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INEQUALITIES, DISCRIMINATION AND EDUCATION

Hiring Discrimination in Higher Education and Research

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Abstract – Discrimination in access to employment in the higher education and research sector is measured using a correspondence test. Two criteria are tested: the applicants' gender and their origin (either French or North African) for two occupations, administrative assistant and administrative and financial executive, using two testing methods, responding to job offers and sending unsolicited applications to recruiters. In total, the study compiles the results of 2,748 job applications sent in 2021 and 2022 to higher education and research institutions in France. The two correspondence test methods revealed no evidence of gender-based discrimination for either occupation. However, in this sector, where principles of equality and integrity are expected to prevail, the study identifies evidence of discrimination against applicants of North African origin for administrative assistant positions, at a level comparable to that observed across the public sector as a whole.

JEL: C81, C93, J15, J45, J71
Keywords: discrimination, higher education and research, correspondence test

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Since the early 2000s, a number of empirical studies have highlighted the existence of discrimination in access to employment (Pager, 2003; Bertrand & Mullainathan, 2004). These studies use an experimental approach that involves observing discriminatory behaviour from employers by presenting them with two applicants who are identical in every respect except for one discriminatory criterion, to detect any potential inequalities in access to employment. While this approach initially involved real individuals, it is now based on the use of fictitious applicants. "Correspondence tests" have gradually become the standard method in international scientific literature on discrimination (Riach & Rich, 2002; Zschirnt & Ruedin, 2016; Bertrand & Duflo, 2017; Quillian *et al.*, 2017; Neumark, 2018; Lippens *et al.*, 2023).

In France, a recent report identified twenty scientific studies devoted to measuring ethno-racial discrimination in access to employment, which is the most frequently examined field and criterion (L'Horty & Petit, 2023). All of these studies were based on a large number of tests (several hundred in each case), apply statistical inference theory, and used regression models to assess the validity of their results. They differ, however, in the occupations tested, the geographical areas covered, the periods during which the tests were conducted, and other specific aspects of their methodologies. For example, the number of applications sent varies considerably, ranging from 462 to 17,643 depending on the study. In total, between 2005 and 2021, 67,066 applications were submitted across these twenty studies, an average of 3,353 per study.

The results reveal that the relative disadvantages faced by applicants with last names suggesting North African origin vary substantially across studies, with their success rates reduced by anywhere from 10% to nearly 95%, depending on the study. Nevertheless, the studies unanimously conclude that discrimination against North African applicants persists, with an average penalty of 41%. Furthermore, there is no specific time trend observed in the evolution of these penalties, they remained just as high in 2020 as in 2005.

Despite their value for public policymakers, these studies present several limitations that researchers are fully aware of. The standard version of the correspondence test provides a non-representative measure of discrimination. For example, in the labour market, only a limited number of occupations are tested, as creating fictitious applications, consisting of a CV and a cover letter, is costly and can sometimes be detected by employers. As a result, the measure of hiring discrimination remains partial, since evidence of discrimination in the occupation being tested does not necessarily reflect the situation in others. Additionally, data are often collected over a short time period, typically a few months, which may coincide with a specific economic context. The resulting estimates of hiring discrimination are therefore limited in terms of temporal scope. Finally, the employers tested are most often located in the Île-de-France region, and the discrimination observed is not analysed at a precise geographical level. Due to the small sample sizes collected, it is not possible to identify any potential local specificities.

Correspondence tests are limited to a specific form of discrimination, namely that which occurs during the screening of CVs, whether applications are sent in response to job offers or on an unsolicited basis. Other forms of discrimination may arise at later stages of the recruitment process. Correspondence tests do not produce representative figures; instead, their primary purpose is to reveal the existence of a particular form of discrimination and, where the methodology allows, to offer explanatory interpretations. Several studies have sought to address these limitations, whether by developing correspondence tests on representative samples of companies (Chareyron *et al.*, 2023a), by conducting repeated experiments over time to monitor trends in discrimination (Challe *et al.*, 2023), or by exploring the spatial dimension of discrimination (Chareyron *et al.,* 2023b).

An additional, and notably underexplored limitation of the literature is the lack of attention paid to sectoral differences. Within a given sector, companies share the same core activity, resulting in a degree of standardisation in market structures, technological requirements, and regulatory frameworks that govern the activity. This suggests that comparing sectors – often called meso-economic approach – could provide valuable insights into patterns of discrimination. However, in the field of discrimination research, no study to date has sought to position a specific sector in relation to others. Even at an aggregated level, there is no evidence indicating whether hiring discrimination is, on average, more pronounced in industry than in services or agriculture.

At best, the most detailed studies draw comparisons between the public/private sector (Petit *et al.*, 2020). The few studies focusing on the public sector do not reach a consensus regarding

the existence of discrimination: Wood *et al.* (2009); Eid (2012); Midtbøen (2016) conclude that public employers discriminate less than private recruiters. For Jankowski *et al.* (2020), the normative principles of meritocracy and impartiality have a greater influence on hiring decisions within the civil service than in the private sector. However, Villadsen & Wulff (2018) find no evidence that the public sector is a fairer employer than the private sector.

This study aims to measure discrimination in access to employment according to two criteria – origin and gender – within the higher education and research sector.[1] At first glance, this is a field where hiring discrimination should not be expected to occur. Such practices would stand in direct contradiction to the core values of equality and universality that define the academic mission. Professionals in the higher education and research sector uphold principles such as freedom of thought, intellectual rigour, moral integrity, and ethical responsibility, all of which are fundamentally incompatible with discriminatory behaviour. On the contrary, they actively promote equitable access to knowledge, address social challenges, and seek to foster inclusion, while ensuring gender equality and embracing diversity. In light of these values, there should be no evidence of hiring discrimination in the higher education and research sector.

Recruitment in higher education and research is extensive and dynamic, both in the private and public sectors. France boasts more than 3,500 public and private higher education institutions, including 250 major institutions comprising 150 *Grandes Écoles*, 66 universities, 24 *grands établissements* and 10 other institutions.[2] According to data from the French Ministry of Higher Education and Research (MESR, 2022), around 665,600 people worked in research and development in 2020, including researchers, lecturers and support staff. Of these, 474,100 held a full-time equivalent (FTE) position, with 321,400 as researchers and 152,700 as support staff. These figures represent 1.8% of total employment in France.[3] Among these 474,100 people, 286,300 worked in the private sector (60%), mainly in five industries that together employ more than half of all researchers: Specialised, scientific, and technical activities (10%), information technology and information services (9%), the automobile industry (7%), aerospace and aviation manufacturing (6%) and publishing, audiovisual, and broadcasting (5%). In the public sector, of the 187,800 employees (40%), 80,300 worked directly for the State, and 98,600 were employed by higher education institutions. According to the State of the Civil Service report (MTFP, 2022), these employees represented 8.4% of the total full-time equivalent (FTE) workforce in the State Civil Service.

To assess hiring discrimination in higher education and research, this study uses two testing methods to boost internal validity: one based on responses to published job offers and the other on unsolicited applications. It examines two potential grounds for discrimination: applicants' origin and gender. The study specifically analyses how exposure to discrimination varies with the geographical location of the institutions. The results are fairly consistent for both approaches. The study revealed no evidence of gender-based discrimination for either occupation or testing method. However, it indicates evidence of exposure to ethno-racial discrimination, limited to the position of administrative assistant, at a level comparable to that observed across the civil service sector, where similar correspondence tests have been conducted.

1. Data Collection Protocol

The data used in this DESPERADO-ES study are experimental and self-constructed. They were collected using the correspondence testing method. This method involves sending a large number of formal job applications that are identical in every respect except for one characteristic, the variable under investigation for its effect on access to employment. Information is then gathered on how employers respond to these applications. The aim is to detect potential discriminatory practices in recruitment, based on two factors: gender and origin, the latter indicated by the cultural or ethnic connotation of the applicant's first and last names. Both applications in response to formal job postings and unsolicited applications were used, enabling researchers to assess whether results vary depending on the data collection method. For unsolicited applications, messages were sent to the generic contact addresses of departments or organisations.

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1. Within the French activity classification system, known as NAF Rev. 2, higher education corresponds to code 8542Z. Research and development falls under Division 72.

2. This census is based on the official dataset "Main Higher Education Institutions" *published on the* Open Data *platform of the Ministry of Higher Education, Research, and Innovation (MESRI). The ten additional institutions listed by the Ministry of Higher Education and Research include the Regional Institutes of Political Studies (Aix, Bordeaux, Lyon, and Toulouse), the French schools in Athens, the Far East, and Rome, the Casa de Velázquez in Madrid, the Jean-François Champollion National University Institute, and the French Institute of Oriental Archaeology.*

3. This proportion of 1.8% corresponds to the ratio 474,100 / 26,600,000. The denominator is derived from an INSEE data set.

Each application consisted of a CV and a cover letter, both entirely fabricated for the purposes of the study. No applicant was ever physically sent to an interview. There were two methodological reasons for this choice. First, sending real applicants to interviews could introduce biases stemming from recruiters' subjective evaluations of physical appearance, behaviour, or personality. These biases are unobservable and therefore beyond the researchers' control, potentially leading to distorted or unreliable measurements. Since scheduling interviews imposes a cost on recruiters, they will only invite applicants they consider have a genuine chance of being hired. The assumption is therefore that employer preferences can manifest as early as the screening of written applications, which constitutes the first stage of the recruitment process. None of the written applications used in this study included a photograph. Second, using entirely fictitious applicants simplifies the data collection process, making it possible to construct a larger sample within a given timeframe.

Since these applications are sent to the same recruiters, they must contain differentiating features. These differences concern the formatting of the CVs, such as font type, font size, and layout, while adhering to standard presentation norms. The applicants are presented as having prior experience in real institutions, which are different but remain comparable in activity and size. The applicants' hobbies also vary, though they remain generic and neutral (e.g. sports, cinema, reading, music). Each CV is accompanied by a brief cover letter that highlights specific aspects of the applicant's background, particularly in terms of education.

Applications submitted in response to the same job offer are sent on the same day, at different times, as soon as the offer appears on an online job board, via email sent from the applicant's own email address. The order in which applications are submitted for each job offer is determined at random, so that, across all tested job offers, each fictitious applicant appears in every sending position an equal number of times. Data on responses to formal job offers were collected between 5 November 2021 and 26 August 2022. Concurrently, a second test based on unsolicited applications was also conducted between 25 January and 15 February 2022. To minimise the risk of detection, a minimum interval of one week was maintained between two unsolicited applications sent to the same recruiter.

A response is considered positive when the recruiter invites the applicant to an interview or contacts them by email or phone to request additional information about their situation, availability, or qualifications. By contrast, a negative response includes explicit rejections from the recruiter, automatic acknowledgements of receipt, or the absence of any reply by the end of the testing period. The meta-analysis by Lippens *et al.* (2023), based on 169 correspondence tests, shows that applying either a strict definition of a positive response (formal interview invitation) or a broader one (interview invitation or request for further information) has little impact on the overall assessment of hiring discrimination.

The main advantages of correspondence testing stem from the fact that, by design, the data are free from selection bias and typically unobservable heterogeneity, allowing for the precise isolation and measurement of the impact of specific applicant characteristics on access to job interviews. The primary limitation of this method is that the results are not fully representative, as correspondence test data are usually partial in scope, time-bound, and geographically restricted. In this case, however, this limitation can be mitigated. First, the selection of occupations was guided by their relevance to the higher education sector, focusing on roles that are regularly subject to recruitment. Second, the testing was conducted on a national scale, covering higher education institutions across a wide range of French administrative departments throughout the country. Applications were submitted to all job offers published on relevant job search platforms during the data collection period. As such, the resulting sample is nearly exhaustive, and therefore representative of the flow of job offers in the sector. In parallel, unsolicited applications were sent to a representative sample of higher education institutions.

The absence of observed discrimination at the stage of gaining access to an interview does not imply that discrimination is absent in later stages of the hiring process. It remains possible that applicants face discrimination after the interview stage, but the testing protocol used here does not allow this to be assessed. Nevertheless, evidence of discrimination at the interview selection stage indicates the existence of discriminatory behaviour within the recruitment process, which can be detected with correspondence testing.

1.1. Two Occupations Experiencing Labour Shortages, Common in Higher Education

Because discrimination testing is a particularly complex and resource-intensive methodology, it

is not feasible to cover all occupations exhaustively. A selection must therefore be made, and the decision was to focus on occupations experiencing labour shortages, which are those with both a high number of job seekers and a substantial volume of job offers. Focusing on occupations with many job seekers helps reduce the risk of detection, since multiple applications can be sent simultaneously without arousing suspicion. Selecting occupations experiencing labour shortages[4] lowers the likelihood of employer refusals, unrelated to discriminatory motives. This methodological precaution is especially important during periods of strong economic recovery. Nevertheless, the higher success rates enjoyed by applicants seeking employment in an occupation under pressure come with a trade-off, as recruitment tends to be less selective and applicants are less likely to face hiring discrimination for this type of occupation. As a result, any potential hiring discrimination is more likely to be underestimated in the analysis.

On this basis, two occupations that are regularly recruited for in higher education and correspond to different qualification levels were selected for testing: administrative assistants and administrative and financial executives. For each of these two occupations, three fictitious job applications were created. The applications are identical in terms of productive and individual characteristics, except for the variables that are being tested for their effects on access to employment, namely origin and gender. In particular, these applications are equivalent in terms of education, career paths, and professional experience. They are designed to be credible applications for the targeted positions. They were reviewed and validated by a professional in the field, who confirmed that the applications were comparable, realistic, and relevant.

Since the three applications were sent to the same employers, minor differentiating elements were introduced to minimise the risk of detection. These differences concern the formatting of the CVs, such as font type, font size, and layout, while adhering to standard presentation norms. The applicants are presented as having prior experience in real private sector institutions, which are different for each applicant, but remain comparable in activity and size. The applicants obtained their degrees and began their careers in different cities, outside Paris region. For the past five years, they have been working and living in the same French administrative department as the higher education institution to which they are applying. The applicants' hobbies also vary, though they remain generic and neutral (e.g. sports, cinema, reading, music). Brief cover letters sent along with the CVs also varied slightly in phrasing, without being distinctive. Each applicant was assigned a postal address, mobile phone number and email address.

1.2. Two Criteria for Discrimination Tested: Origin and Gender of Fictitious Applicants

For each of the two occupations tested (administrative and financial executive, and administrative assistant), three fictitious applications (CV and cover letter) were created that are identical in all respects, except for origin and gender. The three fictitious applicants differ as follows. The first applicant corresponds to the modal gender for the occupation under study and bears a French-sounding first and last name. This profile serves as the reference applicant. The modal gender was identified using data from the INSEE Labour Force Survey. The second applicant differs from the reference applicant only by having a North African-sounding first and last name. The third applicant differs from the reference applicant only by gender. Table 1 presents the main individual characteristics of the three applicants for each occupation tested, and Appendix 1 describes the average profiles of workers employed in these two occupations in France.

With the exception of gender or the sound of their first and last names, the three fictitious applicants are identical. They are all French citizens, of comparable age, and share the same family situation. They each indicate they are geographically mobile (holding a category B driver's license and owning a personal vehicle). They have the same educational qualifications and have followed similar career paths. In their applications, they describe their language, IT, and professional skills, as well as the tasks performed in their previous positions.

The first and last names of the fictitious applicants were selected from among the most common names in France, based on data from the INSEE civil registry. Table 2 provides examples of the first and last names used in this correspondence test, and Appendix 2 presents the fictitious CVs of two administrative and financial executives submitted in response to job postings in the Bouches-du-Rhône department.

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*4. "An occupation is considered 'experiencing labour shortages' when it faces significant and persistent recruitment difficulties that the labour market is unable to resolve. Such pressures may arise from a quantitative shortage of applicants, a mismatch between required and available skills, or from unattractive working conditions." (*French Ministry of Labour, Employment and Integration*, official website, section on Employment and the Labour Market).*

Table 1 – **Individual characteristics of the three fictitious applicants for each occupation**

	Administrative and financial executive (private sector/category A of the civil service)	Administrative assistant (private sector/category B of the civil service)
Modal gender for the occupation	Male	Female
Age and marital status	Between 31 and 33 years old, single, no children	
Qualifications	Master's Degree in Accounting, Control and Auditing	Advanced Technician's Certificate (BTS) or Two-year University Diploma in Technology (DUT)

Table 2 – **Examples of fictitious applicants' first and last names, depending on their gender and origin**

	Female first names	Male first names	Last names
French origin	Élodie Marion Pauline	Vincent Thomas Jérôme	LECOMTE DURAND LEGRAND
North African origin	Samira Saïda	Youssef Omar	BELHADJ SLIMANI

To prevent any specific style or content of a given application from systematically influencing an higher education institution's choice of applicant (despite the precautions taken during the design phase), the CVs and cover letters were randomly interchanged among the fictitious identities. The application materials were therefore rotated among the applicants throughout the data collection process.

1.2.1. Responses to Formal Job Offers

The three applications in response to the same job offer were sent on the same day, at different times throughout the day, as soon as the offer appeared on an online job board, or via email sent from the applicant's own email address. The order of submission of the applications for a given offer was randomly determined. As a result, across all tested job offers, each fictitious application occupied every order position an equal number of times.

Job offers were collected daily from multiple websites: Emploi public, Place de l'emploi public, ATS, LinkedIn, Indeed, APEC, Pôle emploi, etc. For both occupations, the three fictitious applicants applied to fixed-term (CDD) and permanent (CDI) positions in private higher education institutions, as well as to contract positions in public higher education.

The study covered all job offers for administrative and financial executives and administrative assistants in higher education located in metropolitan France. All offers brought to our attention between early November 2021 and late August 2022 for administrative executives, and between early November 2021 and early April 2022 for administrative assistants, were tested. In total, this corresponds to 64 job offers for administrative and financial executives and 284 job offers for administrative assistants.

1.2.2. Submission of Unsolicited Applications

In addition to applications submitted in response to published job offers, we also tested the unsolicited application channel. We sent unsolicited applications by email, with each applicant's CV attached, mainly using the generic email addresses for the institutions. Unsolicited applications for administrative and financial executive positions were sent to 283 institutions, and those for administrative assistant positions to 285 institutions. Since the number of higher education and research institutions varies widely across French administrative departments, the study focused on around twenty administrative departments, specifically those with the largest concentration of institutions. These administrative departments were identified using SIREN records of legal entities with the code 8542Z, which corresponds to higher education institutions. This resulted in a sample of 473 institutions potentially subject to testing. The two administrative departments with the highest number of institutions are Rhône (69) and Paris (75). In these two administrative departments, institutions were distinguished according to size, those with more than and fewer than 50 employees. Institutions with fewer than 50 employees (representing 40% of institutions in Rhone and

60% in Paris) received either the three applications for administrative and financial executive positions or the three applications for administrative assistant positions. Larger institutions (more than 50 employees) received both sets of three applications. For all other administrative departments, each institution received only one set of three applications, either for administrative and financial executives or administrative assistants. There were 2,748 observations in the total sample (64 + 284 + 283 + 285 = 916 jobs, with three applications per job). Each institution was tested just once, in order to avoid any risks of detection. Table 3 presents the distribution of the various job positions by administrative department.

By comparing the interview invitations received by the three fictitious applicants from the same recruiters, pair by pair, it is possible to assess the presence of discrimination based on gender and discrimination based on origin. The possible comparisons are shown in Table 4.

A response is considered positive when the recruiter invites the applicant to an interview or contacts them by email or phone to request additional information about their situation or qualifications. By contrast, a negative response includes explicit rejections from the recruiter, or the absence of any reply by the end of the testing period. In practice, explicit rejections are rare, while non-responses are very common.

Table 3 – **Number of institutions tested (responding to job offers or unsolicited applications) per French administrative department**

Department		Responses to job offers		Unsolicited applications		Total
Code	Name	Administrative executives	Administrative assistants	Administrative executives	Administrative assistants	
6	Alpes-Maritimes	0	0	13	0	13
13	Bouches-du-Rhône	1	14	0	22	37
31	Haute-Garonne	0	0	21	0	21
33	Gironde	0	0	24	0	24
34	Hérault	0	0	0	15	15
35	Ille-et-Vilaine	0	0	0	18	18
38	Isère	0	0	5	7	12
44	Loire-Atlantique	2	24	20	0	46
59	Nord	3	25	0	20	48
67	Bas-Rhin	0	0	0	15	15
69	Rhône	8	43	34	32	117
75	Paris	20	89	116	115	340
77	Seine-et-Marne	4	10	8	0	22
78	Yvelines	1	9	5	0	15
91	Essonne	6	8	13	0	27
92	Hauts-de-Seine	8	35	0	26	69
93	Seine-Saint-Denis	7	9	0	13	29
94	Val-de-Marne	3	10	17	0	30
95	Val-d'Oise	1	8	9	0	18
Overall		64	284	285	283	916

Source: DESPERADO-ES test (TEPP-CNRS).

