Inbreeding in Universities: In Favour of Administrative Regulation

A reply to Olivier Bouba-Olga, Michel Grossetti and Anne Lavigne

by Olivier GODECHOT and Alexandra LOUVET

In response to the reaction of three researchers in Economic Sciences and Sociology published yesterday in *La Vie des Idées*, Oliver Godechot and Alexandra Louvet here round out and clarify their position regarding academic inbreeding.

The text we published in *La vie des idées* had several aims: to gauge the interesting and little-known social phenomenon of academic inbreeding, to enlighten the academic community of its statistical importance, and to provoke a debate on the potential harmfulness of this phenomenon and its possible solutions. We are also delighted by the critical, constructive response we received from our colleagues Olivier Bouba-Olga, Michel Grossetti and Anne Lavigne. It demonstrates that one of the article's aims has already been achieved.

The criticisms put forward by Bouba-Olga, Grossetti and Lavigne (hereafter referred to by the acronym "BGL") focus secondarily on a question of method, a definition of inbreeding considered too restrictive, and, more generally, on the implicit basis for the text. They reproach us for having taken for granted and failed to demonstrate both the harmful effect of inbreeding on the recruitment process and the benefit of a ban on inbred recruitment with a view to improving recruitment as a whole. They put forward useful arguments explaining the importance of inbred recruitment, and they highlight the adverse consequences of our proposals for regulation.

The primary objective of *Le localisme académique : un essai d'évaluation* ("Academic Inbreeding: an Evaluation") was above all, as the title indicates, to evaluate a particular trend. To BGL's comment that "the problem with their article is that it only demonstrates the first proposal", we would respond by saying that this is not a problem but, rather, the basic aim. Certain elements such as the harmfulness of inbreeding were only suggested in the introduction or the conclusion – precisely to provoke a debate – but could not be the subject of an evaluation with the data we had available. Now that this point concerning the status of our article has been clarified, the fact remains that BGL are quite right to question the unifying theme of our text. Since it is not always possible to provide empirical proof, we propose to give a response within our limited means. We will address several points: firstly, the question of our Paris-orientated method; we will then return to the question of the link between inbred recruitment and quality of recruitment; next we will discuss the model used by BGL to explain inbred recruitment; finally, we will clarify our reasons for remaining in favour of administrative regulation.

1. A Paris-orientated method?

Quite rightly, BGL observe that we use a very strict definition of inbreeding (defending and supervising a doctoral thesis in the same discipline and at the same university), one that could lead people to underestimate the closeness and nepotism that exist between neighbouring universities, particularly those in the same urban area. They suggest adopting a wider approach to inbreeding and defining it as the fact of being recruited both in the same discipline and the same urban area. According to BGL, such a step would lead us to reconsider the position held by Paris in the hierarchy of inbreeding. Indeed, by our measure Parisian universities generally appear to be less closed than the rest. However, this relative openness could eventually benefit mostly Parisian doctoral students from other institutions, who may even have completed their thesis practically within the four walls of the institution that goes on to employ them (at the Sorbonne, for the University of Paris I, III, IV and V; at Jussieu for the University of Paris VI and VII, etc.)

We accept BGL's observation. In fact, such an analysis had been planned with different geographical criteria (city; distance in kilometres; journey time by train). This is difficult to implement on account of the arbitrary borders that are always imposed on an urban area. Are the universities of Versailles Saint-Quentin-en-Yvelines and Marne-La-Vallée part of

the same urban area? Is there a greater affinity between the doctoral graduates and juries of these universities than between those of Grenoble and Lyon?

Based on where were defended, we can thus look at "recruitment" in the Paris area according to three levels of proximity to the city: Île-de-France inbred candidates, other Île-de-France candidates, and candidates from the provinces (table 1).

Table 1. Recruitment in Île-de-France universities (1972-1996).

Type of applicant	Number of applicants	Number of applicants recruited	Success rate
1. Parisian inbred candidates	36,102	1473	4.08%
2. Parisian external candidates	137,737	1027	0.75%
3. Candidates from the provinces	199,062	323	0.16%
1+2. Total Parisians	173,839	2500	1.44%
2+3. Total from outside Paris	336,799	1350	0.40%
Total	372,901	2823	0.76%

Note: Our analysis includes 36,102 applications from inbred Parisians, of whom 1473 were recruited, giving a success rate of 4.08%. Source: DOCTHESE.

Inbred applicants have a better chance than Parisian external candidates, who in turn have a better chance than applicants from the provinces. The proportion of provincial applicants recruited is particularly low: 11.44%, despite the fact that candidates from the provinces make up 53% of the total applicants.

