing the weighting of student marks** in the Paris Affelnet scale would be, under these conditions, the most direct way to increase the social mix in general and technological lycées in the capital.

Finally, geographic zoning, which continues to play a preponderant rôle in Créteil and Versailles, automatically limits the degree of social and academic mixing in public lycées in these two academies. While the population density is not always enough to warrant the consideration of extending school choice at present, yet it does not seem impossible to **expand the recruitment zones** of the lycées in some municipalities of these areas, where the public transport system allows it.

References

This IPP Note is based on data collected in the IPP Report of June 2014, "L'impact des procédures de sectorisation et d'affectation sur la mixité sociale et scolaire dans les lycées d'Île-de-France", by Gabrielle Fack, Julien Grenet and Asma Benhenda, available on the IPP website : www.ipp.eu

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