Table 4 – **Effects that can be identified**

Comparison of interview access probabilities between pairs of candidates	**Effects that can be identified**
Reference applicant versus applicant of North African origin	Discrimination based on origin, by gender of individuals
Reference applicant versus applicant of the non-modal gender	Discrimination based on gender among applicants of French origin

2. Correspondence Test Results

The results of the correspondence tests are presented in Table 5. A first observation is that the failure rate is high for applications in the higher education and research sector, regardless of the profiles tested. For published job offers, only 229 fictitious applicants received a positive response, corresponding to a response rate of 21.9 % (229 responses out of (64 + 284) × 3 = 1,044 applications). The results are even less favourable for unsolicited applications, with only 159 fictitious applicants receiving a positive response, corresponding to a response rate of 9.3% (159 responses out of (285 + 283) × 3 = 1,704 applications).

Table 5 provides a detailed breakdown of responses by pair of applications, in line with the standard principle of correspondence test, which compares the success rates of two applicants who are identical in every respect except for the variable being tested. All comparisons are made with the reference applicant. The table also presents the ratio of response rates (column 6).

For published job offers, the overall response rate for both occupations is 25.6% for reference applicants, 17.0% for applicants of North African origin, and 23.3% for applicants of the non-modal gender. This indicates a significantly lower probability of success for applicants whose first and last names suggest North African ancestry.

Table 5 – **Breakdown of response rates**

Sample	(1) Number of job offers tested	(2) No positive response	(3) Two positive responses	(4) Only the reference applicant received a positive esponse	(5) Only the potentially discriminated applicant received a positive response	(6) Response rate ratios (reference vs. potentially discriminated)
Responses to posted job offers						
Overall						
Reference vs. North African origin	348	249	49	40	10	1.508***
Reference vs. non-modal gender	348	237	59	30	22	1.099
Administrative assistant (ref.: female*)*						
Reference vs. North African origin	284	208	33	35	8	1.659***
Reference vs. non-modal gender	284	197	44	24	19	1.079
Administrative executive (ref.: male*)*						
Reference vs. North African origin	64	41	16	5	2	1.167
Reference vs. non-modal gender	64	40	15	6	3	1.167
Unsolicited applications						
Overall						
Reference vs. North African origin	568	493	27	29	19	1.217
Reference vs. non-modal gender	568	488	33	23	24	0.982
Administrative assistant (ref.: female*)*						
Reference vs. North African origin	283	239	16	17	11	1.222
Reference vs. non-modal gender	283	237	18	15	13	1.065
Administrative executive (ref.: male*)*						
Reference vs. North African origin	285	254	11	12	8	1.211
Reference vs. non-modal gender	285	251	15	8	11	0.885

Note: The response rate ratio is (6) = ((3)+(4))/((3)+(5)). The selected significance thresholds are 1% (***), 5% (**) and 10% (*).
Source: DESPERADO-ES test (TEPP-CNRS), authors' calculations.

Positive response rates are slightly higher for administrative executive positions than for administrative assistant positions. For the former, 32.8% of reference applicants received a positive response. This proportion is almost 10 percentage points lower (23.9%) for administrative assistant positions. For administrative executives, the positive response rates are identical for applicants of North African origin and those of the non-modal gender (28.1% in both

cases). In contrast, for administrative assistants, there is a pronounced disadvantage linked to origin, with a response rate of 14.4%, nearly 10 percentage points lower than the reference applicant (23.9%).

For unsolicited applications, although overall response rates are lower, the same general patterns emerge. The probability of receiving a response is about 2 percentage points lower for applicants of North African origin (8.1%) than for reference applicants (9.9%) or applicants of the non-modal gender (10.0%). The differences are consistent across both occupations tested: the lowest positive response rate is consistently observed for applications from applicants of North African origin (8.1% for administrative executive positions, 6.7% for administrative assistant positions). From a statistical standpoint, however, these differences do not appear significant for any of the profiles tested. The only response rate ratio that is statistically significantly different from 1 across all tests conducted is that observed for applications from applicants of North African origin for administrative assistant positions.

It is also interesting to examine the time elapsed between the submission of applications and any positive responses. Figure I illustrates the number of days elapsed before receiving a positive response. This is based on Kaplan-Meier survival functions estimated for the three applicant profiles: the reference applicant, the applicant of North African origin, and the applicant of the non-modal gender.[5] The profiles differ both by type of occupation and by type of test (response to a job offer or unsolicited application). For administrative assistants, the survival rate declines sharply during the first ten days, then tends to stabilise afterwards. This suggests that employers make shortlisting decisions quickly. The pattern is somewhat different for administrative executives, for whom the survival curve gradually flattens after around 40 days. Comparing the curves by applicant profile clearly shows longer waiting times before applicants of North African origin receive a positive response for administrative assistant positions.

Correspondence test makes it possible to measure the effect of a specific characteristic, in this case, origin or non-modal gender, while controlling for all other characteristics, since the fictitious applicants were created with the same education and similar career backgrounds. However, some residual heterogeneity may still influence response rates, such as local labour market conditions affecting supply and demand. Econometric analysis can be used to estimate the impact of applicant profiles on response rates, independently of other influencing factors.

Table 6 presents the results from the estimation of linear probability models, first for all applications combined (column 1), and then separately for the two occupations tested (columns 2 and 3). Let t_{ji}^{om} and t_{ji}^{snm} be two indicator variables equal to 1 for, respectively, the applicant of North African origin and the applicant of the non-modal gender, and 0 otherwise. Denoting R_{ji} as the response received by applicant i for job posting j (or institution j in the case of unsolicited applications), with $R_{ji}=1$ if a positive response is received and $R_{ji}=0$ otherwise, the following model is estimated:[6]

$$\Pr\left(R_{ji}=1 \mid t_{ji}^{om}, t_{ji}^{snm}, X_{ji}\right)=\gamma_1 * t_{ji}^{om}+\gamma_2 * t_{ji}^{snm} + X_{ji}\beta+\omega_j+\varepsilon_{ji} \quad (1)$$

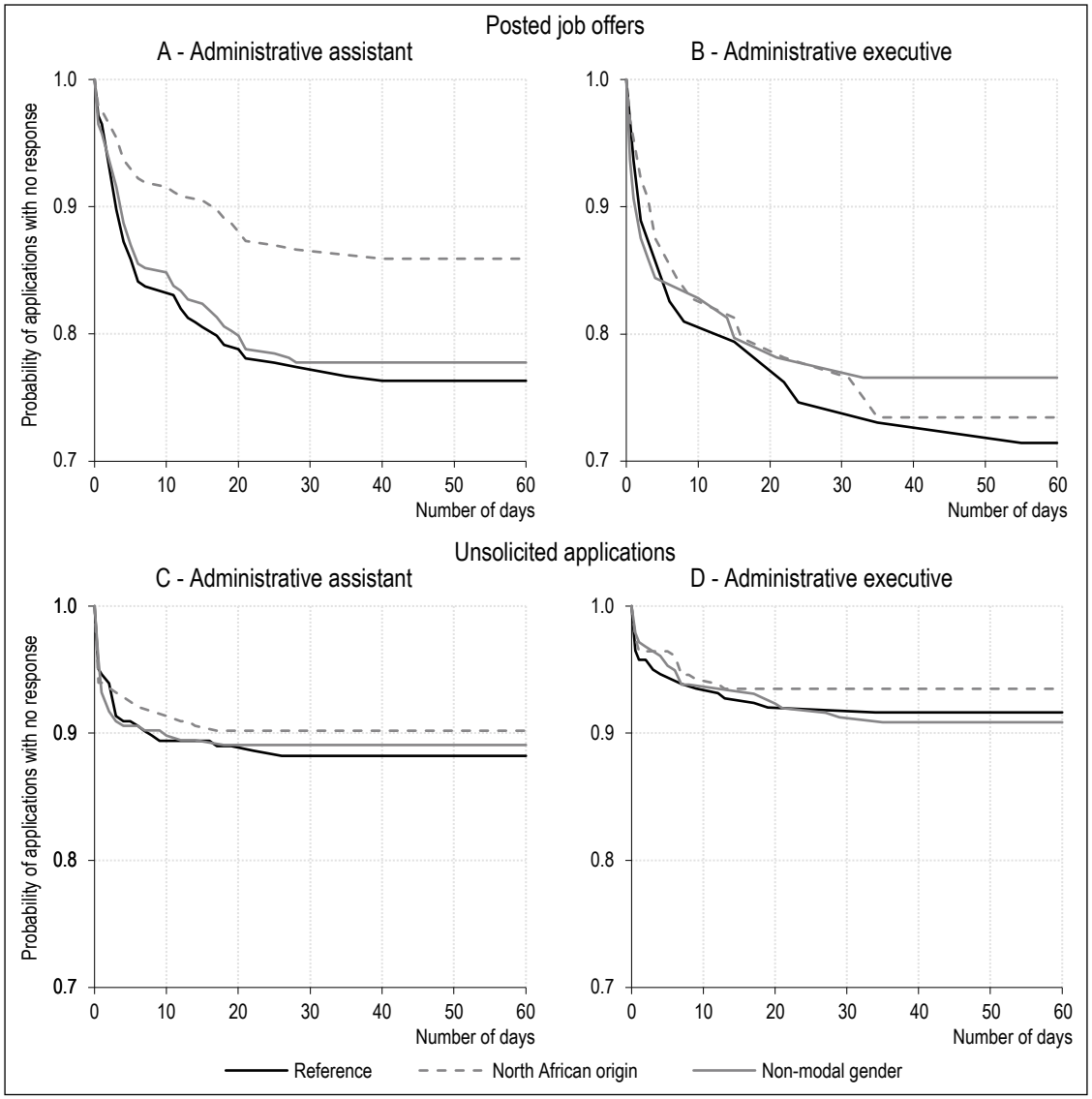
where γ_1 and γ_2 measure the effects of North African origin and non-modal gender, respectively, relative to the reference applicants, on the probability of receiving a positive response, X_{ji} is a vector of control variables specific to each application, with associated effects shown by vector β, ω_j represents a fixed effect for the job offer (or for the institution, in the case of unsolicited applications), and ε_{ji} is a residual error term. The identifying assumption under which the causal effects of origin and gender can be estimated using ordinary least squares is $E(\varepsilon_{ji} \mid t_{ji}^{om}, t_{ji}^{snm}, X_{ji})=0$. This identification assumption is satisfied by design, owing to the randomisation of applicant characteristics across CVs.

By design, the fixed effect term ω_j captures all observed and unobserved characteristics associated with the posted job offer or institution in the case of unsolicited applications. These characteristics fall into two main categories. On the one hand, ω_j includes job-related factors, such as the geographical location (the French administrative department in which the higher education institution is located is recorded in the data), and the type of institution (public or private) the applications are submitted to. On the other hand, ω_j includes application-related characteristics shared by all applicants

5. The survival function describes the time until an event occurs. It is widely used in medicine to study patient survival after treatment, or in economics to analyse the lifespan of a product or job, providing the probability that an observation "survives" beyond a given time t.

6. The econometric analysis relies on simple linear hypothesis tests, meaning that the effects of origin and non-modal gender are analysed separately for each sample. Appendix 3 shows that the results remain consistent when multiple linear hypothesis tests are applied.

Figure I – **Time elapsed before receiving a response (Kaplan-Meier survival functions)**



Source: DESPERADO-ES test (TEPP-CNRS), authors' calculations.

responding to the same job offer, such as the set of CVs used, the application script, and the month in which the applications were submitted. The only variable X_{ji} specific to each application that was retained is the order of submission of applications.

The main finding from the estimated linear probability models is that accounting for observed and unobserved heterogeneity does not alter the previous results.[7] All else being equal, no significant effect of gender is observed for either of the two occupations, whereas discrimination based on origin is statistically significant (at the 1% level), but only for responses to published job offers. This effect is entirely driven by the differences observed among administrative assistants, for whom the positive response rate is 9.3 percentage points lower for applicants of North African origin. Although a negative effect of origin is also observed for administrative executives, it is smaller (−4.7 percentage points) and not statistically significant.

The sector in which the institution operates – public or private – is captured by the fixed effect term ω_j in equation (1). However, it may still influence potential patterns of discrimination. The distribution between public and private institutions varies significantly depending on the type of position. For unsolicited applications, approximately 70% were sent to private-sector institutions (201 vs. 84 for administrative

7. Comparable results are obtained using a Cox proportional hazards survival model, which estimates the time from application submission to receiving a positive response.

Table 6 – **Estimation of success rates using a linear probability model**

Sample	(1) Overall	(2) Administrative assistant	(3) Administrative executive
A. Responses to posted job offers			
Reference vs. North African origin	−0.085*** (0.020)	−0.093*** (0.022)	−0.047 (0.042)
Reference vs. non-modal gender	−0.023 (0.021)	−0.017 (0.023)	−0.047 (0.047)
Controls (including fixed effect)	Yes	Yes	Yes
Number of observations	1,044	852	192
R^2	0.726	0.708	0.786
B. Unsolicited applications			
Reference vs. North African origin	−0.018 (0.013)	−0.021 (0.019)	−0.014 (0.016)
Reference vs. non-modal gender	0.002 (0.013)	−0.007 (0.019)	0.010 (0.015)
Controls (including fixed effect)	Yes	Yes	Yes
Number of observations	1,704	849	855
R^2	0.660	0.690	0.686

Note: The table presents the results of a linear probability model estimated by Ordinary Least Squares (OLS). Standard errors are clustered at the job-offer level (responses to posted job offers) or at the institution level (unsolicited applications) and are shown in brackets below the estimated coefficients. The selected significance thresholds are 1% (***), 5% (**) and 10% (*). The regressions include a fixed effect for the job offer or institution, and the order of application submission as an explanatory variable.
Source: DESPERADO-ES test (TEPP-CNRS).

executives; 197 vs. 86 public institutions for administrative assistants). Posted job offers for administrative executives were predominantly in the public sector (47 vs. 17), whereas those for administrative assistants were more common in the private sector (189 vs. 93). Separate regressions were therefore estimated for each job type (administrative executives, administrative assistants) and each sector (public, private). For unsolicited applications, no significant effect was observed for either North African origin or non-modal gender.[8] For posted job offers, the variable indicating North African origin reduces the probability of receiving a positive response by 9.9% when the offer comes from a private-sector institution for administrative assistants. The effect is also negative in the public sector, with a similar magnitude (−7.9%). This estimate is significant at the 10% level ($p = 0.079$), which is likely due to the smaller sample size once public-sector offers are analysed separately from private-sector ones.

3. Explaining the Heterogeneous Effects of Origin

3.1. Differences Between Occupations

The results obtained by the statistical and econometric analyses raise an initial question: why does the degree of discrimination based on origin differ between the two occupations when responding to posted job offers?

There are two possible explanations. The first is that there are genuine differences in employer behaviour depending on whether they are recruiting an administrative executive or an administrative assistant. The second is that no such behavioural difference exists, and that administrative executives also face discrimination, but the smaller sample size for this group limits the ability to detect statistically significant differences in response rates. While fictitious applications were sent in response to 284 job offers for administrative assistants, it was only possible to respond to 64 offers for administrative executives. This naturally implies less accurate estimates for this occupation. It is therefore essential to determine whether the observed difference in response rates of 4.7 percentage points, to the disadvantage of applicants of North African origin, could become statistically significant if a larger sample of posted job offers were available.

Power analyses[9] can be conducted to assess these two explanations. Conventionally, a

8. The coefficients associated with North African origin are very similar (between −1.5% and −2.5%) and are never statistically significant.
9. As a reminder, the power of a test corresponds to the probability of correctly rejecting a false null hypothesis (the complement of a Type II error).

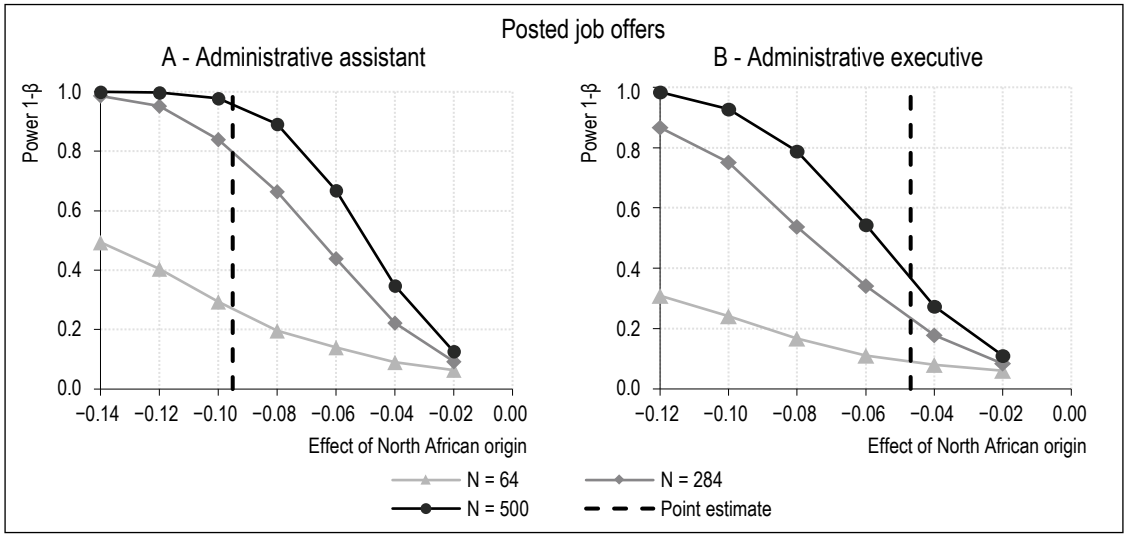
power level above 80% is considered satisfactory. Monte Carlo simulations are therefore used. As a first step, a linear probability model is estimated using the samples of responses to job offers. For each occupation (administrative assistant and administrative and financial executive), a model is estimated explaining the probability of receiving a positive response as a function of the applicant's variable of interest, their gender and origin. The results are very similar to those reported in Table 6, with persistent differences in response rates between applicants even after the inclusion of control variables. The limited influence of the explanatory variables on the phenomenon under study, consistent with the experimental design, confirms that the testing procedure was properly implemented.

A second step involves simulating samples of different sizes to assess the extent to which the coefficient associated with North African origin could be detected as statistically significant. Three sample sizes are used: 64, corresponding to the sample size for posted job offers for administrative executives, 284, corresponding to the sample size for posted job offers for administrative assistants, and 500, a substantially larger sample, roughly double the largest one used. Power analyses are then conducted, allowing the effect of North African origin to vary between −0.02 and −0.12 (in increments of 0.02). For each occupation and sample size, 5,000 separate simulations are performed. The results for responses to posted job offers are presented in Figure II.

For administrative assistants, with a sample size of 284, the power associated with a coefficient of −0.095 (very close to the estimated coefficient of −0.093, see Table 6) is exactly 80%. This means that the sample size for administrative assistant job offers was sufficient to statistically detect a discrimination effect of that magnitude. However, if the sample for the same occupation had been limited to 64 job offers, it would not have been possible to detect a statistically significant effect of North African origin, as the corresponding power would have fallen below 30%. By contrast, with a sample of 500 job offers, an effect of North African origin as small as 7.5 percentage points could have been detected with 80% power.

For administrative executives, the same type of analysis reveals that, for all sample sizes, the power to detect a marginal effect of origin equal to −0.047 remains very low. It reaches 40% at most for a sample size of 500. With a sample as small as 64 job offers, the power does not exceed 30%, even with a negative effect of North African origin of −0.12. In conclusion, this power analysis indicates that the number of posted job offers for administrative executives is too small to detect a statistically significant effect, under the assumption that the true effect of origin is −0.047 (which corresponds to the estimate reported in Table 2). Such an effect would remain undetectable even with a sample size of 284. Given the limited sample size and the low statistical power, it is therefore not possible to determine whether a genuine difference exists in the degree of discrimination based on origin between the two occupations.

Figure II – **Estimated power for the effect of North African origin in tests responding to job offers**



Note: Power analysis based on Monte Carlo simulations with 5,000 replications, using a linear probability model estimating the likelihood of receiving a positive response to a job application depending on the applicant's origin and gender, with standard errors clustered at the job offer level.
Source: DESPERADO-ES test (TEPP-CNRS), authors' calculations.

3.2. Differences Between Published Job Offers and Unsolicited Applications

A second question arising from the results concerns the differences observed between the two correspondence test methods. Why does the intensity of discrimination vary between tests conducted in response to published job offers (with a significant effect only for administrative assistants) and those based on unsolicited applications (with no significant effect for either occupation, administrative assistant or administrative and financial executive)? As a preliminary remark, it is worth noting that the estimated coefficients associated with origin in Table 6 are particularly low: −2.1% for administrative assistants and −1.4% for administrative and financial executives. Unsurprisingly, replicating the previous power analysis procedure for unsolicited application tests indicates that no significant effect could be detected, even with a large sample size.[10]

A key difference between the two correspondence test methods lies in their geographical coverage, as the administrative departments tested were not exactly the same in both cases. This difference in geographical coverage could possibly explain the discrepancies observed between the two correspondence test methods. Table 7 compares the response rate ratios between the reference applicant and the potentially discriminated applicant for each administrative department, separately for published job offers and unsolicited applications. The number of observations may be limited but the results reveal disparities across the country. For unsolicited applications, the lowest response ratios are observed in Seine-Saint-Denis (0.333), Bouches-du-Rhône (0.667), Paris (0.889) and Hauts-de-Seine (1.000). For published job offers, the lowest response ratios are observed in Seine-Saint-Denis (1.000), Seine-et-Marne (1.000), Rhône (1.200) and Bouches-du-Rhône (1.333).