A more surprising result − one we had not anticipated − is that the difference in success rates between inbred Parisians and the total percentage of applicants from outside Paris (4.08% as opposed to 0.40%) is the same as the difference in success rates between all of the Parisian candidates and those from the provinces (1.44% as opposed to 0.16%). The Mantel-Haenszel odds ratio is 7.49 in the first case and 7.37 in the second.

The same process does not lead to any substantial changes in the results for other urban areas. In the provinces, within a single urban area, divisions between universities are usually in line with discipline specialisation, and the results are even less likely to vary[1].

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1 In Lyon, we find a fairly similar scale to that of Paris: success rate for Lyon inbred candidates, 7.2%; for Lyon external candidates, 1.2%; and for candidates from the rest of France, 0.2%. However, the proportion of Lyon external candidates is relatively low (2602 applicants as opposed to 3772 inbred applicants and 93,928 for the rest of France). Here, the odds ratio falls slightly when we shift from inbreeding at university level to inbreeding

The interesting analysis suggested by BGL does not, therefore, change our observation that inbreeding in Paris universities is comparatively lower.

2. Quality of inbred applicants, quality of external applicants

One of the difficulties when evaluating the harmful effects of inbreeding stems from the fact that we have no indicator of candidate quality. We cannot, therefore, demonstrate empirically that inbreeding results in the recruitment of inferior applicants. We can only presume that such a phenomenon is likely. We will try to clarify the reason for this.

BGL put forward a very pessimistic conception of inbred recruitment according to which inbred candidates are, on average, of lower calibre than external candidates: that is, $C_{loc} < C_{ext}$. Generally speaking, this suggestion is problematic. How can candidates always be worse locally and better externally when they apply for positions both as external candidates and inbred candidates?

The notion used implicitly in the article is slightly different: it is believed that the further we get from a situation of independence (the proportion of inbred candidates recruited is the same as the proportion of inbred candidates overall), the greater the likelihood of missing the best applicants. At a university, when external and inbred candidates are of equal calibre, the recruitment "error" risk rises according to inbreeding bias and according to inverse "outbreeding" bias (systematically recruiting external applicants only). For this reason, given the lack of information regarding quality, we measure inbreeding in terms of a deviation from a situation of independence.

Furthermore, in conclusion we wish to bring in the matter of quality by putting forward two extreme hypotheses. The first hypothesis: universities, whose doctoral students are of equal calibre on average, collectively recruit the best applicants. The inbreeding that has been observed would therefore reflect the applicants' preference for staying in the same universities. Second hypothesis: the academic world follows a strict hierarchy: $C_{11} > \ldots > C_{1n1} > C_{21} > \ldots > C_{2n2} > \ldots C_{ji} > C_{kn1} > \ldots > C_{knk}$, whereby C_{ji} represents the value of candidate i

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within an urban area, dropping from 38 to 32.

from university *j*. In that case, in a university of rank *j*, if all the candidates from university *j-l* are not recruited by the universities of rank *j-l* then inbred recruitment means that an inbred candidate who is recruited is of lower calibre than the best external candidate who is refused. In the best university, inbred recruitment is justified; in subsequent universities, unless there is a lack of applicants, it is unjustified.

The questions raised by BGL regarding the quality of inbred and external candidates on the one hand, and the importance of candidates' own preference for inbred recruitment on the other hand, invite us to clarify the relationship between inbred recruitment and quality in different scenarios.

1. Inbred recruitment in the absence of university hierarchy and of preference for inbred recruitment shown by candidates and university staff.

Let us suppose that the distribution of the quality of doctoral students follows the same continuous random variable[2]. According to this hypothesis, the form of the random variable does not depend on the university: the average and the standard deviation in quality are the same. All doctoral students could be placed in order according to quality $q_1 > q_2 \ldots > q_N$.

In order to understand the absence of candidate preference for a given university, let us imagine a sequential recruitment of *j* people in *k* universities, according to a random order: university 1 recruits on the first day, then university 2 the second day, and so on, until university *k* on day *k* (which corresponds approximately with the examination timetable). Let us add the following constraint: it is not possible to withdraw or be placed on a waiting list.