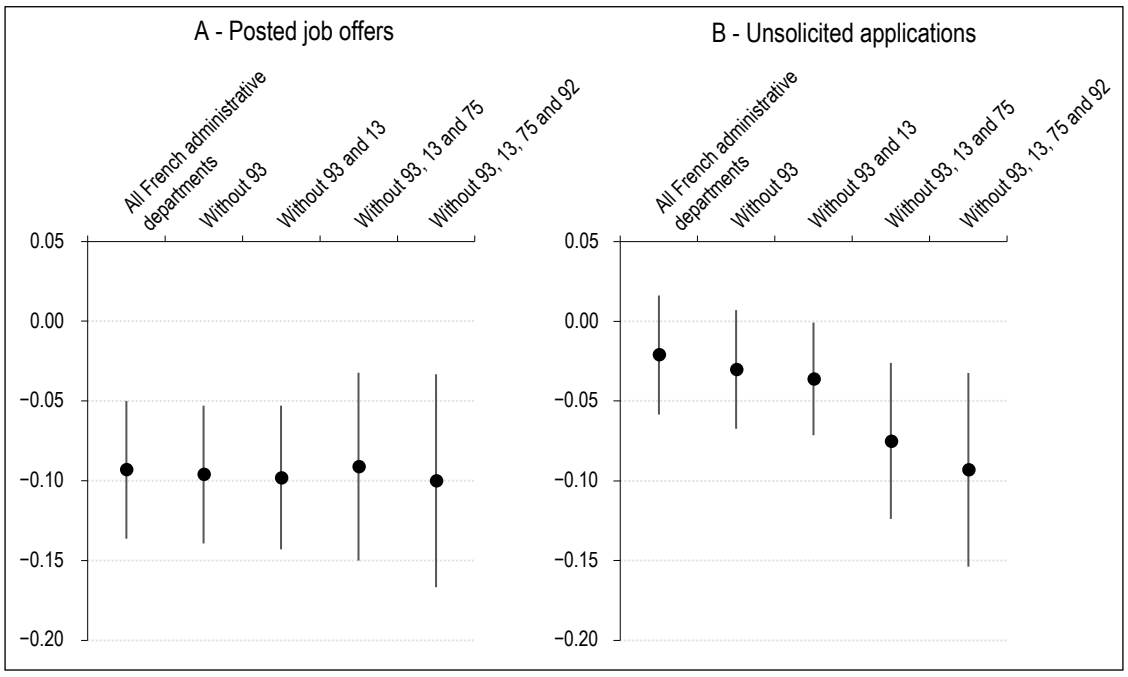
10. The corresponding results are presented in Figure S-I of the Online Appendix (Link of the Online Appendix at the end of the article).

Table 7 – **Response rate ratios for administrative assistants by department**

Department		Responses to job offers		Unsolicited applications	
Code	Name	(1) Number of job offers tested	(2) Response rate ratios (reference vs. potentially discriminated)	(1) Number of job offers tested	(2) Response rate ratios (reference vs. potentially discriminated)
6	Alpes-Maritimes				
13	Bouches-du-Rhône	14	1.333	22	0.667
31	Haute-Garonne				
33	Gironde				
34	Hérault			15	1.500
35	Ille-et-Vilaine			18	1.333
38	Isère			7	-
44	Loire-Atlantique	24	3.500		
59	Nord	25	1.500	20	1.667
67	Bas-Rhin			15	-
69	Rhône	43	1.200	32	3.000
75	Paris	89	1.909	115	0.889
77	Seine-et-Marne	10	1.000		
78	Yvelines	9	-		
91	Essonne	8	2.000		
92	Hauts-de-Seine	35	2.000	26	1.000
93	Seine-Saint-Denis	9	1.000	13	0.333
94	Val-de-Marne	10	2.000		
95	Val-d'Oise	8	2.000		

Note: The response rate ratios (2) indicate the probability of a reference applicant receiving a positive response compared with that of a potentially discriminated applicant.
Source: DESPERADO-ES test (TEPP-CNRS), authors' calculations.

Figure III – **Estimation of the effect of North African origin for administrative assistants, for different geographical areas**



Note: Each point corresponds to a coefficient estimated from a linear probability model with standard errors clustered at the job offer level (responses to posted job offers) or at the institution level (unsolicited applications). Confidence intervals are at the 95% threshold.
Source: DESPERADO-ES test (TEPP-CNRS), authors' calculations.

For unsolicited applications, the four administrative departments where origin-based discrimination levels are the lowest account for just over half of all tests conducted (62.2%, (13 + 115 + 22 + 26) / 283). This makes it possible to assess the extent to which these administrative departments contribute to the lack of significant effects of origin observed in Table 6. Figure III shows how the effect of origin on the probability of receiving a positive response from an employer changes as the administrative departments with the lowest response rate ratios (for unsolicited applications) are progressively excluded from the sample.[11] As these administrative departments are removed, the gap in success rates between applicants, an indicator of discrimination, steadily widens. The coefficient associated with origin increases from −0.021 for the full sample to −0.093 after excluding the administrative departments of Seine-Saint-Denis, Bouches-du-Rhône, Paris, and Hauts-de-Seine. Most notably, the effect becomes significant once at least the two administrative departments with the lowest response rate ratios are excluded, despite the gradual reduction in sample size. By contrast, Figure III shows that modifying the geographical scope has virtually no impact on the level of discrimination measured from posted job offers: the probability that an applicant of North African origin is contacted remains 9 to 10% lower than that of the reference applicant, regardless of which administrative departments are excluded.

This analysis of possible spatial variations ultimately yields two key findings. First, the overall absence of an observed effect of origin for unsolicited applications masks any substantial differences between administrative departments. Excluding just two administrative departments from the sample (including Paris, the main contributor to the sample) is enough to reveal a negative and significant effect of North African origin. Second, excluding certain administrative departments makes it possible to obtain comparable magnitudes of the effect (around 10%) for both unsolicited applications and posted job offers.[12]

11. The detailed results of these regressions are presented in Table S-2 of the Online Appendix.

12. The analysis cannot produce meaningful results for administrative executives, given the very small number of job offers or institutions per department. Table A3 in Appendix 3 presents the response rate ratios by department. For unsolicited applications, the response rate ratio is undefined for two departments and reaches a minimum value of 0.500 for six departments.

* *
*

Even if such findings may seem difficult to reconcile with the principles of equality and universality that underpin the very foundation of universities, this study clearly demonstrates that hiring discrimination exists in the early stages of the recruitment process within higher education and research. For the position of administrative assistant, the occupation tested on the largest sample, having a North African origin, as suggested by the applicant's first and last name, reduces the probability of receiving a positive response to an application submitted in response to a job offer from a higher education institution or a research centre by 9.3 percentage points. The effect is also negative for unsolicited applications, although its magnitude is smaller and statistically insignificant. The magnitude of the effect measured for responses to posted job offers is comparable to that found in studies covering the entire public sector (Challe *et al.*, 2023). This shows that the higher education and research sector is not immune to discrimination.

Admittedly, the study does not reveal a similar result for more highly qualified administrative executive positions, for which the sample size is smaller. Nor does it show a significant effect of the applicants' gender, which was tested using the same procedures as the origin criterion. The absence of a gender penalty in higher education and research is consistent with findings from numerous studies conducted across both the public (L'Horty, 2016) and private employment sectors. According to a recent review (L'Horty, 2025), while gender-based disparities are well-documented in earnings trajectories, in both the public and private sectors, they are not systematic at the recruitment stage. Women tend to face disadvantages in certain tested occupations (e.g. software developer, construction trades, electrician, assembly technician, wiring technician, order preparation operator), advantages in others (e.g. management controller, accountant, sales engineer, production engineer, restaurant manager), while access to many occupations appears gender-neutral (e.g. plumbers, kitchen assistants, sales agents, administrative clerks).

Nonetheless, a closer examination of the test results highlights their sensitivity to geographical coverage, particularly regarding the effect of origin. Excluding just one administrative department of the twenty included in the samples is sufficient to reveal a significant effect of origin, both for administrative assistant positions tested through unsolicited applications and for administrative executive positions tested through responses to job offers.

This study also demonstrates that it is possible to detect discrimination within a relatively narrow sector, representing less than 2% of total employment. Even within such a limited sector, it proves relevant to conduct multi-criteria studies, testing several occupations simultaneously using multiple testing methods, as was done in this study. To conclude, several limitations should be acknowledged. First, the correspondence testing method applied to the labour market measures discrimination in the likelihood of being invited to a job interview, while unequal treatment may also occur at later stages of the hiring process. Second, the study was conducted over a specific period, between 2021 and 2022, just after the COVID crisis, and focused on a non-exhaustive set of occupations within the well-defined sector of higher education. Finally, although the results suggest variations in the intensity of origin-based discrimination across French administrative departments, the limited number of job offers and institutions tested does not allow for a more detailed analysis of geographical patterns. It would be worthwhile to study in greater detail the potential sources of heterogeneity across the three dimensions, sectoral, temporal, and geographical. □

Link to the Online Appendix:
https://www.insee.fr/en/statistiques/fichier/8743917/ES548_Challe-et-al_Online-Appendix.pdf

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APPENDIX 1

COMPLEMENTARY STATISTICS ON THE TWO OCCUPATIONS TESTED

Table A1-1 – **Descriptive statistics for the administrative executive occupation (private sector/category A of the civil service)**

Characteristics	**Administrative executives (2008-2012)**	**Administrative executives (2013-2016)**
Gender (modal)	Male	Female
Nationality (modal)	French	French by birth, including by reinstatement
Region of residence (modal)	Île-de-France	Île-de-France
Age of end of studies (average)	22 years old	22 years old
Highest level of qualification (modal)	Higher education bachelor's level (bac+3) degrees or above, other than a general or professional bachelor's degree	Higher education bachelor's level (bac+3) degrees or above, other than a general or professional bachelor's degree
Potential labour market experience, average (in years)	22	23
Share of women (percentage)	47.02%	55.25%
Type of employer in the main occupation		
Not applicable (self-employed)	12.11%	11.63%
State	0.15%	0.19%
Local authorities, rent-controlled housing	-	0.43%
Public hospitals	0.17%	-
Social security	-	0.36%
Private individual	0.02%	0.02%
Public company (La Poste, EDF-GDF, etc.)	3.91%	3.26%
Private company, association	83.63%	84.12%
Declared status of public sector employees		
Permanent civil servant	46.97%	75.67%
Contract employee	53.03%	24.33%

Note: In the Professions and Socio-Professional Categories (PCS 2003) classification, the occupational codes used to identify administrative executives are as follows: 312c - Chartered accountants, certified accountants, independent professionals; 373a - Executives in financial or accounting departments of large firms; 373c - Executives in financial or accounting departments of small and medium-sized enterprises.
Scope: Employed individuals aged 15-64 who have completed their initial education.
Source: Labour Force Survey 2008-2016 (INSEE).

Table A1-2 – **Descriptive statistics for the administrative assistant occupation (private sector/category B of the civil service)**

Characteristics	**Administrative assistant**
Gender (modal)	Female
Nationality (modal)	French (by birth, including by reinstatement)
Region of residence (modal)	Île-de-France
Age of end of studies (average)	20 years old
Highest level of qualification (modal)	Technical diploma (BTS)
Potential labour market experience (average)	14 years old
Share of women (percentage)	95.22%
Type of employer in the main occupation	
Not applicable (self-employed)	0.14%
Private company, association	92.45%

➔

Table A1-2 – *(contd.)*

Characteristics	Administrative assistant
Public company (La Poste, EDF-GDF, etc.)	4.84%
State	1.49%
Local authorities, social housing	0.45%
Public hospitals	0.34%
Social security	0.21%
Private individual	0.09%
Declared status of public sector employees	
Permanent civil servant	49.43%
Contract position	47.67%
Intern	2.90%

Note: In the Professions and Socio-Professional Categories (PCS 2003) classification, the occupational code used to identify administrative assistants is as follows: 461a: Senior secretarial staff, executive secretaries (non-executive positions).
Scope: Employed individuals aged 15-64 who have completed their initial education.
Source: Labour Force Survey 2013-2016 (INSEE).

APPENDIX 2

EXAMPLE OF FICTITIOUS APPLICANTS

Here is an example of two CVs for administrative and financial executives residing in Marseille: one for the reference applicant and one for the applicant of North African origin. These two CVs were used to respond to job offers in higher education in the Bouches-du-Rhône department.

Thomas Durand
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Single, 33 years old, French, Mobile (driver's licence B and personal vehicle)

EXPERIENCED ADMINISTRATIVE EXECUTIVE

PROFESSIONAL EXPERIENCE

Since Nov. 17 — Administration and Human Resources Manager
Management control. Monitoring and oversight of HR operations. Preparation, monitoring, and control of analytical and budgetary accounts, development of analytical tools, cost and process optimisation, monthly reporting, preparation of forecast budgets, variance analysis. Supervision of 11 employees.
Permanent contract (CDI) at Beuchat International, Marseille (13).

Dec. 14 to Oct. 17 — Management Controller
Audit and restructuring of purchasing methods, monitoring and analysis of variations and evolutions, development of dashboards, production and analysis of profitability indicators, supervision of general and analytical accounting, budget preparation and monitoring, reports, accounting closings, tax declarations, and recommendation of corrective actions.
Permanent contract (CDI) at Larivière, Paris (75).

Sept. 11 to Nov. 14 — Audit Associate at an accounting firm
Financial and accounting audits, preparation of year-end closings.
Financial, legal, and tax advisory services.
Permanent contract (CDI) at accounting firm Cogep, Châtellerault (86).

QUALIFICATIONS

June 2011: — Master's Degree (M2, Professional) in Accounting-Control-Auditing, University of Poitiers
Five-month final-year internship at accounting firm
Soregor, Poitiers (86).

June 2009: — Bachelor's Degree in Management, University of Poitiers

June 2008: — Undergraduate Degree (DEUG) in Economics and Management, University of Poitiers

June 2006: — Scientific Baccalaureate

ADDITIONAL INFORMATION

IT tools: Word-Excel-Powerpoint, Sage-Ciel-EBP-Ciril software programmes.

Foreign language: English.

Hobbies: MTB, basketball, reading.

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Current situation:
31 years old, single
French

EXPERIENCED ADMINISTRATIVE EXECUTIVE

PROFESSIONAL EXPERIENCE

January 2019 to the present day: Administrative, Financial, and HR Manager (Permanent contract - CDI)
Supervision of all accounting operations (team of 6), monitoring of budget cycles, financial consolidation, preparation of centralised dashboards, formalisation of procedures, updating control processes, dealing with financial matters, and supervision of the HR department (team of 4). **MARSEILLE FRET (13 Marseille).**

December 2015 to December 2018: Administrative and Financial Manager (Permanent contract - CDI)
Supervision of financial and accounting departments, preparation of budgets, reports, development of management tools, implementation of dashboards, legal advice, performance analysis, management control. **ALPHA SIGNALETIC (53 Laval).**

July 2013 to November 2015: Management Controller in an accounting firm (permanent contract - CDI)
Management control for companies, implementation of performance indicators and dashboards, price and cost analysis, collection of financial data, monitoring accounts, variance analysis, and report writing. **CELIANSE Accounting Firm (72 Le Mans).**

January to May 2013: External Auditor for an Accounting Firm (Master's 2 Internship)
Participation in statutory audit assignments, preparation of reports and summary notes, accounting review. **BDO Accounting Firm (72 Le Mans).**

QUALIFICATIONS

2013: Master's Degree (M2) in Accounting, Control and Auditing – University of Le Mans
2012: Master's Degree (M1) in Accounting, Control and Auditing – University of Le Mans
2010: Bachelor's Degree in Economics and Management – University of Le Mans
2009: Undergraduate Degree (DEUG) in Economics and Management – University of Le Mans
2008: Scientific Baccalaureate – Lycée Marguerite Yourcenar, Le Mans

ADDITIONAL INFORMATION

Excellent command of Excel.
Excellent proficiency with Ciril, Ciel, EBP, Sage software programmes.
Foreign language: English.
Hobbies: Volleyball. Reading. Cinema.
Category B driver's license and personal vehicle.

APPENDIX 3

DISCRIMINATION AND MULTIPLE HYPOTHESIS TESTING

The discussion of the effects associated with the non-modal origin and gender variables in the text is based on simple hypothesis tests. For example, for administrative assistants, the presence of discrimination based on origin is assessed by testing the validity of the null hypothesis $H_0 : t^{om} = 0$, and gender-based discrimination by testing the validity of the null hypothesis $H_0 : t^{snm} = 0$. Each hypothesis is tested independently, even though the dependent variable Y R_{ji} is expressed as a function of both explanatory variables t^{om} and t^{snm}.

However, such an approach can create issues in the presence of multiple hypotheses, and there is an econometric literature dedicated to possible adjustments to the precision of estimators in this case (Romano *et al.*, 2010; Viviano *et al.*, 2025). In a framework with one outcome variable (R_{ji}) and two treatment variables (t^{om}, t^{snm}), there are in fact two null hypotheses to test. Suppose both null hypotheses are true ($H_0 : t^{om} = 0$ and $H_0 : t^{snm} = 0$). With a 5% significance level, the probability of committing at least one Type I error (false positive) is $1 - 0,95^2 = 0,0975$. Even when both null hypotheses are true, the probability of incorrectly rejecting at least one of them is therefore close to 10%. This probability increases to 18.5% when four null hypotheses are tested simultaneously, and to 40.1% when ten are tested. To account for this increased probability of false positives, several correction methods have been proposed in the literature. These include simple adjustments such as the Bonferroni correction (which accounts for the number of tests conducted), false discovery rate control procedures, and resampling methods (Westfall & Young, 1993; Romano & Wolf, 2005; Anderson, 2008; Young, 2019).

The Romano-Wolf correction is applied to the data to assess the robustness of the results to multiple hypothesis testing. This procedure can be used to assess the family-wise error type, which is the probability of committing at least one Type I error across a set of simultaneously tested hypotheses. The correction relies on bootstrap resampling methods. The procedure is described in detail by Clarke *et al.* (2020). For each hypothesis, a test statistic is computed and then recalculated for each bootstrap sample, which means that the distribution of test statistics under the null hypothesis can be estimated. This correction therefore makes it possible to monitor the error rate in multiple hypothesis testing by producing adjusted p-values that take into account the dependence among test statistics.

The results of the Romano-Wolf correction are presented in Table A2. A total of 2,500 bootstrap replications were used in the procedure. Column (1) reports the p-values associated with the original regression coefficients; column (2) reports the p-values after resampling; and column (3) presents the p-values adjusted according to the Romano-Wolf procedure. In the first stage (A), the regression focuses exclusively on posted job offers and is limited to administrative assistants, where there was evidence of the effect of origin. Two hypotheses are tested simultaneously (origin and gender). In the second stage (B), the regression covers all posted job offers. The coefficients for origin and gender, respectively for administrative executives and administrative assistants, can be obtained from a single regression of the form $\Pr\left(R_{ji} = 1 \mid t^{om}_{ji}, t^{snm}_{ji}, CA, AG, X_{ji}\right) = \gamma_{CA,1} * t^{om}_{ji} * CA + \gamma_{CA,2} * t^{snm}_{ji} * CA + \gamma_{AG,1} * t^{om}_{AG,ji} * AG + \gamma_{AG,2} * t^{snm}_{ji} * AG + X_{CA,ji}\beta_{CA} + X_{AG,ji}\beta_{AG} + \omega_j + \varepsilon_{ji}$. In this case, four hypotheses are tested simultaneously. In the third stage (C), a single regression is estimated by combining both posted job offers and unsolicited applications for administrative executives and administrative assistants, resulting in eight hypotheses tested simultaneously. The p-values reported in Table A2 clearly show that the negative effect of origin for administrative assistants responding to posted job offers remains statistically significant.

Table A2 – **Adjusted p-values for multiple hypothesis testing**

Specification	Regression p-value	p-value after resampling	Romano-Wolf p-value
A. Posted job offers, administrative assistants (852 applications, 284 job offers)			
North African origin	0.0000	0.0008	0.0016
Non-modal gender	0.4565	0.5226	0.5226
B. Posted job offers, administrative executives and administrative assistants (1,044 applications, 348 job offers)			
North African origin: administrative executive	0.3203	0.3071	0.7045
Non-modal gender: administrative executive	0.3197	0.3419	0.7045
North African origin: administrative assistant	0.0000	0.0004	0.0012
Non-modal gender: administrative assistant	0.4553	0.5138	0.7045
C. Posted job offers and unsolicited applications, administrative executives and administrative assistants (2,748 applications, 916 job offers)			
Posted job offers			
North African origin: administrative executive	0.3755	0.2767	0.8745
Non-modal gender: administrative executive	0.3749	0.3327	0.8745
North African origin: administrative assistant	0.0002	0.0004	0.0004
Non-modal gender: administrative assistant	0.5056	0.4922	0.8745
Unsolicited applications			
North African origin: administrative executive	0.5757	0.4006	0.8745
Non-modal gender: administrative executive	0.6783	0.5118	0.8745
North African origin: administrative assistant	0.4023	0.2903	0.8745
Non-modal gender: administrative assistant	0.7832	0.7345	0.8745

Source: DESPERADO-ES test (TEPP-CNRS).