Let us suppose that the best candidates are always recruited. The probability of finding X_j inbred candidates among the l_j recruited in university *j* follows a hypergeometric law.

$$P(X_j = i / l_j) = \frac{C_{l_j}^i C_{N-l_j}^{n_j-i}}{C_N^{n_j}}$$

The expected number of inbred candidates recruited in university *j* when l_j people are recruited is written as:

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2 Henceforth, in order to facilitate reasoning, we shall consider there to be an external hierarchy of quality. This is not at all easy. In fact, if we imagine that each member of staff can establish his or her own ordinal hierarchy of candidates (which would depend, in particular, on his or her own academic interests), in general there is no reason why the aggregation of these orders of individual preference should generate a transitive order if there is no rule of cardinalisation.

$$E(X_j / l_j) = l_j \frac{n_j}{N}$$

We return here to our implicit case of independence mentioned earlier: the proportion of inbred candidates recruited when the best applicants are systematically recruited is equal to the proportion of inbred applicants overall.

In terms of academic discipline, the expected number can be written as:

$$E(X / l_1, ..., l_k) = \sum_{j=0}^{k} l_j \frac{n_j}{N}$$

This is the comparison criterion that we prioritised with the odds ratio. A deviation can arise either from university inbreeding; from recruited candidates who, by using withdrawal tactics would match themselves with the university where they studied; or from a combination of the two. We do not know in what proportions these two methods are used or the overall prejudice that would ensue from university inbreeding. We will examine this last point later.

2. Maximum inbred recruitment without causing any overall detriment.

Let us imagine we give the candidates the opportunity to express their preferred place of recruitment through a system of withdrawals and waiting lists. Thus, supposing the candidates always prefer to be recruited locally rather than externally and that they can easily exchange positions within the ranking until the number of graduates recruited locally reaches a maximum number[3]. What would be the proportion of candidates recruited locally? That proportion also represents a certain amount of discreet inbreeding that could be carried out by universities without adversely affecting the quality of recruitment at aggregate level: the inbred candidate is only preferred if he or she is one of the *k* best who must be recruited in the year in question.

In a university, the probability of having at least one inbred candidate among the *k* best candidates can be expressed thus:

$$P(\exists i_j / i_j \leq k) = 1 - \frac{C_{N-k}^{n_j}}{C_N^{n_j}}$$

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3 It should be noted that even if we suppose there is a systematic preference of candidates for inbred recruitment and an identical ranking in each university, there are many scenarios in which the *k* best applicants cannot be given their first choice of university.

This probability may be quite high.

For example, let us imagine a university to which 5 inbred candidates and 195 external candidates apply. We know that in the year in question, 10 positions are open in the discipline. While the chances of the inbred candidate being the best candidate are slim (2.5%), the chances of one of the five inbred candidates being one of the five best is much higher (23%).

The expected number of inbred candidates among the k recruited, knowing that l_j positions are available in university j, can be expressed thus:

$$E(X_j / l_j) = l_j - \sum_{i=0}^{l_j} (l_j - i) \frac{C_k^i . C_{N-k}^{n_j - i}}{C_N^{n_j}}$$

The expected level of inbreeding in terms of academic discipline is therefore:

$$E(X / l_1, ..., l_k) = \sum_{j=0}^{k} E(X_j / l_j)$$

This expected number of inbred candidates, based on highly heroic and improbable hypotheses (equivalence between universities, systematic preference among candidates for inbred positions, ideal exchanging of positions), represents the most favourable hypothesis when analysing our levels of inbreeding. According to the hypothesis of equivalence between universities, in order to obtain a number of inbred candidates superior, by discipline, to the sum of these expected numbers, it is necessary to have recruited inbred candidates in the discipline who are not among the k best (and therefore to reject some of the k best).

It can be useful to measure the level of inbred recruitment that can be achieved by applying this most favourable hypothesis. Let us therefore apply it to our data. According to these hypotheses, insofar as they are adopted, we can reach a level of inbred recruitment that is almost as high as that stated: 4403 locally recruited candidates are expected, as opposed to 4549 actual candidates. The overall difference is therefore minimal, around 1.8% of recruited candidates.

Nevertheless, behind this correct overall adaptation of these heroic hypotheses to the aggregate data can be found some substantial subsets, on account of which the hypotheses are less effective. In some disciplines, we find fewer inbred candidates than expected, and in

other disciplines we find more. In the first case, we can easily imagine that this stems from a failure on the part of universities to respect candidates' systematic preference for inbred recruitment. However, the fact that by discipline there were more inbred candidates recruited than expected under the most favourable hypotheses (according to the hypothesis of equivalence between universities) is due to the fact that some of the locally recruited candidates are not always among the best applicants (see table 2). The results go beyond the most favourable expectations in 19 disciplines and the aggregate deviation rises to 595 people, that is, 15% of recruited candidates in these disciplines and 7% of the total. This can be interpreted as follows: inbred recruitment has led to 595 external candidates being rejected even though they were better than the inbred candidates[4].

Table 2: main academic disciplines in which there are more inbred candidates than expected, even according to the most generous hypothesis (1972-1996).

Discipline	Number of inbred candidates recruited	Expected number of inbred candidates recruited, according to H1	Ratio A/B
Ethnology – Religious Sciences	37	29.5	1.3
Engineering	513	405.3	1.3
Computer Science	255	200.4	1.3
Geography	96	72.6	1.3
Law	191	140.6	1.4
Economics	181	117.1	1.5
Chemistry	286	182.8	1.6
Management	68	39.8	1.7
Education Sciences	24	12.2	2.0
Medicine	87	42.5	2.0
Political Science	32	10.3	3.1

Note: In Ethnology, 29.5 inbred candidates were expected, under the most favourable hypothesis. Our data gives the figure 37. Source: DOCTHESE

3. Introducing quality differentials between universities.

Under the most reasonable hypotheses, introducing a quality differential between the universities that produce doctoral graduates leads to a reduction in the level of inbred recruitment under the most favourable hypothesis. In addition, the greater we consider the hierarchy between universities, the more inbreeding implies recruiting candidates who are not among the *k* best.

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4 Ideally, we should be able to calculate a trust interval, which would be extremely complex: the law of high numbers does not apply.

Let us provide some further insight with the following illustration of the quality differential between universities. We consider doctoral students to be like balls that fall into several bags with different independent probabilities p_{ji} (with $\Sigma_j\, p_{ji}=1$)[5]. Probability p_{ji} can be re-written as a combination of selectivity a_{ji} and overall attractiveness p_j : $p_{ji} = a_{ji} + p_j$ with $\Sigma_i\, a_{ji}=0$ and $p_j=\Sigma_i\, p_{ji}/N$. A university will belong to an even higher rank if it selects the best students: that is, a_{ji} is higher for an i of superior calibre.

A doctoral graduate is recruited in each of k universities in such a way that the k best are recruited.

Once again, two scenarios are envisaged:

a) The candidates have no preference for any given university, the order of recruitment follows an equiprobable, random order and there is no possibility of exchanging positions.

In the case of a given university, the expected inbred recruitment can deviate enormously from the hypothesis of independence (here equalling p_j). The expected inbred recruitment is all the higher given that the university selects the k best.

$$E(X_j\,/1) = p_j + \frac{1}{k}\sum_{i=1}^{k} a_{ji} \neq p_j$$

On the other hand, when the expected number is calculated according to academic discipline, we return to the situation of independence, which equals 1.

$$E(X\,/\,k) = 1$$

Once again, this justifies measuring inbreeding bias – according to academic discipline rather than university – as a deviation from independence.

b) Maximum inbreeding with overall prejudice: the candidates prefer inbred positions and can exchange positions without any problem and/or the universities favour inbreeding insofar as inbred recruitment favours one of the k best.

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5 This is not calculated on the basis of a fixed total number of students per university. The expected number of doctoral students per university is therefore $\Sigma_i\, p_{ji}$.

$$E(X/k) = \sum_{j=0}^{k} E(X_j/1) = \sum_{j=1}^{k} \left(1 - \prod_{i=1}^{k}(1 - a_{ji} - p_j) \right)$$

This expectation reaches a minimum when the *k* best candidates all graduate from the first university, and a maximum *k* (100% of inbred candidates) when those *k* best are divided among the *k* universities. Every kind of result can thus be generated. Nevertheless, by adding fairly realistic extra growth constraints to our selectivity parameter a_{ji} for the *k* best doctoral students ($a_{ji} \geq a_{(j+1)i}$, $\forall i \leq k$, $1 \leq j \leq k-1$), our simulations show that, in many cases, the situation of non-hierarchy $a_{ji}=0$ causes this expected inbreeding to be maximised[6]. To be sure, in other cases we can find distributions of a_{ji} that produce a higher level of expectation[7]. Generally speaking, however, this no different from the case of non-hierarchy. Beyond this threshold, the expected number diminishes as the selectivity parameters a_{ji} grow.

Under relatively general hypotheses, introducing a university hierarchy therefore causes a drop (at least beyond a certain threshold) in the expected maximum number of locally recruited graduates with no recruitment errors, that is, without rejecting any of the *k* best. Recruitment errors brought about by inbreeding, estimated at 595, therefore have a high chance of increasing. Although we cannot quantify these exactly, this appears to support our suggestion that the risk of rejecting a good applicant increases with inbreeding.