Should I Stay or Should I Go? Graduate Mobility and Local Economic Dynamics

Bastien Bernela*, Liliane Bonnal, Inès Touré* and Ahmed Tritah*****

Abstract – The present article analyses the effect of social and territorial origin on geographic mobility choices of young people. The objective is to assess the extent to which local economic dynamics influence mobility at entry into higher education and the labour market, and to examine whether this effect varies according to social background. The 2017 Generation survey from Céreq is used to characterise individual mobility trajectories, supplemented with INSEE's Labour Force surveys to provide a description of the local employment context. The results show that a favourable local economic situation, measured by an index capturing labour demand shocks, reduces post-baccalaureate mobility; however, it has little or no discernible effect at the time of labour market entry. These effects are tempered by social background factors: young people with at least one parent employed at executive level are slightly more responsive to local economic conditions when joining the labour market.

JEL: C35, J24, R23
Keywords: spatial mobility, graduates, Bartik index, local economic dynamics, social background

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Geographic mobility has become an increasingly prominent topic in economic research on employment and education, given the role it plays in the reallocation of resources at the macroeconomic level and in access to education and employment at the microeconomic level. This article focuses exclusively on spatial mobility, as distinct from other forms of mobility (social, sectoral, or occupational) and is generally measured by crossing administrative boundaries (communes, departments, regions), whether on a temporary basis or through a permanent change of residence (Caro, 2011).

There is an abundant academic literature on the determinants of geographic mobility, particularly among young people pursuing further education and recent graduates entering the labour market (see for example Diamond, 2016; Kidd *et al.*, 2017; Blanchard *et al.*, 2021; Dupray, 2023). Among these determinants, the spatial distribution of education and employment opportunities, together with the economic and social constraints faced by individuals, plays a central role. Young people may be motivated to move in search of a specific university programme, a better job or better career prospects.[1]

Individual mobility decisions occur within a constantly evolving labour market. In France, around 10,000 jobs are created and destroyed every day, under the combined effect of technological change, globalization, or changes in the skills expected by companies (Cahuc & Zylberberg, 2015). The dynamics of job creation vary from one period to the next, but also from one territory to the next, largely on account of the sectoral breakdown of the local employment market. Since the 2008 crisis, employment has grown unevenly across France's different regions (Cabannes, 2014). Regional disparities in job creation and losses are redefining local opportunities, and may thus influence the mobility decisions made by young people when choosing their course of study or first job.

In this article, we look at the connections between these two central dimensions – geographical mobility and local labour market conditions – and analyse the spatial trajectories of high school leavers. Our goal is to determine how much impact the social background of individuals and the economic circumstances of their local territories have at two crucial moments in the socio-economic integration of young people: *(i)* mobility when entering higher education, and *(ii)* mobility when entering employment, having finished their studies. At the individual level, these mobility decisions shape career trajectories and their effects may be nuanced by factors relating to social background, which can either mitigate or accentuate inequalities of access to education and employment. At a more aggregated level, fluctuations in local labour markets influence the distribution of investment in human capital and, ultimately, the availability of qualified jobs, thus contributing to these dynamics of territorial divergence.

The originality of this study resides in its use of a Bartik index (Bartik, 1991), also known as a *shift-share* index, which we have adapted by correcting the trend component in order to isolate short-term jolts in demand for labour at the local level, allowing us to examine their consequences for mobility for reasons of education or employment. Although this index has become widely used in recent years, applied to any number of economic phenomena (Goldsmith-Pinkham *et al.*, 2020; Borusyak *et al.*, 2022), its application to mobility decisions among young graduates has not, to the best of our knowledge, been explored heretofore. Moreover, the trend correction which we use to retain only local variations in the employment conditions constitutes another original methodological contribution to the existing literature.

On an empirical level, we make use of the Generation survey 2017 conducted by Céreq, which follows a cohort of young people leaving the education system in 2017 through to 2020.[2] This survey allows us to track the geographic mobility of individuals at different points in their lives, distinguishing between short-term moves and more long-term changes of address associated with their entry into higher education or the labour market.

We also construct a Bartik index using data derived from the INSEE Labour Force Surveys, in order to measure the degree to which individuals are exposed to local variations in the employment conditions in their *département* of origin. In fact, two indices are constructed, corresponding to the periods immediately preceding mobility decisions: before completing the Baccalaureate (student mobility) and before completing higher education (job mobility).

From a theoretical point of view, and in light of existing research, we might expect to find that

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1. At the micro-economic level, young graduates often regard mobility as a means of improving their career prospects and, more broadly, their well-being (Sjaastad, 1962; Dahl, 2002; Faggian & McCann, 2009; Notowidigdo, 2020).

2. French Centre for Research on Employment and Qualifications: www.cereq.fr.

education and employment mobility decisions are influenced by observable factors – such as level of education, social background and favourable local conditions – as well as unobservable factors such as risk aversion (Kidd *et al.*, 2017; Bernela & Bonnal, 2022; Dupray, 2023). Working within this framework, we estimated a linear probability model for each decision, in order to identify its determinants. Our results indicate that the local economic conditions, as measured by the Bartik index, influence our two types of mobility in different ways. Their impact on student mobility is robust, negative and statistically significant, both before and after we control for individual and territorial parameters. However, its impact on job mobility only becomes significant once we introduce the control variables, and becomes more pronounced when we exclude return mobility (graduates returning to their home region, defined as the place in which they sat their Baccalaureate examinations).

We also highlight the fact that variations in the economic conditions affect the mobility of individuals of different genders and social backgrounds differently, measured by looking at the socio-professional category and migration history of their parents. Mobility to enter higher education appears to be more sensitive to local economic conditions, irrespective of gender. However, only young people from more privileged backgrounds – defined as having at least one parent in an executive position, and neither parent being an immigrant – adjust their mobility decisions in response to the economic conditions. This differentiated capacity to respond to local economic circumstances is a vector of inequality: young people from less privileged backgrounds have less control over their mobility choices, and are less well-equipped to seize territorial opportunities, which may penalise them at the start of their careers. To the extent that student and job mobility is correlated with potential gains in terms of earning potential, this asymmetry may serve to perpetuate intergenerational inequality.

Our study is structured as follows. In Section 1 we situate our research question within the context of the existing literature. Section 2 contains details of the data we used, and how we adapted the Bartik index to analyse mobility among young graduates, along with some stylised facts regarding student and job mobility. In Section 3 we present our first descriptive results. Section 4 sets out our chosen econometric specifications, and our principal results. Finally, the implications of these results are discussed in our conclusion.

1. Where Young Graduates Go: Geographic Mobility and Local Economic Context

Among the forces which drive local economic development, the capacity of a territory – and its institutions of higher education – to attract and retain the most highly-qualified individuals has become a central preoccupation and a key determinant of relative positioning within the national economic hierarchy (Faggian & McCann, 2009; Poirot & Gérardin, 2010; Dotti *et al.*, 2013; Ciriaci, 2014). Within the familiar economic framework, student or job mobility is regarded as an investment allowing individuals to maximise their potential earnings (and utility, more broadly) over the course of their careers (Sjaastad, 1962; Dahl, 2002; Kennan & Walker, 2011). Individuals make mobility decisions seeking to boost their utility, taking into consideration a variety of factors such as employment opportunities, salary levels, cost of living, housing conditions, educational opportunities, public services and quality of life in different territories.

The decision to migrate for educational purposes may depend upon the number and quality of educational opportunities available locally. Students growing up in a region with a diverse, high-quality choice of university teaching and research are likely to continue their educational careers within that region (Caro, 2011; Dotti *et al.*, 2013; Ciriaci, 2014). There is thus less mobility away from regions with an abundant educational offering (INSEE, 2020). Decisions may also be influenced by local economic conditions, which affect the ability of individuals – particularly parents – to cover the cost of studying outside one's home county. School leavers are not able to cover the costs of educational mobility themselves, and are thus largely dependent upon parental support. This would appear to confirm the intuition that access to economic resources during childhood and adolescence is an important causal factor of outcomes in adulthood (Black & Devereux, 2011). Recent contributions to the literature have demonstrated that even slight instances of disruption affecting parents and their resources (loss of income, or health problems) can have substantial, lifelong consequences (Almond *et al.*, 2018).

The decision to migrate in pursuit of professional opportunities may also be influenced by local conditions and tensions on the labour and housing markets. Structural changes such as technological progress, globalisation, economic

fluctuations and demographic shifts can alter the nature of work and the skills required, creating economic imbalances between regions (Diamond, 2016; Verdugo & Allègre, 2020; Amior, 2024). These imbalances compel the most qualified individuals to migrate away from economically underprivileged regions to more prosperous areas (Berry & Glaeser, 2005; Chen & Rosenthal, 2008; Moretti, 2011). The most educated individuals tend to gravitate towards regions offering relatively favourable economic conditions. Notowidigdo (2020) has shown that, when demand for labour decreases, the relative immobility of less qualified individuals is partially offset by falling rents and increasing social transfers. By the same token, a jolt which has the effect of increasing the productivity of a given city will attract qualified workers and drive their real wages up. Meanwhile, it will have a negative impact on the real wages of less qualified workers with no experience of mobility (as the cost of accommodation rises) (Moretti, 2013). Mitze (2019) notes that disparities in local labour markets have an impact on net regional migration rates (particularly evident during the economic crisis of 2008). Numerous studies have demonstrated a positive correlation between repeat migration and earnings from the labour market (Faggian & McCann, 2009; Kidd *et al.*, 2017; Faggian *et al.*, 2017). Nevertheless, a significant proportion of people changing region to enter employment are actually returning to their home regions, having moved elsewhere to study (Crescenzi *et al.*, 2017; Bernela & Bonnal, 2022). This phenomenon suggests that not all mobility decisions are motivated by human capital factors, and often involve more personal considerations such as relationships and a sense of attachment to place (Magrini, 2007; Bernela & Bertrand, 2018).

Although there is, a priori, a positive correlation between geographic mobility and financial returns from the labour market, these returns vary depending on gender and distance travelled. For men, the "return on investment" associated with mobility decreases as the distance travelled increases, whereas for women these returns increase proportionally with distance and level of education (Lemistre & Moreau, 2009; Lemistre & Magrini, 2010). The social and territorial background from which individuals emerge may also have an influence on their migration decisions. For example, young people from underprivileged urban areas are less mobile, while those from peri-urban areas are more mobile, albeit within a smaller radius (Bernela & Bonnal, 2022; Dupray & Vignale, 2022). In addition to the effects of geographical disparities, education and career choices are influenced by students' social backgrounds. Social background has an influence on young people's school results, their choice of course of study and the grades obtained, as well as their aspirations and their understanding of higher education options (INSEE, 2020).

Mobility may also serve to exacerbate existing inequalities. For example, women and young graduates (in the 20-35 age group) are more likely to move to areas experiencing positive jolts in demand for labour, or more economically prosperous areas (Verdugo & Allègre, 2020; Chen & Rosenthal, 2008). Moreover, the choice to prioritise quality of life and the amenities offered by different regions also plays an important role in motivating these mobility decisions (Dahl, 2002; Chen & Rosenthal, 2008). There may be a mismatch between the areas with a greater availability of jobs and the areas where more jobseekers actually live. The latter find themselves cut off from employment opportunities because they must often contend with constraints such as high transport costs, or limited efficacy in their job search efforts (Gobillon *et al.*, 2007).[3]

This article constitutes a contribution to the existing literature in so far as it uses an indicator to measure local employment dynamics at the time when individuals are making key choices regarding their further education or entry to the labour market: we can thus measure the effects of local economic conditions on the geographical location of investments in human capital and graduate starter jobs across different territories. We also study the sensitivity of this effect to the social background of individuals.

2. Data

2.1. Determining the Characteristics of Geographic Mobility

In order to study student mobility and job mobility involving baccalaureate and university graduates, we used data derived from the Generation 2017 survey, conducted by Céreq. This survey, widely used by economists looking at employment and education, provides ample information regarding the personal characteristics of individuals at different points in their educational and professional careers (in first

3. *The* spatial mismatch *theory, first articulated by Kain (1968), is based on the hypothesis that the spatial distance between working class neighbourhoods and workplaces offering qualified jobs serves to accentuate social inequalities (Duguet* et al.*, 2009).*

year of middle school, when sitting school leaver examinations, at the end of their studies and as of the survey date). It monitors the professional circumstances of people leaving the education system over a period of three years.

The sample focuses on a study of approximately 25,000 individuals, selected to be representative of the cohort leaving the education system in 2017. Excluding mature students returning to education, and focusing exclusively on those with at least a High school diploma – or Baccalaureate certificate – (*Baccalauréat*), our final sample contains 15,519 individuals.[4] It is worth noting that, although all of the individuals in our sample left the education system in the same year (2017), their date of entry into higher education ranges from 2008 to 2016, in light of the variety of levels to which they pursued further study. Our population thus contains graduates with five different levels of educational qualification:

- Baccalaureate (general, technological or professional), corresponding to students who did not complete any further studies after the school leaving certificate (43%);

- Bac+2, holders of higher technical diplomas (BTS), university technological diplomas (DUT) or two-year health and social work diplomas (19.6%);

- Bac+3, university graduates with Bachelor's degrees or an equivalent three or four-year diploma (e.g.: Bachelor's programmes at business schools) (13%);

- Bac+5, graduates with master's degrees from universities or engineering or business schools (23.9%);

- Bac+8, graduates with doctoral degrees (0.5%).

In order to identify the defining characteristics of individual situations, we mobilize a number of social and demographic variables derived from the Generation survey: the socio-professional category and country of birth of graduates' parents, to determine their social background and migration history, as well as their gender, their age, their choice of baccalaureate and the results obtained, etc. The main descriptive statistics for our sample are given in the Appendix, in Tables A1-1 and A1-2.

We identified two types of mobility:[5] student mobility, defined as the fact of completing your studies in another *département* from the one in which you obtained your Baccalaureate, and job mobility, defined as the fact of completing your studies in a different *département* from the one where you reside three years later.[6] Distinguishing these two key stages in an individual's career trajectory allows us to obtain a more detailed insight into mobility behaviour, which may be influenced by individual goals at time of mobility, and by individual preferences (Combes & Gobillon, 2015; Bernela & Bonnal, 2022; Dupray & Vignale, 2022; Dupray, 2023).

For our sample as a whole, we observed that *i)* 23.5% of the individuals surveyed had moved to another *département* at some time between completing their Baccalaureate and completing their higher education, and *ii)* 31.5% of the individuals surveyed had changed *département* between graduating from higher education (2017) and the date of the survey (2020). Figure I illustrates the geographical flow of student mobility and job mobility in mainland France and Corsica. Rates of educational mobility range from 9% for the Val-de-Marne *département* to 61% for Lozère. Those *départements* with the highest outgoing flows of school leavers are not concentrated in any particular part of France (3rd quartile and above). Nonetheless, there are a few peaks in the south of the country, particularly Dordogne and Southern Corsica. As for job mobility between graduation and the date of the survey (3 years later), the lowest rate of mobility was 11%, in Haute-Savoie, whereas the highest was 60%, in Creuse. Outgoing flows of young university graduates appear to be highest in the centre and south-east of the country.

2.2. Determining the Characteristics of Territorial Economic Dynamics

The national economic conditions are reflected at the local level in employment dynamics which vary considerably from one territory to the next, due in large part to their sectoral specialisations. These disparities, as perceived and experienced by individuals, may significantly influence their decision-making on matters of geographic mobility, especially at decisive moments such as entering higher education or employment.

In order to quantify just how exposed individuals are to sudden variations in demand

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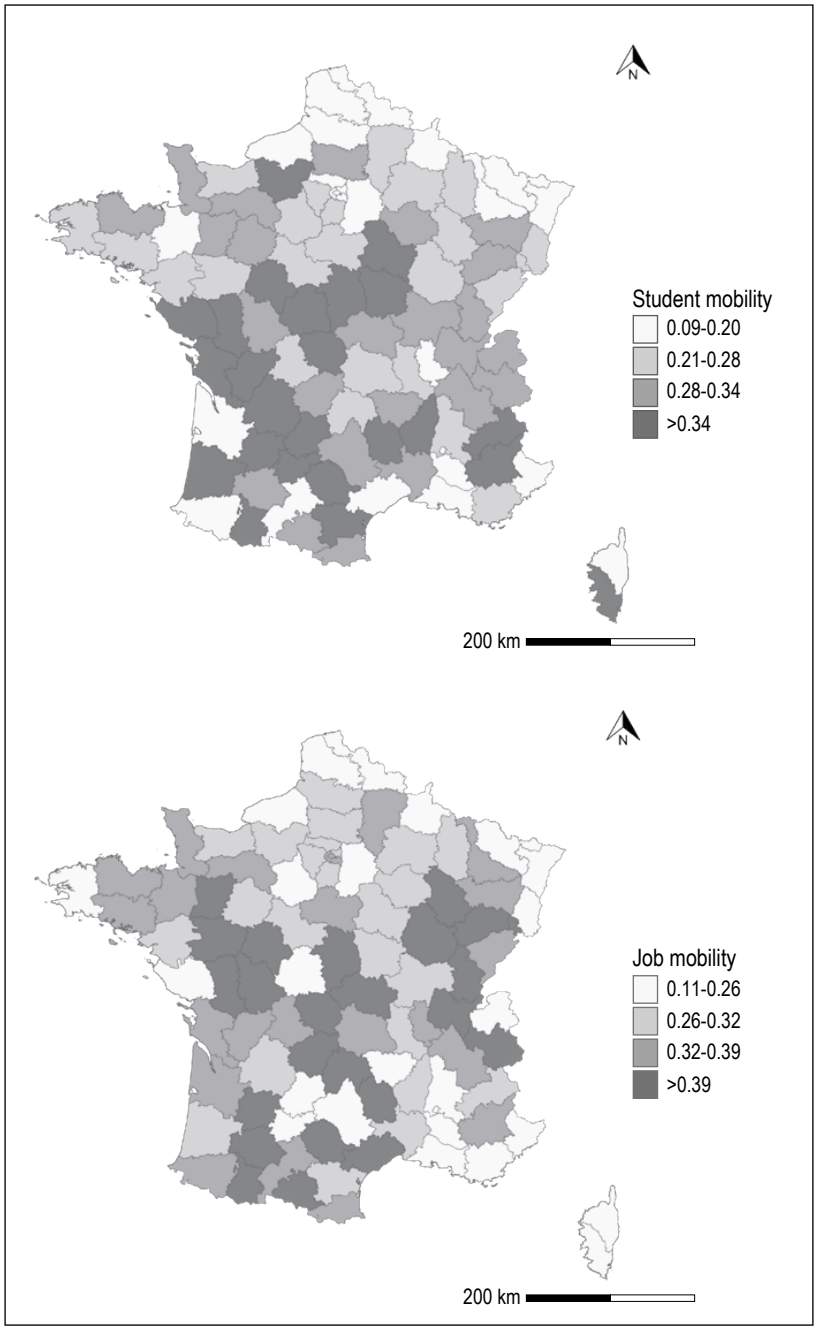
4. This sample is representative of the 439,732 individuals in this generational cohort, applying a weighting protocol constructed for the Generation survey: in all of our descriptive statistics and econometric analyses, we make use of this weighting protocol. It is standardised for our estimates, so as not to bias the significance calculations.

5. Combining them gives us the five profiles explained in detail in our descriptive statistics (cf. Table 1): no mobility (no/no) / student mobility only (yes/no)) / job mobility only (no/yes) / student and job mobility, no return (yes/yes) / student and job mobility, with return to home region (yes/yes).

6. We chose France's départements *(roughly equivalent to counties) as the appropriate scale for our empirical analysis: the numbers observed at finer levels of detail (for individual towns, urban areas or employment areas) are too small for some geographical units. Departmental statistics give a satisfactory representation of the geography of higher education in France.*

Figure I – **Student and job mobility, by *département* of origin**



Reading note: *Départements* are divided into 4 quartiles. In the top quartile of *départements* with the highest levels of student mobility (the darkest areas), between 34% and 61% of school leavers move outside the *département* to pursue further studies. In the quartile of *départements* with the highest proportion of graduates changing *département* between completing their studies in 2017 and the date of the survey in 2020, the percentages range from 39% to 60%.
Field: Individuals leaving the French education system for the first time in 2017 with at least a Baccalaureate diploma.
Source: Generation 2017 survey (Céreq), authors' calculations using weighting coefficients.

for labour at the local level, we turned to the Bartik index (Bartik, 1991), otherwise known as the shift-share index. This instrument allows us to isolate the exogenous part of variation in local employment, which can be attributed to two components: the initial sectoral structure of employment in the territory, and developments in employment in different sectors, as observed at the national level (Blanchard & Katz, 1992; Borusyak *et al.*, 2022). It thus measures the growth in employment which a territory would be expected to experience if it strictly mirrored the national sectoral trends. It therefore serves as a measure of predicted growth for local employment, considering the aggregate economic conditions and the initial characteristics of the local economy.