3. Risk aversion or sympathy for doctoral graduates

As BGL explain, the fact remains that there may be good reasons for rejecting external candidates. They put forward a practical explanation for the preferential recruitment of inbred doctoral graduates in terms of managing uncertainty. They take up and clarify one of the reasons we suggested: specialist committees are better acquainted with inbred graduates. Having had contact with them over several years, they have more overall information on them than they do on external students. They have a clearer idea of their calibre and the risk of making an incorrect assessment of them is therefore lower. We would like to clarify one point here: as there is no reason to think that the risk of wrongly evaluating quality is asymmetrical, the argument concerning recruitment risk is intrinsically linked to a form of risk aversion.

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6 The maximum is then an "edge solution" which is complicated to express and depends on the structure of p_j. The non-hierarchy ($a_{ji}=0$) seems to correspond to the maximum expected inbreeding when the universities produce the same number of doctoral graduates or when the number of those graduates increases along with the university's rank.

7 Thus, when the universities of inferior rank produce more doctoral graduates, the maximum level of this expected inbreeding can be noticeably greater than the hypothesis of non-hierarchy.

BGL cite a certain number of studies to show that establishing networks in the world of economics can help to spread information, reduce uncertainty and improve candidate matching. This effect is undeniable, but should be considered carefully. While private sector networks often help to inform potential candidates of available positions, and inform companies of potential candidates, in the French academic world the partially centralised nature of the procedure (the long-awaited publication of available positions in the *Journal Officiel*) mitigates their claim. What more specific information is available on inbred applicants? Professors have more complete information on the candidates' work and capacity to present it in seminars because they have followed and supervised their progress. They know their capacity to work with others and be a pleasant colleague. To be sure, their teaching ability is better known, but this, although commonly cited, should not be overestimated: it is rare for professors to attend each others' classes. Teaching evaluations, when these are carried out, are not usually distributed and a course syllabus is not always available. Information is more often gathered from teachers' meetings, rumours spread by students and casual conversations.

Actual contact certainly enables information to be gathered, but reducing social relations to a mere exchange of information would give a restricted concept of these. They also include gift-exchanging, mutual obligation, loyalty, affinity, sympathy in the etymological sense or, to use the language of economists, altruism: a utility that depends on the utility of another person. In other words, the informational dimension of social relations cannot explain the considerable variations in inbreeding that are found according to academic discipline or, more still, to university. There is no clear reason to suppose that teachers at a particular university are more risk-averse than others at a different university, or that their risk of error is greater. According to BGL's reasoning, to do so we would have to cite reasons in terms of relational isolation – partly geographical, but also partly endogenous – which would reveal lower quality and, overall, greater benefits reaped from external recruitment.

We shall now examine recruiters' main objectives when recruiting.

a) the quality of the doctoral graduates
This quality could be described as the academic community's average assessment of a graduate.

b) the risk of error in the assessment of that quality, weighted by risk aversion

This point was well demonstrated by BGL.

The bias involved in evaluating quality could be placed within the same section. If a doctoral student specialises in a given subject, there is a high chance that his or her university will find that subject interesting.

c) the profitability of specific investments

Certain candidates, particularly inbred ones, are more in a position to develop certain investments made by the department that is recruiting. These may be teaching investments (lessons already prepared), a growing school of thought, an emerging scientific field, material equipment (laboratories), partnerships with companies, etc.

d) the risk of candidate defection

There is a risk of defection in the very short term and in the medium term.

In the short term, ranking only the excellent candidates who may go elsewhere is a risky strategy. The risk of exhausting the shortlist (limited to 5 times the number of positions available) does exist, which would mean wasting one year and having to begin the recruitment process all over again (if it is, indeed, repeated). In the United States, Christine Musselin[8] explains that assessing the university's position in relation to larger institutions and avoiding aiming too high during the selection process is a way of avoiding the problem. In France, ranking an inbred graduate reduces the risk of invalidating the recruitment process.

In the medium term, recruiting a candidate externally carries the risk that the candidate leaves quickly (at the end of his or her *exeat*) in order to take up a position elsewhere. Once again, selecting an inbred candidate who is less inclined to go elsewhere reduces that risk.

In both cases, the risk of defection is even higher if we consider that candidates themselves prefer an inbred position and that they want to return to their hometowns.