Because it is derived from national sector-specific fluctuations which are assumed to be

exogenous to local dynamics, the Bartik index is generally considered exogenous to local employment. This makes it an ideal tool for identifying causal relations in empirical observations. It can thus be profitably used to study the impact of immigration (Card, 2001), overseas competition (Autor *et al.*, 2013) or automation (Acemoglu & Restrepo, 2020) on local employment, as well as the impact of demographic growth on the availability of social housing (Verdugo, 2011). In France, Frocrain & Giraud (2018) have used this index to study variations in employment in those sectors exposed to international competition, in order to estimate the multiplying effect on more sheltered sectors.[7]

This empirical success has been accompanied by a renewed methodological interest in the index, seeking to ascertain the conditions required to make it a valid instrument. Recent work, including publications by Goldsmith-Pinkham *et al.* (2020) and Borusyak *et al.* (2022), has highlighted the importance of hypotheses such as the stability of the sectoral distribution of the local economy, the absence of short-term endogenous adjustments, and of course the fact that national variations are exogenous to local developments. These contributions have allowed researchers to control the use of this index more effectively in quasi-experimental approaches.

For the purposes of this study, we adapted the Bartik index to provide more detail regarding elements of the local conditions liable to influence the mobility decisions of young graduates. We made structural adjustments to ensure that the index focuses on short-term fluctuations, which are difficult to predict by definition, and which might have an immediate impact on young people deciding where to pursue further education or seek employment. To be more specific, we corrected sector-specific variations in employment for their long-term trends. For each sector, we estimated a trend trajectory on the basis of historical data, using this trend to distinguish between the expected structural component and the unexpected component associated with the immediate economic conditions. The latter component – defined as the gap between observed growth and the long-term trend – reflects actual short-term jolts in employment.

This correction allows us to reinforce the exogenous character of the index, by eliminating the structural component of fluctuations in local employment, which might be anticipated by individuals, or else correlated to unobservable local factors. By focusing exclusively on transient divergences from the structural trajectory, we can reduce the risk of endogeneity associated with planned migration decisions and human capital investments.

We are thus able to construct a short-term Bartik index for each *département*, representing the expected exposure of each *département* to recent sectoral developments at the aggregate level, on the basis of their initial sectoral specification. A high Bartik index indicates that a *département* is specialised in sectors whose economic situation at national level is dynamic, whereas a weak index suggests that it is overly exposed to sectors which are currently stagnating or in decline.

To put this method into practice, we used the INSEE Labour Force Surveys (*enquêtes Emploi*) for the period 2005-2017. These surveys provide detailed information on sectors of activity and places of work (at departmental level) for the workforce as a whole, thus enabling us to reconstruct both the sectoral structure of employment at departmental level, and national developments in employment in each sector. Consider the example of an economy comprising D territories (*départements*), written d, each of which has its own particular structure of production involving J sectors of activity, written j. We use $E_{d,j,t}$ to represent employment in sector j in territory d at date t, while $E_{j,t}$ is total employment in sector j at national level as of date t, and $E_{d,t}$ is employment in territory d at date t.

In order to separate *sector-specific short-term jolts* from long-term, structural trends in those sectors, we estimated, for each sector j, a long-term trend by means of a linear regression of national employment figures over time:

$$E_{j,t} = a_j + \beta_j\, t + \varepsilon_{j,t}.$$

The estimated trend component is written:

$$\widehat{E_{j,t}} = \widehat{\alpha_j} + \widehat{\beta_j}\, t\,.$$

We then calculated the observed rate of growth and its trend component, for a sliding window of three years:

$$\Delta E_{j,t} = \frac{E_{j,t} - E_{j,t-3}}{E_{j,t-3}}, \quad \Delta\widehat{E_{j,t}} = \frac{\widehat{E_{j,t}} - \widehat{E_{j,t-3}}}{\widehat{E_{j,t-3}}}.$$

A pure short-term jolt is defined as the difference between observed growth and the long-term trend for the sector:

$$\Delta G_{j,t} = \Delta E_{j,t} - \Delta\widehat{E_{j,t}}\,.$$

7. The most exposed sectors produce exchangeable goods or services, and are thus in competition with employment areas in other countries, whereas the more sheltered sectors exclusively serve domestic demand (Frocrain & Giraud, 2016).

This correction enables us to neutralise structural developments specific to each sector, retaining only the transient fluctuations which are difficult to predict and, in theory, more likely to be exogenous. This adjusted Bartik index thus measures a territory's degree of exposure to sector-specific short-term jolts, weighted with reference to the structural distribution of employment in that territory. It can be written as follows:

$$\text{Bartik}_{d,t} = \sum_{j=1}^{J} S_{d,j,t_0} \times \Delta G_{j,t}$$

where $S_{d,j,t_0} = 100 \times \frac{E_{d,j,t_0}}{E_{d,t_0}}$ corresponding to the percentage of local employment engaged in sector j at the reference date t_0.

The periods used to calculate the index vary depending on the type of mobility we seek to study:

- Student mobility: the calculation period corresponds to the three years immediately preceding the Baccalaureate examinations. This period is individually defined, with reference to the year in which each subject completed the Baccalaureate, and corresponds to the years spent in high school – a period during which the local conditions may influence decisions regarding higher education.

- Job mobility: the same calculation period is used for the whole cohort, namely the years 2014 through 2017. This corresponds to their last three years in education, a period in which individuals may be planning ahead for their entry into the labour market.

We find three years to be an appropriate period of time for observing the effect of the local economic environment on short-term relocation decisions. Tests conducted using longer windows did not have any significant effect on the results, which suggests that regional sectoral specialisation remains relatively stable.[8]

The index is expressed as a percentage. It measures, for each territory, expected growth of employment as predicted on the basis of sector-specific variations at national level, in light of the initial specialisation of the territory. Across all of France's *départements*, the index for educational mobility varies between −8 and +4.74, with standard deviation of 2.10 (calculated for the sample of individuals), while the index for employment mobility ranges from −3.46 to 4.74, with standard deviation of 1.91.

For a territory whose economy displays a given sectoral structure, a high index value indicates positive exposure to national sectoral dynamics (the territory is "dynamic"), whereas a low value indicates that the local conditions are unfavourable (the territory is "sluggish").

The index constructed in this manner displays little correlation with other territorial characteristics: it is weakly correlated with the average level of education in the *département* (see Figure A1-I in the Appendix) and not significantly connected to the range of educational options available locally (Figure A1-II in the Appendix).

Figure II is a geographical representation of the Bartik index calculated for the period 2014-2017, the three years before our cohort entered the labour market. It reveals a more favourable employment dynamic in those *départements* in the West of the country, on the Mediterranean coast, and in some of the eastern border regions. Some *départements* in the centre and north-east of the country, however, appear to have a greater exposure to struggling sectors of the economy, reflecting their historic specialisation.[9]

Our analysis takes two other territorial dimensions into consideration. The first is the status of each individual's hometown, using a categorisation of urban settlements (four categories: the Greater Paris region, urban areas other than Paris, peri-urban areas not including Paris, rural areas). We also included an indicator for local educational opportunities, constructed using Dupray's methodology (2022), corresponding to the ratio between the number of students enrolled in the first year of higher education programmes and the theoretical total number of local high school graduates pursuing further studies. The latter total is estimated using INSEE-DEPP data, taking account of the total number of students successfully completing the Baccalaureate that year, the rate of further study and national resit rates.[10]

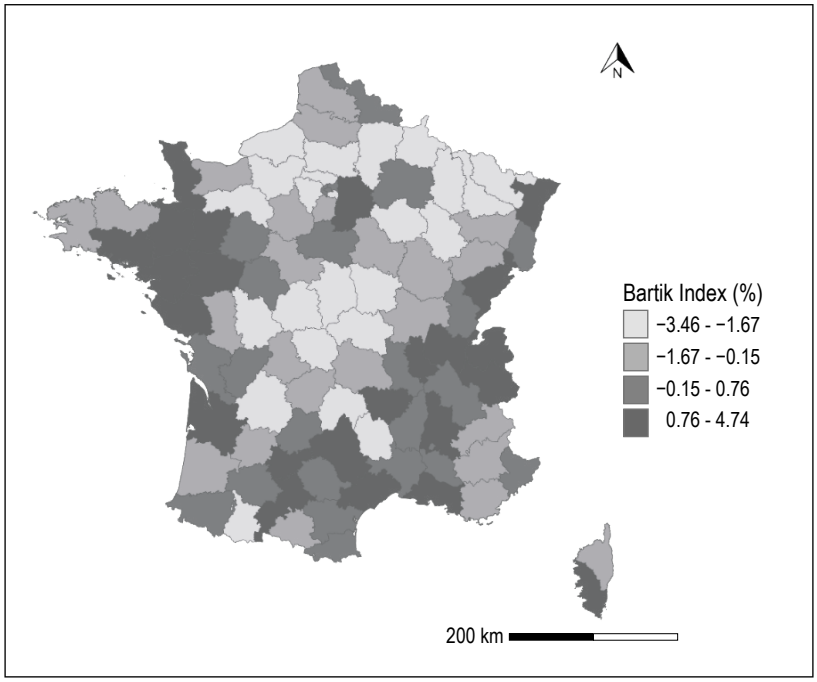
3. Descriptive Statistics

3.1. Mobility, Socio-Demographic Characteristics and Territorial Origin

Table 1 shows the geographic mobility of the individuals in our sample, with reference to their personal characteristics (gender, level of education) and their social and territorial background. Women are more mobile than men, particularly

8. Longer reference periods were tested for the robustness analyses, with no substantial impact on the results.
9. See Figure S-I in the Online Appendix for the spread of the index with regard to year of Baccalaureate (link at end of this article).
10. The number of people entering higher education for the first time was estimated using MESR data, correcting the total figure to remove students resitting their first year and mature students returning to education.

Figure II – **Bartik index at departmental level (mainland France and Corsica) for the period preceding entry into the labour market (2014-2017)**



Reading note: *Départements* are divided into 4 quartiles on the basis of their Bartik index for employment. For the quartile of *départements* with the lowest scores (the lightest colour), the Bartik index ranges from −3.46% to −1.67%.
Field: Population in employment in 2014 or 2017.
Source: French Labour Force Surveys 2014 and 2017, INSEE, authors' calculations.

with regards to student mobility and double mobility (student and job), while men are more likely to move in pursuit of their first job (job mobility only). Mobility rates rise considerably in line with level of academic qualification, corroborating the results reported by Faggian & McCann (2009) and Notowidigdo (2020): 74.9% of individuals successfully completing the Baccalaureate pursue further studies (if they choose to enter higher education) and find their first jobs within their *département* of origin, compared with 58.5% of individuals with 2 or 3 years of post-Baccalaureate studies, and 31.5% with 5 years or more of post-Baccalaureate studies. Mobility behaviour is also influenced by social background and migratory experiences: individuals with at least one parent employed at executive level, and those for whom neither parent is an immigrant, are more mobile than others. Indeed, individuals from less privileged social backgrounds may encounter various obstacles to mobility, such as limited financial resources, lack of information and difficulty accessing professional networks.

With regard to the relationship between mobility and territory of origin, young people from the Greater Paris area are the least mobile group, which would appear to support the hypothesis that living in a densely-populated urban area facilitates access to higher education – with no need to move to another *département* – and, thereafter, access to a more diverse and rewarding array of employment opportunities. As for the local economic conditions, individuals growing up in *départements* with a weak Bartik index (Q1) have high rates of mobility, whereas those from counties with a high Bartik index (Q4) have lower rates of both student and job mobility. This would appear to offer initial corroboration of the idea that mobility decisions are dependent upon the local economic context in one's native region.

Finally, women, the children of executives and individuals with no family history of immigration are more likely to return to their home region after completing their studies.

3.2. Mobility Behaviour: From One Bartik To Another

Do young people choose mobility in order to move to territories where the employment prospects are more promising? In order to answer this question, we constructed an origin-destination matrix for the flows of education and employment mobility – for the sub-population of individuals who had experience of mobility – including the Bartik index for all *départements*

Table 1 – **Mobility, socio-demographic characteristics and territorial origin**

(In %)	Student mobility	Job mobility	No mobility	Student mobility only	Job mobility only	Student and job mobility (excluding returning home)	Student and job mobility including returning home	Proportion of school leavers
Individual characteristics								
Gender								
Women	25.5	32	57.5	10.5	17	10.1	5	52.9
Men	21.3	30.9	60.6	8.4	18.1	8.6	4.3	47.1
Level of qualification								
Baccalaureate	7.7	22.1	74.9	3	17.3	2.5	2.3	43
Bac+2/3	24.3	32.1	58.5	9.4	17.2	9.2	5.8	32.6
Bac+5/8	50.3	47.4	31.5	21.2	18.3	21.8	7.3	24.4
Social background								
At least one parent exec-level professional	33.7	39.5	46.5	14	19.9	14.2	5.4	33.3
No executive parent	18.5	27.5	65.2	7.3	16.3	7	4.3	66.7
At least one immigrant parent	18.9	25.5	66.2	8.3	14.9	7.2	3.4	18.2
No immigrant parent	24.6	32.9	57.4	9.8	18.1	9.9	4.9	81.8
Territorial characteristics								
Place of residence								
Greater Paris	16.4	29.5	63.3	7.2	20.3	6.5	2.7	16
Urban area (excluding Greater Paris)	27.4	33.1	55.3	11.6	17.3	10.8	5	37.7
Peri-urban area (excluding Greater Paris)	21.1	29.7	62.9	7.4	16.1	9	4.6	25.1
Rural area	25	32.5	57.6	9.9	17.4	9.5	5.6	21.2
Bartik index quartiles	Upon completing high school	Upon completing further education						
Q1	26.6	31.1						
Q2	23.2	30.5						
Q3	23.5	31.8						
Q4	22.2	32.1						
Total	23.5	31.5	59	9.5	17.5	9.4	4.7	

Reading note: For individuals with at least one parent employed at executive level, 46.5% did not move at all, 14% moved only for their further studies, 19.9% moved only to take up employment, 14.2% moved for both education and employment (without returning to their *département* of origin) and 5.4% moved for employment, before subsequently moving back to the *département* in which they sat the Baccalaureate.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE). Authors' calculations, with weighting coefficients.

(Table 2). On average, mobile individuals move to more dynamic territories, i.e. in a higher quartile of the Bartik index.[11] The local employment conditions do therefore appear to contribute to the image of certain territories as being more attractive than others (Caro & Roux, 2004; Arnoult, 2020). This phenomenon thus

11. Although employment mobility tends to flow towards more dynamic territories, this trend is less obvious than it is for educational mobility, suggesting that decisions to relocate for professional purposes are informed by a broader array of considerations (opportunities in particular sectors, family obligations, cost of living, etc.).

Table 2 – **Mobility destinations by Bartik index quartiles**

A – Student mobility Destination					
Origin	Q1	Q2	Q3	Q4	Total (weighted)
Q1	19.5	15.6	35.0	29.8	19,993
Q2	16.2	13.1	32.4	38.4	28,890
Q3	8.9	13.5	26.9	50.8	24,316
Q4	11.0	7.5	36.5	45.1	30,311
B – Job mobility Destination					
Origin	Q1	Q2	Q3	Q4	Total (weighted)
Q1	25.6	25.0	22.3	27.1	25,153
Q2	25.7	18.3	24.1	32.0	23,894
Q3	25.4	17.3	24.1	33.3	39,602
Q4	24.1	12.8	26.8	36.3	49,987

Reading note: Following a student mobility, 19.5% of students who sat their Baccalaureate examinations in a *département* in the first quartile of the Bartik index finish their higher education in a *département* belonging to a similar quartile, while 29.8% move to a *département* in the top quartile.
Field: Individuals moving for education (Part A), individuals moving for employment (Part B).
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE). Authors' calculations, with weighting coefficients.

appears to exacerbate territorial inequalities, engendering a form of "brain drain" away from the less dynamic territories.

4. Econometric Estimates

4.1. Econometric Specifications

In order to cover both student mobility and job mobility with a single empirical strategy, we opted for a Linear Probability Model (LPM), a linear regression model where the dependent variable is binary. The parameters are estimated using the ordinary least squares model. The LPM is a simple and intuitive method for estimating the probabilities associated with these two binary variables, along with directly interpretable coefficients.[12] The estimated models can be written as follows:

$$M_{1,di} = \beta_0 + X_i\gamma + V_{di}\delta + u_{1di},$$

$$M_{2,di} = \alpha + Z_i\beta + W_{di}\theta + u_{2di},$$

$M_{1,di}$ and $M_{2,di}$ are, respectively, indicators of student and job mobility for an individual i residing in *département* d. X_i is a set of individual control variables including, among others, gender, age when taking the Baccalaureate examinations, Baccalaureate type and grade, and social background. Z_i contains the same variables, with the exception of Baccalaureate grade, and also includes level and type of further studies. V_{di} (resp. W_{di}) contains key characteristics relating to *département* d, such as the Bartik index in an individual's home *département* in the year they completed their Baccalaureate (resp. upon leaving higher education), their address when completing the Baccalaureate (resp. upon leaving higher education). W_{di} also includes a variable representing the educational opportunities available locally. Random variables u_{1di} and u_{2di} represent error terms.

We calculated three different estimates. The first (1) includes only those variables pertaining to social background and gender. The second (2) also includes the socio-demographic characteristics of individuals. Finally, the third (3) supplements the previous model with territorial characteristics relating to their native *départements*.[13] Table 3 presents the results of these three estimates.

4.2. Results

In these different models, we can see that the Bartik index has a negative influence on student mobility. This effect remains stable when we control for socio-demographic and territorial characteristics. For professional mobility, however, the Bartik index upon leaving higher education has no significant effect in Models (1) and (2), becoming slightly negative and significant above the 10% threshold in Model (3).

12. To guarantee the robustness of our results, we performed the same estimates using a probit model. Calculation of the marginal effects revealed that the results were stable.
13. Descriptive statistics for all of our variables are included in the Appendix: Table A1-1 for the qualitative variables and Table A1-2 for the quantitative variables.

Table 3 – **Determinants of student and job mobility**

	Student mobility			Job mobility		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
Bartik index for *département* in which individuals sat their Bac	−0.039*** (0.005)	−0.023*** (0.004)	−0.023*** (0.004)			
Bartik index for *département* in which individuals finished their studies				0.001 (0.003)	−0.003 (0.003)	−0.006* (0.003)
At least one parent exec-level professional	0.136*** (0.012)	0.066*** (0.012)	0.074*** (0.011)	0.116*** (0.012)	0.047*** (0.011)	0.049*** (0.011)
At least one immigrant parent	−0.036** (0.014)	−0.030** (0.012)	−0.008 (0.011)	−0.063*** (0.012)	−0.063*** (0.012)	−0.062*** (0.013)
Female	0.038*** (0.007)	0.011* (0.007)	0.011 (0.007)	0.014* (0.008)	0.005 (0.008)	0.005 (0.008)
Age when sitting the Baccalaureate		−0.019*** (0.004)	−0.018*** (0.004)			
Age upon completing further education					0.004* (0.003)	0.003 (0.002)
Type of Baccalaureate (*Ref.:* professional Bac):						
General Bac		0.233*** (0.016)	0.230*** (0.016)		0.133*** (0.016)	0.126*** (0.015)
Technological Bac		0.113*** (0.011)	0.110*** (0.011)		0.073*** (0.013)	0.069*** (0.013)
Baccalaureate grade (*Ref.:* simple passing grade):						
Cum laude		0.051*** (0.010)	0.050*** (0.011)			
Magna or summa cum laude		0.162*** (0.014)	0.159*** (0.014)			
Choice of further studies *(Ref.:* no higher education):						
Law-economics-management					0.021 (0.020)	0.02 (0.019)
Social sciences					0.072** (0.035)	0.072** (0.034)
Science					0.050*** (0.017)	0.051*** (0.017)
Health					0.037* (0.022)	0.040* (0.022)
Literature					0.003 (0.032)	0.003 (0.031)
Qualification obtained (*Ref.:* Baccalaureate only)						
Bac+2 years					0.035*** (0.013)	0.034** (0.013)
Bac+3/4 years					0.071*** (0.019)	0.073*** (0.019)
Bac+5 years					0.147*** (0.026)	0.149*** (0.025)
Bac+8 years					0.240*** (0.066)	0.238*** (0.065)
Characteristics of territory of origin						
Educational opportunities			−0.044*** (0.016)			
Category of settlement (*Ref.:* Residing in an urban area outside Greater Paris (when sitting Bac or completing higher education)):						
Residing in a rural settlement when sitting the Bac			−0.022* (0.012)			

➔

Table 3 – *(contd.)*

	Student mobility			Job mobility		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
Residing in a rural settlement when finishing higher education						−0.089*** (0.015)
Residing in Greater Paris when sitting the Bac			−0.119*** (0.025)			
Residing in Greater Paris when finishing higher education						−0.070*** (0.016)
Residing in a peri-urban area outside Greater Paris when sitting the Bac			−0.064*** (0.011)			
Residing in a peri-urban area outside Greater Paris when finishing higher education						−0.097*** (0.011)
Constant	0.109*** (0.012)	0.324*** (0.084)	0.378*** (0.082)	0.280*** (0.011)	0.035 (0.059)	0.114* (0.057)
Observations	15,519	15,519	15,519	15,519	15,519	15,519
R^2	0.070	0.143	0.153	0.018	0.068	0.077

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard deviation values shown in parentheses.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE), authors' calculations.