The phenomenon of so-called "turbo" teachers, who do not live in the town where they were recruited and who, according to students, spend less time in their new town (which many "turbos" deny), could be considered as a form of partial defection.

e) the signal and reputational effect of recruitment

8 Cf. Christine Musselin, *Le marché des universitaires. France-Allemagne-Etats-Unis*, Presses de Sciences-po, 2005.

Recruiting a particular candidate may be perceived as a good or a bad thing. It may send out signals that encourage certain kinds of people to expect a position, to become a doctoral student at that university or to apply for a position.

f) affinity with the candidate

Added to these main points concerning recruitment objectives is the candidates' desire to be recruited by a particular university. We can therefore say that the inbreeding which is, in the end, observed in a given department is an increasing function of the following: candidates' preference for an inbred position; the relative quality of inbred doctoral graduates; the risk of error in assessing the quality of external applicants; risk aversion; the importance of specific investments to inbred graduates; the probability that external candidates will leave; the need to encourage inbred graduates; the lack of transparency in the recruitment process; and the affinity with inbred graduates. The legitimacy of the different criteria with regard to the objectives and ideals of the academic system can be discussed further.

Our very limited data does not generally allow us to estimate the influence of these individual factors. If there is one factor whose impact can perhaps be estimated, it is the last one. It suffices to find a variable that has a negative effect on graduates' well-being and to show that this variable has an effect on the level of inbreeding. This would prove that the recruiters also seek to maximise the well-being of the graduates of their own university. Let us therefore examine the relationship between the level of inbreeding in different universities and the universities' capacity to export doctoral students to other institutions (Graph 1).

Graph 1: Variations in inbreeding shown by universities according to their capacity to export their own doctoral students (1972-1996)
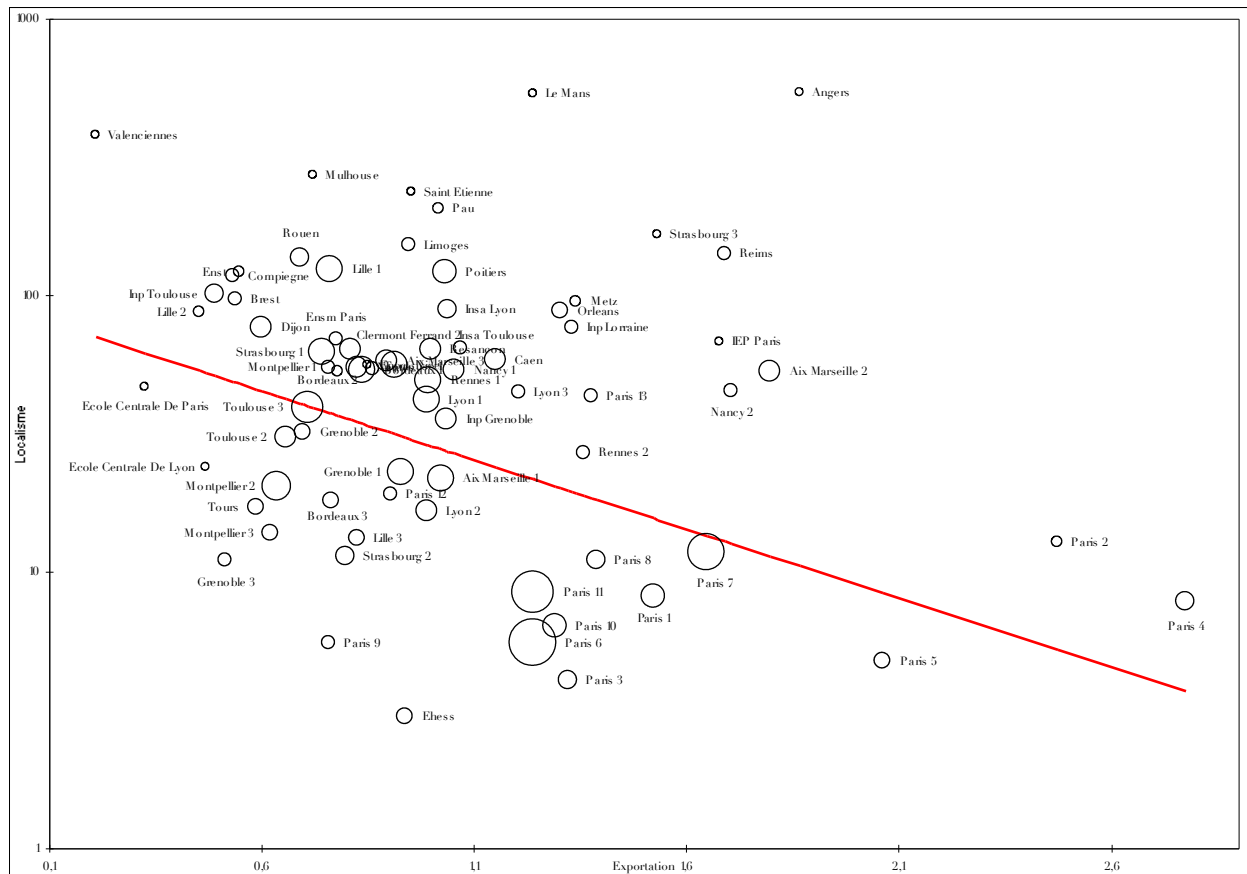
Note: The doctoral graduates of the University of Paris V are exported 2.06 times more often than graduates from other universities. They have 4.76 times more chance of being recruited by Paris V than external candidates. The point size varies according to the number of people recruited in inbred-exterior selection processes. The relationship between the export rate of one university and that of its competitors is based, as for inbreeding, on the Mantel-Haenszel odds ratio[9]. The line of adjustment is estimated by a loglinear regression weighted by the number of people recruited: $\ln(OR_{loc})=4.50-1.15*OR_{Export}$. The parameters are very high (on the threshold of 1/10000). The R2 is 18%. Source: DOCTHESE.

Graph 1 shows a close correlation between inbreeding and a low capacity to export. The R2 rises to 18%. The meaning of this correlation can be interpreted in several ways[10]. We suggest the following interpretation. The thesis supervisors are concerned about their doctoral students' well-being. The more difficulty they have in entering the academic employment market, the more their thesis supervisors try to help them, particularly by recruiting them locally. Such commendable sensitivity to the fate of one's graduates may, however, be detrimental to the quality of the overall recruitment.

9 The base unit for this calculation was, as for inbreeding, the academic department in a university in a given year.
10 We may also take into account the fact that, in the medium term, inbreeding leads to problems with exporting graduates. In addition, the direct relationship between these two variables is not exempt from problems of endogeneity that are difficult to resolve: the inbreeding of some depends on the capacity to export, which in turn depends on the inbreeding of others.

4. Recommendations and adverse consequences

BGL are right to advise caution when dealing with a study that is clearly of an approximate nature. Further studies of more precise data, particularly the ANTARES database, would enable us to make more accurate estimations of recent trends, of the role of counter-mobility and, based on rankings, of the respective proportions of preference for inbred positions shown by universities and by candidates. However, this does not prevent us from reflecting on the most suitable regulation methods if the conclusions reached in the study are confirmed.

BGL advocate making improvements in provisions for transparency and data gathering. We agree with them! Such changes can only improve the matching process. However, we do not agree on the following point: the question of recruitment and inbreeding is, for them, essentially a problem of information. In our view, academic relationships, like any social relationships, are not merely a vehicle for passing on information. They also imply relationships of loyalty, of gift-exchanges, of understanding and solidarity. A thesis supervisor supports his or her doctoral students, has a friendly relationship with them, encourages them to publish work, helps them to find a teaching position and is concerned for their academic future: this is considered a positive thing provided that achieving such goals is not entirely at the professor's discretion. If we consider this solidarity to be an important factor, we may repeat our question concerning the relationship between information gathering and inbreeding. Do we have recourse to local relationships because, as BGL argue, the information system in place is insufficient? Or is it because we can (and want to) rely on local relationships that we do not need to seek out better quality information? In the United States, the correlation between the banning of inbreeding and the intensity of the information gathering process (the job market) would indicate that the second trend follows on from the first.

This is our reason for remaining in favour of a regulation of inbred recruitment by the public authorities (which does not prevent them from carrying out more in-depth studies than ours before making a decision). Several routes to regulation could be followed, and these are not mutually exclusive:

General measures regulating competition:

increased transparency and better existing procedures

a national selection competition

a more restrictive National University Council (CNU)

Policies focusing specifically on the question of inbreeding

an incentive policy

a quota system

a ban on inbreeding

These different measures should be considered from the point of view of recruitment objectives – by limiting controversial appointments on the one hand, and by enabling job matching that is academically beneficial to both universities and candidates on the other hand – and from the point of view of feasibility and implementation costs.

The aim of these general measures is to improve the overall recruitment process and, if the procedures are correct, to limit all recruitment errors and all forms of favouritism. On the other hand, targeting inbred recruitment is necessary when we believe it to have become a form of large-scale bias that owes a great deal to personal relationships based on loyalty. Even though we may be able to imagine the adverse consequences of reducing or curbing inbreeding, such as producing other kinds of networks and loyalties, it is highly likely that the impact of such relationships would be far lower than in the case of inbreeding. When an inbred graduate is appointed, the effect of loyalty is increased because it is mutual. Several members of staff know and personally value the inbred candidate. When faced with an external candidate, however, there is less likely to be a convergence of loyalties. Although loyalties may still transfer to other institutions (a professor may have a friend in another university who enthusiastically supports his or her student and actively encourages that professor to appoint the student), the overall impact is clearly diminished in relation to the direct impact[11].

a) Increased transparency and better existing procedures

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11 A study currently underway, using the same database, demonstrates that the impact of a distant network on the recruitment process (measured in terms of recent transfers of doctoral thesis supervisors from one region to another) does exist but on a smaller scale.