These results suggest that local economic conditions primarily influence mobility decisions pertaining to place of study: growing up in a *département* with a dynamic job market reduces the likelihood of leaving home to pursue further studies elsewhere. The lack of a robust effect on employment mobility may be explained by the fact that choosing where to live for career reasons is a complex decision not solely determined by the local economic conditions.

The estimated effects of individual characteristics confirm the findings presented in the existing literature on this subject (Gobillon *et al.*, 2007; Lemistre & Moreau, 2009; Bernela & Bonnal, 2022). Children of executive-level professionals are significantly more likely to move for both education and employment, and the effect is particularly evident for educational mobility. The scale of these effects remains substantial even when we factor in all of the control variables. Children of immigrants meanwhile, appear to have lower rates of student mobility in Models (1) and (2), but this effect becomes non-significant in Model (3) when we factor in the controls, suggesting that this reduced mobility may be partly attributed to the fact that the immigrant population is more geographically concentrated in the Greater Paris region, where the depth and breadth of educational options mean that there is less need for mobility. As for mobility to enter employment, the negative impact of being a child of immigrants is found across all three models. The impact of gender is more mixed: women are slightly more likely to move for further education in model (1), but this effect dissipates considerably and becomes non-significant when we control for all other characteristics. As for employment mobility, the effect is weak and becomes non-significant when we control for socio-demographic and territorial characteristics.

With regard to the nature of individuals' academic qualifications, those with general and, to a lesser extent, technological baccalaureate certificates are more likely to move than their counterparts with professional (vocational) baccalaureates, especially when it comes to moving to pursue further studies. The grades obtained in the baccalaureate examinations also have consequences for educational mobility, with better grades opening up access to more selective, more geographically concentrated courses of higher education. The higher the final qualification obtained, the more likely individuals are to move to take up their first professional post, confirming the established correlation between level of qualification and propensity for migration.

The characteristics of individuals' territory of origin have a strong on their mobility decisions. The smaller the range of educational opportunities, the greater the probability of educational mobility, confirming the hypothesis that a scarcity of opportunities at local level makes mobility indispensable (Dupray, 2023). Living in the Greater Paris region drastically reduces both types of mobility, compared with other urban areas outside Paris. Rural and peri-urban

zones also have lower rates of mobility, particularly when it comes to employment mobility.

In the remainder of this section, we examine the variability of these results with reference to the gender and social background of individuals (Tables 4, 5 and 6). Full estimates for each sub-group are available in the Online Appendix.

Gender analysis (Table 4) shows that the impact of the Bartik index on student mobility for men and women is comparable to the impact on the population as a whole, which is to say negative and significant. The same goes for employment mobility, where the results for both groups are essentially the same. The Bartik index upon leaving education has no significant effect in Models (1) and (2), and is slightly negative and marginally significant (10% threshold) for men (but not women) in the most comprehensive specification (Model 3). As for social background, children of executive-level professionals have higher rates of both student and job mobility, an effect which is particularly evident for women. Children of immigrants presented mixed results: among women, the negative effect on educational mobility dissipates in Model (3) but remains significant (at the 10%

Table 4 – **Determinants of student and job mobility – A gender-based analysis**

	Student mobility			Job mobility		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
	Women (N = 7,400)					
Individual characteristics						
Social background						
At least one parent exec-level professional	0.158***	0.080***	0.089***	0.122***	0.051***	0.052***
	(0.016)	(0.017)	(0.015)	(0.016)	(0.016)	(0.016)
At least one immigrant parent	−0.050***	−0.043***	−0.021*	−0.070***	−0.071***	−0.072***
	(0.016)	(0.014)	(0.012)	(0.014)	(0.014)	(0.015)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.039***	−0.024***	−0.023***			
	(0.005)	(0.004)	(0.004)			
Bartik index for *département* in which individuals finished their studies				0.001	−0.003	−0.006*
				(0.003)	(0.003)	(0.003)
Other territorial characteristics	No	No	Yes	No	No	Yes
	Men (N = 8,119)					
Individual characteristics						
Social background						
At least one parent exec-level professional	0.113***	0.051***	0.057***	0.043***	0.110***	0.045***
	(0.014)	(0.014)	(0.013)	(0.016)	(0.016)	(0.015)
At least one immigrant parent	−0.021	−0.016	0.005	−0.054***	−0.055***	−0.049**
	(0.018)	(0.017)	(0.018)	(0.018)	(0.018)	(0.020)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.040***	−0.024***	−0.023***			
	(0.006)	(0.005)	(0.004)			
Bartik index for *département* in which individuals finished their studies				−0.003	0.001	−0.007
				(0.005)	(0.005)	(0.005)
Other territorial characteristics	No	No	Yes	No	No	Yes

Note: The "other individual characteristics" are age and type of Baccalaureate, plus grade at Baccalaureate for education mobility and level and subject of higher education qualifications for employment mobility. "Other territorial characteristics" are the range of educational opportunities and the type of territory in which individuals reside when taking the Bac (for student mobility), and type of territory of residence upon completing higher education (for job mobility). *** p<0.01, ** p<0.05, * p<0.1. Robust standard deviation values shown in parentheses.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE), authors' calculations.

threshold), whereas the effect on employment mobility remains stable even when we add in the control variables. For men, being the son of immigrant does not significantly affect student mobility in Models (2) and (3), but significantly reduces employment mobility in all three models.

The socio-professional category of individuals' parents (Table 5) only appears to have an influence on job mobility. For children of executives, the Bartik index has a negative, significant impact on job mobility. For individuals whose parents are not executives, however, the Bartik index has no significant effect on employment mobility in any of our models. The aggregate effect, weak but marginally significant, thus appears to be primarily driven by the children of executive-level professionals.

Analysing the impact of immigration background (Table 6) also reveals contrasting dynamics. For children of immigrants, the Bartik index has a negative effect on educational mobility but no significant effect on employment mobility. These results are very similar to those for individuals with no family history of immigration, with a negative impact on educational mobility and, at most, a faintly negative, marginally significant effect on job mobility. Having an executive as a parent substantially increases one's propensity for both types of mobility, in both groups, and this effect is particularly clear among the children of immigrants.

Table 5 – **Determinants of student and job mobility – An analysis by social background**

	Student mobility			Job mobility		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
	At least one parent exec-level professional (N = 5,259)					
Individual characteristics						
Social background						
At least one immigrant parent	−0.005 (0.021)	−0.010 (0.021)	0.012 (0.021)	−0.039* (0.021)	−0.044** (0.021)	−0.038* (0.022)
Female	0.068*** (0.015)	0.027* (0.014)	0.028** (0.014)	0.022 (0.017)	0.009 (0.017)	0.013 (0.017)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.039*** (0.009)	−0.023*** (0.007)	−0.025*** (0.005)			
Bartik index for *département* in which individuals finished their studies				−0.006 (0.004)	−0.008* (0.004)	−0.014*** (0.004)
Other territorial characteristics	No	No	Yes	No	No	Yes
	No executive parent (N = 10,260)					
Individual characteristics						
Social background						
At least one immigrant parent	−0.048*** (0.014)	−0.040*** (0.012)	−0.024** (0.011)	−0.072*** (0.013)	−0.070*** (0.013)	−0.074*** (0.014)
Female	0.022** (0.009)	0.001 (0.008)	0.001 (0.008)	0.01 (0.010)	0 (0.010)	−0.001 (0.010)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.039*** (0.004)	−0.024*** (0.003)	−0.023*** (0.003)			
Bartik index for *département* in which individuals finished their studies				0.004 (0.004)	−0.001 (0.004)	−0.002 (0.004)
Other territorial characteristics	No	No	Yes	No	No	Yes

Note: See Table 4.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE), authors' calculations.

Table 6 – **Determinants of student and job mobility – An analysis by migratory background**

	Student mobility			Job mobility		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
	At least one immigrant parent (N = 2,744)					
Individual characteristics						
Social background						
At least one parent exec-level professional	0.176***	0.119***	0.117***	0.145***	0.087***	0.087***
	(0.021)	(0.023)	(0.024)	(0.023)	(0.023)	(0.023)
Female	0.010	−0.005	−0.004	0.001	−0.013	−0.013
	(0.018)	(0.017)	(0.017)	(0.017)	(0.019)	(0.020)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.036***	0.026***	0.026***			
	(0.006)	(0.005)	(0.005)			
Bartik index for *département* in which individuals finished their studies				0.002	0.002	0.001
				(0.005)	(0.005)	(0.005)
Other territorial characteristics	No	No	Yes	No	No	Yes
	No immigrant parent (N = 12,775)					
Individual characteristics						
Social background						
At least one parent exec-level professional	0.129***	0.057***	0.067***	0.111***	0.040***	0.041***
	(0.013)	(0.013)	(0.011)	(0.012)	(0.012)	(0.012)
Female	0.044***	0.015**	0.014*	0.017*	0.009	0.009
	(0.008)	(0.007)	(0.008)	(0.009)	(0.009)	(0.010)
Other individual characteristics	No	Yes	Yes	No	Yes	Yes
Territorial characteristics						
Territorial origin						
Bartik index for *département* in which individuals sat their Bac	−0.040***	−0.023***	−0.022***			
	(0.005)	(0.004)	(0.004)			
Bartik index for *département* in which individuals finished their studies				0.000	−0.004	−0.007*
				(0.004)	(0.004)	(0.004)
Other territorial characteristics	No	No	Yes	No	No	Yes

Note: See Table 4.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys 2005-2017 (INSEE), authors' calculations.

These results suggest that, when entering the labour market for the first time, the impact of local economic dynamics varies depending on one's social background, implicating different mechanisms in terms of access to information, contacts and economic resources. These results highlight the fact that individuals are not equally capable of transforming their educational capital into professional prospects, and these inequalities may stem from insufficient knowledge of how the labour market works, as much as the ability to mobilise resources in order to break into that market. For both educational and employment mobility, higher social status tends to attenuate the influence of immigration history, suggesting that immigration is not uniformly an obstacle to mobility, but rather a factor which interacts with other social background parameters to influence inequalities in career trajectories.

To test the robustness of our results in light of the territorial loyalties of young people (i.e. their attachment to their home département), a dimension absent from our principal analysis, we re-estimated the employment mobility model using a narrower definition of employment mobility, considering those individuals who had returned to the *département* where they sat their Baccalaureate within three years of leaving higher education as being immobile. This allows us to control for the influence of individuals' attachment to their native territories on their mobility decisions, independently of local economic factors.

The results show that the effect of the Bartik index on employment mobility is increased (see Table A1-3 in the Appendix). Whereas this effect is insignificant or only marginally significant when we include all forms of employment mobility, it can be more precisely estimated and becomes significant in Model (2) when we exclude return mobility. The respective influences of the other determinants remain comparable: children of executives have a significantly higher probability of moving to take up a job, excluding mobility which constitutes moving back home, while children of immigrants have a smaller probability.

This analysis suggests that the inclusion of return mobility in our principal analysis tends to attenuate the influence of local economic conditions on employment mobility decisions. When we exclude instances of mobility which might potentially be attributed to territorial attachment, the "pure" economic effect of the Bartik index can be seen more clearly, reinforcing our conclusions as to the important influence of local economic conditions on mobility decisions.

* *
*

With this research we sought to identify the impact of local economic circumstances and social background on the mobility decisions of school leavers. The originality of this study resides in its use of a Bartik index to measure jolts in local conditions involving demand for labour, while also controlling for two other local parameters – availability of educational options, and category of urban settlement – as well as the characteristics specific to individuals.

Our results show that more positive economic conditions have an inhibiting effect on educational mobility, but little or no effect on mobility to enter employment. Nevertheless, the impact on employment mobility is significant, albeit more modest in scale, when we discount instances of mobility which actually consist of graduates returning home to the *département* in which they sat their Baccalaureate.

Living in the Greater Paris region, or in a peri-urban area (excluding Paris) has a significant, negative influence on both categories of mobility, compared with young people growing up in urban areas (excluding Paris). Similarly, individuals growing up in a *département* with a strong range of educational options are less likely to move away after the Baccalaureate. Moreover, children of executives are more mobile than others, and children of immigrants are less mobile.

Analyses incorporating gender, social background and immigration history serve to corroborate and expand upon these results. The impact of the local economic conditions on educational mobility is the same for all groups. As for employment mobility, the influence of local economic circumstances may vary from one group to the next: the effect is negative and significant for children of executives, but there does not appear to be any effect for individuals whose parents are not executives. No effect was observed for children of immigrants, while a small and marginally significant effect was observed for individuals with no immigrant parents. There was, however, no detectable difference between men and women.

Our results show that local economic circumstances serve to reinforce the uneven distribution of the most qualified graduates across the country as a whole. They should prompt us to consider potential stabilisation policies which would boost the availability of education and employment opportunities in those *départements* where the economic conditions are currently downgraded, thus avoiding the risk of exacerbating territorial inequalities. Finally, at a more general level, the fact that children of executive-level professionals are more mobile, and children of immigrants less so, should be a matter of concern for government. These differences could have the effect of increasing intergenerational inequalities, since the most affluent population groups are the most inclined to adapt their mobility decisions in response to local economic conditions. □

Link to the Online Appendix:
https://www.insee.fr/en/statistiques/fichier/8743919/ES548_Bernela-et-al_Online-Appendix.pdf

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APPENDIX

TABLES AND FIGURES

Table A1-1 – **Descriptive statistics for qualitative variables**

Variables	%
Sutdent mobility	23.5
Job mobility	31.5
Territorial characteristics	
Residing in a rural settlement when sitting the Bac	21.2
Residing in the Greater Paris region when sitting the Bac	16
Residing in an urban area outside Greater Paris when sitting the Bac	37.7
Residing in a peri-urban area outside Greater Paris when sitting the Bac	25.1
Residing in a rural settlement when finishing higher education	14.8
Residing in Greater Paris when finishing higher education	19.2
Residing in an urban area outside Greater Paris when finishing higher education	44.2
Residing in a peri-urban area outside Greater Paris when finishing higher education	21.8
Individual characteristics	
Gender	
Women	52.9
Social background	
At least one parent exec-level professional	33.3
At least one immigrant parent	18.2
Baccalaureate grade	
No special grade (simple pass)	47.8
Cum laude	32.9
Magna or summa cum laude	19.3
Type of Baccalaureate	
Professional Bac	27.4
General Bac	51
Technological Bac	21.6
Level of qualification	
Baccalaureate	43
Bac+2	19.6
Bac+3/4	13
Bac+5	23.9
Bac+8	0.5
Field of study	
Literature	8
Law-economics-management	40.3
Social sciences	1.9
Science	34.2
Health	6.4

Note: Our sample contains 15,519 observations, representing a total cohort of 439,732 individuals after weighting.
Source: Generation 2017 survey (Céreq), authors' calculations using weighting coefficients.

➔

Table A1-2 – **Descriptive statistics for quantitative variables**

Variables	Mean	Standard deviation	Minimum	Maximum
Territorial characteristics				
Territorial origin				
Bartik index for *département* in which individuals sat their Bac	−1.73	2.1	−8.01	4.74
Bartik index for *département* in which individuals finished their studies	0.43	1.91	−3.46	4.74
Other characteristics of *département* of origin				
Educational opportunities	0.78	0.23	0.53	2.37
Individual characteristics				
Age when sitting the Baccalaureate	18.47	0.91	11	24
Age upon completing further education	24.87	2.41	15	36

Note: Our sample contains 15,519 observations, representing a total cohort of 439,732 individuals after weighting.
Source: Generation 2017 survey (Céreq), authors' calculations using weighting coefficients.

Table A1-3 – **Determinants of job mobility (excluding return mobility)**

		Job mobility	
Variables	(1)	(2)	(3)
Bartik index for département in which individuals finished their studies	−0.004	−0.007***	−0.009***
	(0.003)	(0.003)	(0.003)
At least one parent exec-level professional	0.106***	0.051***	0.052***
	(0.012)	(0.011)	(0.011)
At least one immigrant parent	−0.049***	−0.048***	−0.045***
	(0.011)	(0.011)	(0.013)
Female	0.007	0.001	0.001
	(0.007)	(0.008)	(0.008)
Age upon completing further education		0.000	−0.001
		(0.003)	(0.003)
Type of Baccalaureate (*Ref.:* professional Bac):			
General Bac		0.109***	0.106***
		(0.013)	(0.013)
Technological Bac		0.053***	0.052***
		(0.012)	(0.012)
Choice of further studies (*Ref.:* no higher education):			
Law-economics-management		0.016	0.017
		(0.018)	(0.018)
Social sciences		0.100**	0.100**
		(0.038)	(0.038)
Science		0.038**	0.039**
		(0.017)	(0.017)
Health		0.026	0.028
		(0.023)	(0.023)
Literature		−0.019	−0.018
		(0.027)	(0.027)
Qualification obtained (*Ref.:* Baccalaureate only)			
Bac+2 years		0.021*	0.020
		(0.012)	(0.012)
Bac+3/4 years		0.056***	0.056***
		(0.019)	(0.019)
Bac+5 years		0.130***	0.131***
		(0.025)	(0.024)

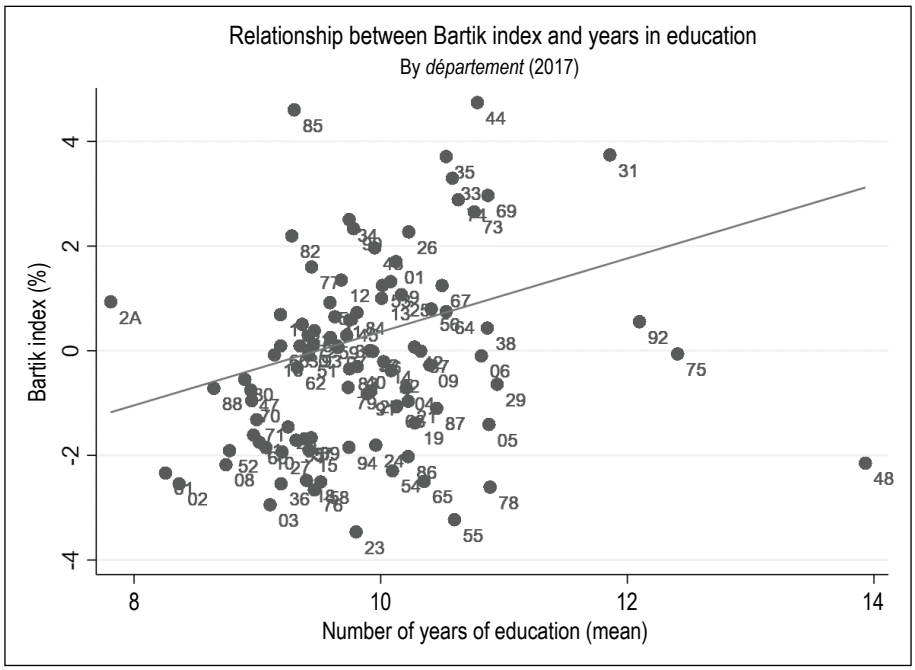
➔

Table A1-3 – *(contd.)*

		Job mobility	
Variables	(1)	(2)	(3)
Bac+8 years		0.252***	0.250***
		(0.060)	(0.060)
Category of settlement (*Ref.:* Residing in an urban area outside Greater Paris (when sitting Bac or completing higher education)):			
Residing in a rural settlement when sitting the Bac			−0.031**
			(0.014)
Residing in a peri-urban area outside Greater Paris when sitting the Bac			−0.039*
			(0.021)
Residing in a peri-urban area outside Greater Paris when finishing higher education			−0.051***
			(0.012)
Constant	0.239***	0.136**	0.167***
	(0.009)	(0.060)	(0.060)
Observations	15,519	15,519	15,519
R^2	0.015	0.052	0.055

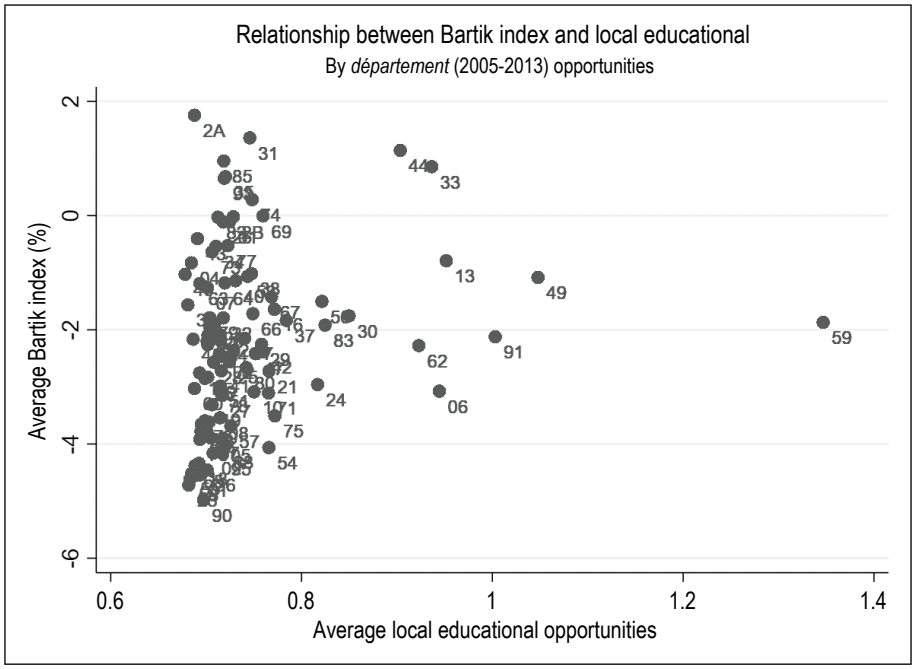
Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard deviation values shown in parentheses.
Source: Generation 2017 survey (Céreq) and French Labour Force Surveys (INSEE), authors' calculations.