Centralising information on the recruitment process – as mathematicians do – would certainly improve the situation[12]. Revising the recruitment timetable, organising longer examinations, reimbursing candidates' travel costs, establishing proper funding for those competitions which, paradoxically, are among the least costly of all the civil service: such measures will only improve things. There are two potential drawbacks: firstly, it is not known whether these measures will be sufficient; and obtaining funding in order to improve the quality of the recruitment process would be challenging at a time when there is an overall lack of available funding.

b) A national selection competition

This solution is similar to the high-level teaching examination in France (*agrégation*) or to the National Centre for Scientific Research (CNRS) competition; it can serve to establish an order of the k "best" candidates (from the jury's point of view) according to academic discipline. There are two potential limitations. On the one hand, the jury may be biased in favour of candidates they know, as shown by studies carried out on the high-level teaching examinations in economics[13]. On the other hand, as BGL observe, the system is restrictive in that it does not allow universities to select the candidates who are most suited to their needs.

c) A more restrictive National University Council (CNU).

By approving more than half of all candidates – for a period of four years – the CNU allows five times more new candidates to participate in the "local phase" than there are new assistant professor positions. The CNU could be required to be much more restrictive in its candidate approvals, in line with the number of positions available. Such a measure would prove limiting due to the fact that, on the one hand, there is a risk that each member of the CNU may show bias towards his or her former doctoral students or colleagues; and on the other hand, the CNU is currently lacking in materials and staff, and so establishing a more restrictive selection process may prove too large a task.

d) An incentive policy

Over the last few years, laboratories in the discipline of mathematics that practise self-recruitment are supposedly sanctioned in CNRS evaluations, while those that practise external

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12 Cf. http://postes.smai.emath.fr/
13 Cf. Philippes Combes, Laurent Linnemer, Michael Visser, « Publish or Peer-rich? The Role of Skills and Networks in Hiring Economics Professors », *Labour Economics*, soon to be published.

recruitment are encouraged. This policy has made a noticeable contribution to mobility[14]. More generally, a policy of financial incentives for universities and candidates (first of all, taking responsibility for the new employee's relocation) would encourage greater mobility. The incentive policy is no doubt the most flexible because it does not forbid beneficial inbred matching while limiting other kinds of matching. As things stand today, its main limitation stems from the fact that a large budget is necessary in order to have a major impact.

e) A quota system

According to what we have demonstrated, inbred recruitment would, ideally, have to be limited in such a way that the overall success rate of inbred and external applicants in a particular academic discipline is the same. How can such an ideal be achieved? It would be complicated to organise. Should universities be allowed to recruit an inbred candidate for one position out of every twelve? Should an external authority allow (preferably *a priori* rather than *a posteriori*) those recruitments that are open to inbred candidates in a particular discipline? Which authority should be responsible – the CNU, the Agency for the Evaluation of Research and Higher Education (AERES), the government…? Such a system would be complex both to establish and to regulate.

f) A ban on inbred recruitment for a limited period of time

The main drawback to this kind of measure is that beneficial, inbred matching would be prevented. At the same time, it is also a more flexible method than the national competition process. The universities would still have the chance to find good candidates among the applications that come in from other French universities, and even more so from abroad – a fact too often forgotten. In addition, the limited period of such a ban would mean that this type of matching could still take place, albeit with a slight delay. Provided that this form of legal discrimination were approved by the courts, it would be simple and inexpensive to set up. After the implementation phase, a monitoring system would enable us to judge whether the scheme was robust or whether it was creating rigidity in the selection process, thus requiring special dispensations[15].

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14 Cf. http://postes.smai.emath.fr/apres/ami/
15 We are thinking of very distant universities in particular (the University of French Polynesia; the University of the French Antilles and Guyana) or of highly specialised sub-disciplines for which there is only one university producing doctoral graduates (Korean studies).

Our reason for supporting this last measure is as follows: it is not perfect, it has its weaknesses but, in a system known for being difficult to reform, its cost-benefit ratio is particularly strong.

Translated from French by Susannah **DALE**

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