Figure A1-I – **Relationship between Bartik index and number of years in education, by *département***



Note: Number of years of education is constructed on the basis of the highest qualification declared in the 2017 Employment Survey, limited to the population in salaried employment. Each qualification is associated with a theoretical number of years spent in education since primary school (for example: 5 years for the CEP, 9 years for the Brevet, 12 years for the Baccalaureate, 16 years for a Master's degree, 19 years for a doctorate). We then calculate the weighted departmental average, which reflects the average level of education of employees in each *département*. The x axis indicates the number of years in education, while the y axis represents the Bartik index. We observed a weak positive correlation between the Bartik index and level of education: Bartik = −6.66 + 0.70 × years in education (limited significance, p = 0.063, standard error values clustered for *département* of final graduation).
Source: French Labour Force Surveys, INSEE, and authors' calculations.

Figure A1-II – **Relationship between Bartik index and range of educational opportunities, by *département***



Note: Each point represents a French *département*. The x axis indicates represents the average educational offering in the years 2008-2016, while the y axis represents the average Bartik index. We did not observe any correlation between the average Bartik index and the average educational offering in this period: Bartik = −2.94 + 1.56 × educational opportunities (not significant, p = 0.268, standard error values clustered for *département* of Baccalaureate graduation).
Source: MESR/INSEE-DEPP/INSEE Labour Force Survey and authors' calculations.

Noble Lineage and Inequalities in Access to Elite Education

Stéphane Benveniste*

Abstract – This paper examines the overrepresentation of students with aristocratic ancestry in elite higher education. It relies on a sample of 269,917 students from ten leading French *grandes écoles* between 1911 and 2015 and uses surname-based indicators of nobility. Individuals with aristocratic ancestry are between six and nine times more likely to enrol in one of these ten *grandes écoles* than the rest of the population, compared to eleven to fifteen times a century ago. While historically concentrated at Sciences Po Paris, their presence has become more evenly distributed across top-tier institutions, with business schools now showing the highest levels of overrepresentation. The analysis also shows that noble men are more overrepresented than noble women in these top-tier institutions, although this gap has narrowed. These results underscore that beyond the abolition of legal privileges, historical hierarchies persist. Future research could distinguish the extent to which this persistence may reflect the transmission of social, educational, cultural, or economic capital.

JEL: I23, I24, N34
Keywords: elite higher education, grandes écoles, nobility and aristocracy, history of inequality

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The French Revolution of 1789 abolished aristocratic privileges, including the formal prerogatives the nobility held in accessing universities under the *Ancien Régime* (French for "Old Regime," the prerevolutionary political and social system). In a radical break, these universities were dismantled in 1793, and several *grandes écoles* (elite French higher education institutions) were subsequently established to train the nation's future leaders. Universities were later reintroduced to provide broader access to higher education, but their coexistence with the highly selective grandes écoles has sustained a durable dual higher education system. Within this system, competitive entrance examinations for the grandes écoles, introduced at the end of the 18th century, became the cornerstone of selection and have remained largely unchanged ever since. Although designed to promote meritocratic access to elite positions, the persistence of this dual system raises the question of whether access to the most prestigious grandes écoles has truly been democratized, or whether historical hierarchies continue to shape educational opportunities. While aristocratic status no longer confers legal privileges, it is still recognized and officially registered by the French administration. Moreover, families from the former nobility continue to wield influence in various sectors of society (Harsanyi, 2005).

The expansion of access to higher education has not altered the role of elite institutions in social stratification. Their prestigious diplomas serve as entry points to dominant social and economic positions in the labour market (Hoekstra, 2009; Anelli, 2020; Bataille & Falcon, 2022), yet admissions are marked by substantial inequalities related to social and economic origin (Clark & Cummins, 2014; Chetty *et al.*, 2020). In France, the grandes écoles have been shown to play a central role in elite reproduction. Covering the periods 1966-1969 and 1984-1985, Bourdieu (1989) highlighted the disparities in economic and cultural capital among students at the most selective grandes écoles, at other grandes écoles, and at universities. Subsequent empirical studies have extended this analysis over multiple decades in the 20th century: Euriat & Thélot (1995) and Albouy & Wanecq (2003) examined admissions to 4 and 19 elite grandes écoles, respectively, while Falcon & Bataille (2018) used a broader sample drawn from the French Labour Force Survey. All three studies found substantial, though declining, social inequalities in access to these institutions. More recent research based on administrative data from 2006-2017 (Bonneau *et al.*, 2021), as well as an intergenerational analysis covering five generations of grandes écoles students (Benveniste, 2023), confirms the persistence of strong inequalities in access. While these inequalities have been well documented with respect to parental occupation and education, those based on aristocratic lineage have received little attention.

In *The State Nobility: Elite Schools in the Field of Power*, Bourdieu (1989) draws an explicit parallel between the modern elite and the nobility of the Ancien Régime and argues that the grandes écoles function as a new mechanism for legitimizing power.[1] Beyond this theoretical parallel, a body of research has examined how former European aristocracies have navigated major social and economic transformations. These studies show that their descendants continue to be overrepresented among the elites (Kuiper *et al.*, 2015). Although noble families partially lost their economic dominance, they remained disproportionately represented among the largest inheritances in Paris during the early 20th century (Piketty, 2020). In the Netherlands, Dronkers (2003) explained that a high degree of homogamy helped preserve the prominence of noble families, reflected in their continued access to elite positions in business and politics. In France, descendants of noble families have remained overrepresented in administrative, political, and economic elites (Birnbaum *et al.*, 1978), as well as in prestigious schools and professions (Coulmont, 2019). Aristocratic families also strategically concentrated in specific schools that fostered exclusive social circles and reinforced homogamy (de Saint-Martin, 1993). This contributed to consolidating a strong noble identity and a sustained collective belief in the continued existence of the aristocracy (Harsanyi, 2005), a perception further legitimized by its ongoing official recognition by the French State.

Public fascination with noble tradition and heritage persists in both academic research and cultural representations, such as the television series *Downton Abbey*, and is embedded in classical literature, for example in the work of Marcel Proust. This reflects a lasting curiosity

1. As Bourdieu puts it: "The gist of the role of the grandes écoles amounts to producing a nobility […]. In the manner of the dubbing of knights, according to Marc Bloch (1939), this operation of ordination (in both the mathematical and religious sense) transforms scalar differences into a series of discontinuous differences […]. The grandes écoles produce individuals who are perceived to be—and who perceive themselves to be—of a different kind, of a 'superior essence,' as we say in French, that is, separate in absolute terms, in terms of ascription: no matter what they do, what they do is different" (Bourdieu & Wacquant, 1993).

and interest in the resilience and longevity of historical elites. Aristocratic identity is indeed deeply rooted in heredity and marked by the transmission of ancestral memory, shaped by glorified narratives of lineage. This heritage imposes ideals of exemplarity and obligation (*noblesse oblige*), fostering both a pursuit of excellence and a fear of decline (de Saint-Martin, 1993; Mension-Rigau, 2015). Yet this aspiration for continuity and immutability contrasts with modern egalitarian ideals. This tension raises a key question: Does the enduring presence of noble families in elite spheres also extend to higher education and its most prestigious credentials?

This article examines the evolution of the overrepresentation of aristocrats in France's most prestigious grandes écoles, using two data sources. The first is a self-constructed dataset of 269,917 elite students, providing exhaustive coverage of individuals admitted between 1911 and 2015 to ten of the most selective grandes écoles, representing 0.39% of the French population over the period.[2] The second source is an administrative one, which reports the number of births associated with each surname in France across different cohorts. The combination of the two sources enables the calculation of admission rates to elite graduate schools, distinguishing between individuals from former noble families and the rest of the population.[3] Two surname-based indicators of noble lineage are used: (1) surnames containing a particle and (2) surnames belonging to a list of family names registered with the Association d'entraide de la Noblesse Française (ANF; Association for Mutual Assistance of the French Nobility), an organization dedicated to verifying noble lineage and fostering aristocratic networks.

The findings reveal a strong, but declining, overrepresentation of aristocratic descendants in elite education. Members of ANF-registered families born between 1891 and 1915 were, on average, 15 times more likely than the rest of the population to gain admission to top-tier grandes écoles. Their overrepresentation gradually declined to 14 times (1916-1940), then 12 (1941-1965), and eventually to 9 (1966-1990), therefore remaining substantial two centuries after the French Revolution. While they were the most overrepresented at Sciences Po Paris in the early 20th century (up to fifty times), their highest presence is now observed in business schools (up to twelve times). Moreover, aristocratic families appear to prioritize sons over daughters, as noble men are more overrepresented than women in the ten grandes écoles of our study.

The remainder of the paper is organized as follows. Section 1 provides historical background on the grandes écoles and the French nobility. Section 2 describes the data. Section 3 details the empirical strategy, explaining the use of surname-based indicators and the relative admission rate as a measure of inequality. Section 4 presents and discusses the results, then we conclude.

1. Institutional Background

1.1. The French Grandes Écoles

Proclaiming the equality of rights, the French Revolution of 1789 overthrew a society in which social positions were largely determined by birth. Closely tied to religious congregations (through estate ownership) and the nobility, who enjoyed legal prerogatives in admissions, universities of the Ancien Régime were dismantled by the Convention nationale in 1793. They were replaced by a new system of elite educational institutions: the grandes écoles. While some of these elite graduate schools – such as the École nationale des ponts et chaussées and École des Mines – predated the Revolution, 1794 marked the foundation of two emblematic schools: École Polytechnique and École Normale Supérieure. In its first year, École Polytechnique introduced a competitive entrance examination system known as the *concours*, which was subsequently widely adopted across the grandes écoles and remains their hallmark (Belhoste, 2002).

Admission to these institutions requires an intensive preparatory program,[4] followed by

2. A detailed description of the dataset is provided in Section 2. While France has approximately 500 grandes écoles, this study focuses on a select group of 10 institutions that have historically played a central role in shaping the French elite: École Polytechnique, ENA, ENS Ulm, ESCP, ESPCI Paris, ESSEC, Mines Paris, Ponts et Chaussées, Sciences Po Paris, and Télécom Paris. As noted in Section 2, the baseline analysis excludes Sciences Po, which alone accounts for half of all students in the sample.

3. Like de Saint-Martin (1993) and Coulmont (2019), this study uses surnames as indicators of aristocratic lineage. Their work provided insights into the presence of noble descendants in grandes écoles by calculating their share within the student body. The present work extends this approach by explicitly accounting for the demographic weight of the nobility in the national population, allowing to compute admission rates for individuals from former noble families relative to those of the rest of the population.

4. At the end of high school, French students take the baccalauréat*, the national secondary school diploma that determines access to post-secondary education. Post-secondary education is traditionally divided between non-selective university tracks and selective tracks. Among the latter, the most prestigious are the* Classes préparatoires aux grandes écoles *(preparatory classes), which prepare students over two to three years for the* concours *(entrance examinations) of the grandes écoles.*

a two-stage concours. The initial anonymous written examinations are followed by oral evaluations for the candidates ranked highest in the first stage. Unlike universities, the grandes écoles admit only a limited number of students through this selection process and are thus selective. Explicitly designed to train the country's future ruling class and specializing in engineering, business, and the humanities, the grandes écoles have long constituted the royal road to high-level administrative, political, and business careers (Suleiman, 1978; Dudouet & Vion, 2024).

Two major structural changes have shaped the French higher education system throughout the 20th century. First, the massification of education has led to a universalization of secondary schooling and a substantial expansion of tertiary education. In contrast, top-tier graduate schools retained their elite status and maintained comparatively strict selectivity (Gurgand & Maurin, 2007). As illustrated in Figure I, the share of the population admitted into the top-tier grandes écoles has increased only slightly, especially when compared to the surge in overall tertiary education enrollment rates and the share of *baccalauréat* holders (see Online Appendix Figure S-I, link of the Online Appendix at the end of the article).

The second major structural transformation of education during the 20th century was the gradual integration of women into higher education, including in the grandes écoles. Historically, these institutions were highly male-dominated, with women almost entirely excluded. The first breakthrough occurred during World War I, when women were admitted to Sciences Po Paris, though under stricter conditions than men. Progress stalled during the interwar period, but the granting of voting rights to women in 1945 coincided with the beginning of a gradual removal of gender barriers in elite education. The École nationale d'administration (ENA) admitted women from its foundation in 1945, but female students remained a tiny minority, rarely exceeding 10% before the 1970s. A decisive shift came in the 1970s, notably when École Polytechnique opened its doors to female students in 1972. It initiated a rapid rise in female representation at business schools and Sciences Po Paris, although progress in engineering schools remained slower. A unique case is the École Normale Supérieure (ENS), which maintained separate schools for men and women until their 1985 merger, a change that sharply reduced the number of women admitted in math-intensive fields (Dousset & Thebault, 2025). Although women now outperform men and are overrepresented in higher education overall, the slow feminization of the French elite graduate schools reflects persistent gender disparities in scientific fields, where women remain significantly underrepresented (Kahn & Ginter, 2017).

1.2. The French Aristocracy

Pierre Bourdieu (1989) famously described the grandes écoles as institutions that do not merely educate but also consecrate their students, drawing a parallel with the dubbing of knights in feudal societies. This process of symbolic elevation echoes the distinction of Ancien Régime aristocrats, who enjoyed legal prerogatives, including privileged access to educational institutions. The very notion of "aristocracy," derived from the Greek *aristos* (excellence) and *kratos* (power), originally referred to government by the most capable rather than to hereditary privilege. In ancient Athens and Rome, aristocratic status was initially linked to intellectual, political, or military merit, but it gradually became entrenched through hereditary transmission. Later European aristocracies, still grounded in landownership and military service, solidified noble identity through stronger hereditary succession and dynastic continuity (Dewald, 1996).

Like in many other societies, the French nobility emerged as a distinct social class during the medieval period (Chaussinand-Nogaret, 1976). The monarchy carefully controlled access to noble status. Unlike the English gentry, which allowed for greater social mobility, the French nobility established strict barriers to entry, though it was not entirely impermeable. Demographic, economic, and political changes created opportunities for both upward and downward mobility over time. The main avenue to noble upward mobility, *anoblissement* (formal ennoblement of commoners), remained rare and required significant wealth or distinguished military or administrative service, as well as royal approval (Chaussinand-Nogaret, 1976; Defauconpret, 1999). Maintaining noble status also required strict adherence to codes of conduct: engaging in activities or professions deemed dishonourable could lead to the loss of noble status (*dérogeance*).

The French nobility was far from homogeneous. A fundamental difference separated the *noblesse d'épée* (nobility of the sword), whose lineage traced back to medieval chivalry and military leadership, from the *noblesse de robe*

(nobility of the robe), which emerged in the 16th and 17th centuries through the venality of offices – namely, the hereditary or financial acquisition of high-ranking legal and administrative roles (Doyle, 1996). Further internal stratifications divided the nobility, due to considerable variation in wealth and political influence. Some families held ducal or princely titles, while others were minor landowners with limited privileges (Defauconpret, 1999). Geographic differences were particularly notable: Parisian aristocrats often held high court positions, whereas provincial nobles typically exercised more modest local authority (Chaussinand-Nogaret, 1976).

Estimating the number of nobles at the outset of the French Revolution is difficult due to the absence of official records, but Chaussinand-Nogaret (1976) suggests a plausible figure of 0.5% of the population, with estimates ranging from 0.3% to 1.2% (Mension-Rigau, 2015). Although wealth varied considerably among noble families, the aristocracy as a whole controlled an estimated 25% of French land before 1789 (Beck, 1981). The Revolution led to the confiscation of some estates, but its primary impact was political rather than economic. Beck (1981) argues that the gradual decline in noble wealth was due less to revolutionary expropriation than to the aristocracy's reluctance to engage with the economic transformations brought by the Industrial Revolution. As industry and commerce became increasingly central to wealth creation, noble families lost prominence in the emerging economic order. While they retained substantial landholdings throughout the 19th century, they could no longer rely solely on rents and gradually entered the workforce, including in sectors once deemed dishonourable.

In the 19th century, successive regimes – the First Empire, the Restoration, and later the Second Empire – briefly reinstated noble titles in an effort to integrate both the traditional aristocracy and newly ennobled military and administrative elites. These titles were purely honorific, and although recognized by the Association d'entraide de la Noblesse Française, their legitimacy as markers of noble status remains contested (Mension-Rigau, 2019). In any case, relatively few such titles were granted, and under Charles X in the 1820s, the traditional aristocracy was deliberately reinstated at the centre of political and social life. As a result, most families of noble origin can trace their aristocratic lineage back to at least the 18th century (de Waresquiel, 2005).

The second half of the 19th century is often portrayed as a rupture, with modernization leading to the decline of the nobility as a new society emerged. However, Mayer (1981) argues that this narrative overlooks important social continuities. He contends that aristocratic families retained substantial political and economic power across Europe during this period, largely unchallenged by the rising bourgeoisie. This persistence, he suggests, was due to the continued dominance of agriculture, which delayed the disruptive effects of industrial capitalism on existing social hierarchies. Nevertheless, he acknowledges that France, having abandoned monarchy earlier than its neighbours, experienced a more pronounced decline in noble influence.[5]

At the beginning of the 20th century, although noble families lost some of their economic dominance, many retained significant real estate holdings and, for example, remained five times overrepresented among the largest Parisian inheritances (Piketty, 2020). The First World War further affected their wealth through destruction and a reshuffling of economic capital, yet these aristocratic families remained among the wealthiest in European societies (Kuiper, 2015). Their overrepresentation in the military came at a demographic cost: 5% to 6% of French noble descendants died in the war, twice the rate of the general population (Mension-Rigau, 2015). As pathways to elite status evolved in the second half of the 20th century, noble families increasingly turned to education. De Saint-Martin (1993) highlights their strategic concentration in a handful of elite educational institutions. Between 1976 and 1985, 19% of pupils at Notre-Dame des Oiseaux, a prestigious Parisian private secondary school, bore aristocratic surnames. In a subsample of 323 individuals listed in the *Who's Who in France*, noble names were also overrepresented in select higher education institutions such as ENA, Sciences Po Paris, military schools, and law faculties (de Saint-Martin, 1993). Coulmont (2019) demonstrates that descendants of the French nobility continue to be numerous in prestigious social positions, drawing on various nominative lists, including those of bishops, parliamentarians, ambassadors, and graduates from prestigious schools. Similar patterns can

5. Noble titles and the possibility of ennoblement persist in several parliamentary monarchies – such as Spain, Belgium, and the United Kingdom – where the sovereign retains the prerogative to grant peerages.

be observed across Europe.[6] Overall, the loss of institutional prerogatives did not put an end to either the sociological significance of the aristocracy or its mystique in the collective imagination. Despite profound social and economic transformations, many noble families adapted to these new societies, preserving their influence well into the 19th, 20th, and 21st centuries.

A crucial way in which aristocratic families have preserved and reinforced their status is through matrimonial strategies (Elias, 1985). Assortative marriages maintain social exclusivity and ensure the intergenerational transmission of noble identity (Wagner, 2008). This highly structured practice has deep historical roots. To counter their decline, noble families also established national organizations to defend their collective interests. In France, the Association d'entraide de la Noblesse Française (ANF), founded in 1932, quickly became a key institution for maintaining elite networks, preserving social capital, and fostering cohesion. As in the Netherlands (Dronkers, 2003), de Saint-Martin (1993) shows that 64% of ANF-registered men married women with noble lineage. This high degree of endogamy reflects a strategic desire to preserve the *family name* across generations (de Saint-Martin, 1993). This contributes to preserving a distinct noble identity and to sustaining the collective perception of an enduring aristocracy (Harsanyi, 2005).

Rooted in the memory of illustrious ancestors – often depicted in portraits displayed in family homes or castles – and of their role in national history, this heritage fosters a sense of exemplarity and a duty to uphold the family name (Mension-Rigau, 2019). It manifests in adherence to traditional customs, the preservation of ancestral values, and the transmission of social rituals, norms, and distinctive cultural practices (Mension-Rigau, 2015, 2019). The French State also contributes to the preservation of this identity through ongoing recognition and protection of noble titles. Once authenticated by the Direction des Affaires civiles et du Sceau (Civil affairs and Seal directorate) of the Ministry of Justice, these titles remain legally attached to surnames and may still appear in official documents and administrative records.

2. Data

This study draws on two main types of data: (1) nominative lists of students from French elite schools and (2) aggregated data providing surname distributions in France by cohort of birth.

The Grandes Écoles Nominative Elite Sample (GENES) is a dataset compiled by the author from lists provided by alumni associations and from archival sources held by the schools and their supervisory bodies. It comprehensively covers students from ten grandes écoles between 1911 and 2015, totalling 287,724 student records corresponding to 269,917 unique individuals. The dataset covers students who effectively enrolled in these institutions, regardless of degree completion; dropout rates in the grandes écoles have historically been extremely low (Suleiman, 1979). Accordingly, references to admission throughout the article refer to effective enrolment rather than to graduation. The ten institutions covered have historically been – and continue to be – among the most prestigious in France, serving as pathways to elite careers in both the public and private sectors (Suleiman, 1978; Dudouet & Vion, 2024). The sample includes École Nationale d'Administration (ENA), founded in 1946 to train senior civil servants; École Normale Supérieure (ENS Ulm), a leading institution for advanced research training in the humanities and sciences; five public engineering schools – ESPCI Paris, École Polytechnique, École des Ponts et Chaussées, Télécom Paris, and Mines Paris; and two business schools – ESSEC and ESCP.[7] Although these schools differ in nature, Bourdieu (1989) describes them as part of an interconnected system of elite education, which justifies their joint analysis in most empirical studies (e.g., Albouy & Wanecq, 2003; Bonneau *et al.*, 2021).

Details on the collection and processing of the GENES dataset are provided in Benveniste (2021). Each observation includes the student's school, its entry year, surname and first names, with gender information available for one third of the sample. For the remaining two thirds, gender was imputed using a gender propensity score derived from national birth records by

6. In Austria and Sweden, aristocratic families gradually shifted from careers in diplomacy and military service to business and finance (Kuiper et al.*, 2015). In the more decentralized context of Switzerland, the importance of patrician families declined throughout the first half of the 20th century, although they retained some influence in specific spheres (Benz* et al.*, 2024). Political shocks further destabilized elite status across Europe. While Russian nobility faced mass executions or expropriation under the Soviet regime, Italian aristocrats navigated the fascist regime with relative success, and Polish noble families maintained their influence by serving in the communist government (Kuiper* et al.*, 2015). In Hungary, World War II and the Nazi occupation severely weakened the nobility's political and economic roles, yet noble descendants remain overrepresented in high-level socio-professional positions (Kézdy, 2019).*

7. The dataset does not include a few other highly selective and prestigious institutions, such as HEC Paris and École Centrale Paris, due to data availability constraints. Aside from these omissions, its coverage closely matches the set of top-tier grandes écoles analysed in previous studies, including Suleiman (1978), Bourdieu (1989), and Bonneau et al. *(2021).*

first name. To improve data accuracy for first and last names, fuzzy matching was applied to correct misspellings and abbreviations sometimes used in school records. This technique computes similarity scores between character strings to identify minor spelling variants. To avoid double-counting, individuals who attended several grandes écoles were identified and consolidated. Birth years were imputed for all individuals based on the age of enrolment of 20 in the grandes écoles.[8] To ensure consistency over time, the analysis focuses on standard curricula, excluding PhDs, MBAs, executive and specialized master programs, as well as international cycles at ENA.

Table 1 presents summary statistics for each school, including coverage years, total number of students, and average annual students. Figure I shows the evolution of the share of the national population enrolled in these elite institutions over time, highlighting notable fluctuations, particularly around wartime periods. After World War I, these shares rose, especially for students from business schools and from Sciences Po Paris. However, the most striking pattern is the relatively slow increase of the proportion of the population enrolled in these institutions, particularly in contrast to the substantial expansion of both secondary and higher education throughout the 20th century (see Online Appendix Figure S-I for a comparison with the share of *baccalauréat* graduates). Given that Sciences Po Paris accounts for nearly half of the students in the GENES dataset, most of the analysis focuses on a baseline sample that excludes it. However, results are also presented separately for Sciences Po, as well as for the full ten-school sample.

The second key data source is the *Fichiers des noms patronymiques de 1891 à 1990* (1999 edition), a file of surnames collected from birth certificates, compiled by the Institut National de la Statistique et des Études Économiques (INSEE; French National Statistical Institute). The dataset reports surname-level birth counts for four 25-year birth cohorts: 1891-1915, 1916-1940, 1941-1965, and 1966-1990. To extend the analysis to 1995, a pseudo-cohort (1971-1995) is constructed by assigning to each surname the same number of births as observed in the 1966-1990 cohort, under the assumption that the surname birth distribution remained unchanged over the five-year extension.

This file of surnames allows us to calculate the proportion in the population of the groups of people with noble and non-noble surnames. Combining it with the nominative school registers makes it possible to estimate, for each birth cohort, the admission rates of each group in the grandes écoles. A key challenge in this long-term analysis is ensuring comparability in estimating population sizes of both nobles and commoners across birth cohorts.

Because birth certificates record only births in France, they exclude foreign-born individuals who migrate to France during childhood, as well as international students enrolling directly from abroad, whose numbers have increased in recent decades. As these groups overwhelmingly bear non-noble surnames, the measurement error in

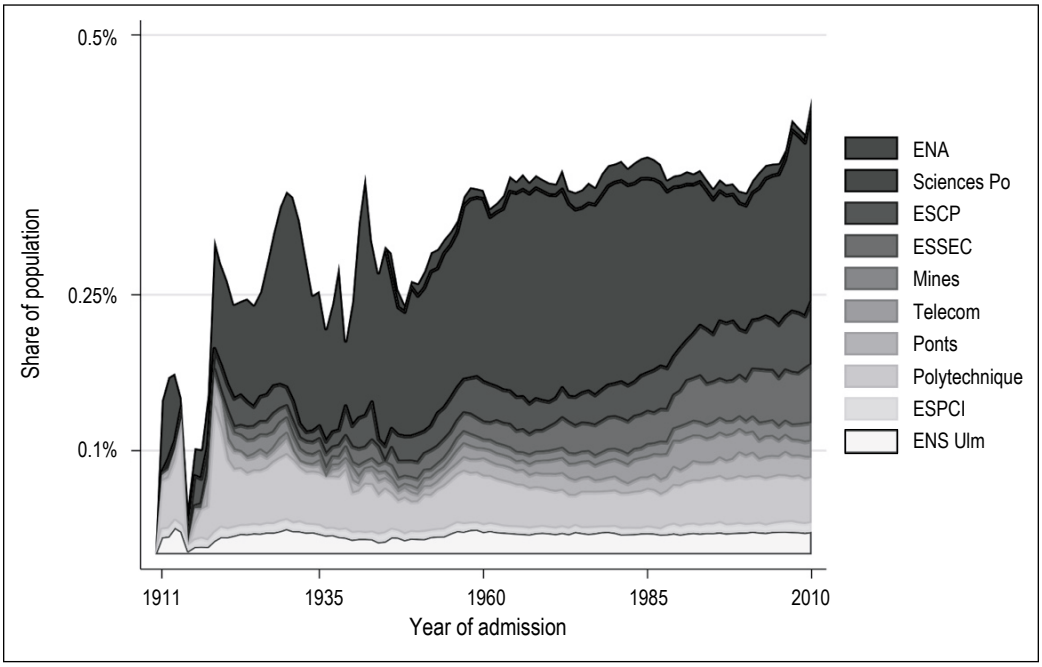
8. For ENA, a higher age of enrolment (26) was used, reflecting the later stage at which students enter this school on average. In most cases, ENA students had previously studied in another school in the sample; their birth year was therefore inferred from the entry year into that earlier institution. When individuals appear in multiple schools, the birth year is inferred from the earliest enrolment observed.

Table 1 – **GENES dataset for 10 prestigious grandes écoles**

Category	Grandes écoles	Data coverage period	Total number of students	Average annual number of students
Administration and research	Sciences Po Paris	1911-2015	145,517	1,399
	ENA	1946-2015	7,714	112
	ENS Ulm	1911-2015	15,219	146
Engineering	ESPCI Paris	1911-2015	5,201	50
	Polytechnique	1911-2013	32,511	319
	Ponts et Chaussées	1911-2014	12,641	120
	Télécom ParisTech	1911-2012	11,765	120
	Mines ParisTech	1921-2012	8,476	91
Business	ESSEC	1911-2010	20,267	199
	ESCP Europe	1911-2011	28,394	278

Source: GENES data (1911-2015).

Figure I – **Share of the French population admitted to 10 elite grandes écoles (1911-2010)**



Note: Only graduates with native surnames, as defined in Section 2, are included. Annual counts are divided by the national birth cohort corresponding to the admission year. Online Appendix Figure S-II shows the raw annual number of enrolees by grande école.
Source: GENES data (1911-2010); *Statistiques de l'état civil* (population records), INSEE.

their births would lead to an undercount of the non-noble population, mechanically inflating non-noble admission rates and biasing comparisons between nobles and non-nobles over time. This bias would therefore tend to understate the overrepresentation of nobles relative to non-nobles.

To address this potential issue and ensure a consistent measure of population sizes of both groups over time, the baseline analysis restricts the sample to a stable set of surnames that were present in France at the start of the 20th century, hereafter referred to as "native" surnames.[9] Consistent with established practice in prior surname-based studies (Dupâquier & Kessler, 1992), this restriction limits distortions caused by missing birth records for foreign-born individuals, who are rarely classified as nobles. A robustness analysis includes all surnames to assess the sensitivity of results to this sample restriction.

The study includes individuals born between 1891 and 1995. Table 2 presents descriptive statistics on births and students at both the nine grandes écoles of the baseline sample and at Sciences Po Paris, which is analysed separately due to its substantial weight. In total, 107,618 Sciences Po students and 110,340 students from the baseline schools have native surnames. Each group represents approximately 0.17% of the native French population over the period.

3. Empirical Strategy

This section describes the surname-based identification of noble lineage and introduces the relative admission rate (RAR) as a measure of inequality in access to the grandes écoles.

3.1. Surnames and the Legacy of History

Surnames offer a unique lens on long-term social mobility, particularly in historical contexts where administrative or survey data are scarce. Surname-based methods have been widely used in intergenerational mobility research (Santavirta & Stuhler, 2024), but they also apply to a broader range of questions.[10] These approaches rely on the premise that surnames act as stable family identifiers and are therefore

9. Following Benveniste (2021), in addition to surnames absent at the beginning of the period we also exclude surnames exhibiting a marked increase in frequency over time. These exclusions are applied to both the birth and student data. Although this procedure primarily targets first-generation migration, surnames already introduced through migration continue to enter the population across successive cohorts. Consequently, restricting the analysis to a stable set of surnames also excludes some second- and later-generation immigrants born in France, who cannot be reliably distinguished from first-generation migrants using surname data alone. Table 2 shows the prevalence of native names in the data.

10. Historians, demographers, and economists have long relied on nominative sources. For example, Galton & Watson (1875) studied surname attrition as a marker of aristocratic decline over a century ago, while Stone (1971) highlighted how such data illuminate the interactions and social networks of historical figures.

Table 2 – **Number of births and grandes écoles students by cohort**

	All cohorts		Cohorts				
	Number of surnames	Total number of births	Births 1891-1915	Births 1916-1940	Births 1941-1965	Births 1966-1990	
All population							
Births	807,229	65,423,121	10,686,923	14,149,274	20,099,847	20,487,077	
Native births	541,426	59,938,195	10,574,454	13,700,315	18,655,322	17,008,104	
Share of native (%)	67	92	99	97	93	83	
Nine baseline grandes écoles							
	Number of surnames	Total number of students	Students cohort 1891-1915	Students cohort 1916-1940	Students cohort 1941-1965	Students cohort 1966-1990	Students pseudo-cohort 1971-1995
Students	63,155	133,363	13,962	20,331	36,287	57,437	53,407
Native students	48,073	110,340	13,291	19,202	31,920	42,438	38,240
Share of native (%)	76	83	95	94	88	74	72
Share of women (%)		20	6	6	18	32	33
Top educ (%)		0.17	0.13	0.14	0.17	0.25	0.22
Sciences Po Paris							
Students	77,496	145,517	14,364	26,273	52,752	45,025	43,346
Native students	49,956	107,618	11,088	21,508	39,993	30,837	28,592
Share of native (%)	64	74	77	82	76	68	66
Share of women (%)		35	6	20	36	51	53
Top educ (%)		0.17	0.10	0.16	0.21	0.18	0.15

Note: The top panel records births; the two lower panels record students from the nine grandes écoles and from Sciences Po Paris. For individuals bearing a native surname, the table also reports the proportion of the total population that enrolled in the nine baseline grandes écoles as well as in Sciences Po Paris (Top educ). Because some individuals attended several grandes écoles, the sum of students from both Sciences Po Paris and at least one of the nine grandes écoles exceeds the total number of unique individuals reported (269,917 overall; 210,438 for native surnames). Besides, some students may appear in both the 1966-1990 cohort and the 1971-1995 pseudo-cohort.
Source: *Fichiers des noms patronymiques de 1891 à 1990 (1999 edition)*, INSEE; GENES data (1911-2015).

not randomly distributed across socioeconomic characteristics. While surnames have no causal effect on admission to elite schools, they encapsulate valuable information about family histories and social backgrounds.

Their usefulness stems from their intergenerational transmission. In France, surnames have been patrilineally inherited since the 12th century, with standardized spelling established by 1870. Although a law adopted in 2003 now allows children to inherit their mother's surname, surnames provide a reliable paternal link across generations for individuals born between 1891 and 1995, which is the focus of this study.[11] One limitation of this approach lies in individuals of mixed noble–commoner ancestry being classified as noble only when their paternal line is noble. This results in a measurement error, albeit one that is likely to be small, given the persistence of high levels of endogamy within the French nobility until the early 1990s (de Saint-Martin, 1993). As discussed in Section 1, noble marriages were carefully managed to preserve family name and status.

This study identifies individuals of noble descent using two complementary approaches. The first method includes all bearers of surnames containing a particle, which is commonly associated with aristocratic lineage.[12] However, while most noble surnames include a particle, not all surnames with a particle correspond to noble lineages. The second method draws on the *Table des familles* compiled by the Association d'entraide de la Noblesse Française (ANF), which maintains a list of authenticated noble families and whose mission is to ensure the "authentication of true nobility." As detailed below, this list covers a substantial share of the French nobility and provides a more precise identification of noble lineage.

The ANF list poses a challenge in that some registered surnames are also widespread in the general population, because only certain family

11. Law No. 2003-516 of 18 June 2003 on the transmission of surnames.
12. This includes all surnames containing the particles d', de, du, *or* des.

branches bearing these names are of aristocratic origin. Such surnames would not precisely identify noble lineage. For example, listed surnames such as Mercier, Fabre, Leblanc, Michaud, Lejeune, and Duhamel together account for more than 50,000 births per 25-year cohort, only a fraction of which have a noble lineage. Because of their large demographic weight, retaining these surnames would contribute to considering a large number of people who are not of aristocratic origin as being so. To limit this dilution effect, the analysis retains only surnames whose number of births per cohort falls within two standard deviations of the mean in the ANF list. This limits the sample to surnames with at most 125 births per cohort, each representing no more than 0.1% of the total ANF-registered nobles. As a result, 53 surnames are excluded from the initial set of 2,539 ANF surnames, leaving 2,486 surnames in our final ANF-registered sample.

ANF-registered nobles largely form a subset of surnames with a particle. Among the 14,363 surnames containing a particle, 2,415 (17%) appear in the ANF list, accounting for 30% of births with particle-bearing surnames. Conversely, 97% of ANF-registered noble surnames contain a particle, while only 3% (71 surnames) do not. This confirms that most – but not all – aristocratic families bear a particle, whereas not all bearers of a particle are of noble origin (see Beck, 1981 or Coulmont, 2019, who refers to the latter as "nobility of appearance"). Particle-based identification therefore provides a convenient yet imperfect proxy for noble lineage. By misclassifying some non-nobles as nobles, this measurement error overstates the number of noble descendants and likely understates noble overrepresentation in elite graduate schools. By contrast, ANF registration is selective: not all noble families are registered, though the association states that it covers more than two-thirds of the nobility. This measure both understates the total number of noble descendants in the population while potentially overstating the degree of noble overrepresentation in elite graduate schools. Using both definitions allows us to bound empirically the proportion of noble descendants in the whole population and among students at the grandes écoles.

3.2. Relative Admission Rates

To quantify inequalities in access to elite higher education, we use the relative admission rate (RAR), a simple measure that, in our case, is closely related to an odds ratio but easier to interpret.[13] For a given school or set of schools and cohort c, the RAR compares the admission rate ($AR_{c,N}$) of noble descendants (N) to that ($AR_{c,N'}$) of the rest of the population (N'):

$$RAR_c = \frac{AR_{c,N}}{AR_{c,N'}} = \frac{S_{c,N} / B_{c,N}}{S_{c,N'} / B_{c,N'}},$$

where the admission rate of descendants of the nobility is defined as the number of noble students in the grandes écoles in cohort c ($S_{c,N}$) divided by the number of noble births in the same cohort ($B_{c,N}$). The same calculation applies to the population of non-nobles (N'). The rate will alternatively be calculated for the ten grandes écoles of the sample, the nine grandes écoles in the baseline, a single grande école, or specific subsets such as business schools. A value of RAR equal to 1 indicates that nobles and commoners have comparable admission rates. A value above 1 (resp. below 1) indicates that nobles have higher (resp. lower) admission rates than commoners.

Although relative admission rates can be computed directly, we estimate them using log-binomial models to obtain confidence intervals. For each cohort c, we estimate the probability of admission to a grande école using the following specification:

$$\log\left[P\left(GE = 1 | c, N\right)\right] = \alpha_c + \beta_c N$$

where GE is a dummy equal to 1 for admission to the grandes écoles, and N is a dummy for noble lineage, defined either by a surname with a particle or a surname registered with the ANF. The exponentiated β_c coefficient provides the relative admission rate of cohort c.

4. Results

This section shows that, despite a gradual decline, noble families have remained highly overrepresented in France's most prestigious grandes écoles throughout the past century. Table 3 reports the relative admission rates (RAR) of descendants of noble families to the nine grandes écoles in the baseline sample (i.e., excluding Sciences Po Paris) across cohorts. Results are presented separately for both identifications of noble lineage: surnames with a particle and those registered with the ANF.

13. Empirical studies often use the odds ratio as an indicator of inequality, calculated as $\frac{p/(1-p)}{p'(1-p')}$*, where* p *and* p' *represent the probabilities of admission for two groups, for example. The RAR is simpler, equal to* $\frac{p}{p'}$*. Because admission rates to the then grandes écoles we consider are very low, both measures yield very similar results; the RAR nevertheless offers a simpler interpretation.*

The admission rate to these elite schools among the overall French population ranges from 0.13% to 0.25% depending on the cohort (column 2). Columns 3 and 7 show the population: ANF-registered noble individuals are about three times less numerous than individuals with a particle in their surname. Using either indicator of nobility, the share of individuals from noble families in the French population increased over the course of the 20th century, reflecting higher fertility among noble families. For instance, the proportion of natives bearing a surname with a particle rose from 1 in 278 in the 1891-1915 cohort (0.36 %) to 1 in 170 in the 1966-1990 cohort (0.59%).[14,15]

Columns 4 and 8 show that the share of people from noble families among admitted students has remained quite stable over the period: around 4% of admitted students bear a surname with a particle, and just under 2% belong to ANF-registered noble families. Their admission rates to elite French graduate schools also remained largely unchanged (columns 5 and 9), while overall admission rates increased (column 2). Over the full period, approximately 1.5% of individuals with a particle surname and 2% of those from registered noble families were admitted to one of the nine elite grandes écoles.

As a result of the stability of the admission rate for nobles and the increase for the general population, the relative admission rate of noble families has declined over time. A century after the French Revolution, individuals born between 1891 and 1915 who bore a particle in their surname were 11.6 times more likely than the rest of the population to be admitted to a grande école. The advantage was even greater among members of the ANF, who were 15.1 times more likely to enrol. Two centuries after the Revolution, for the most recent cohort (1971-1995) of our sample, the advantage remains, though attenuated, reaching 6.5 for particle bearers and 8.9 for ANF-registered families.

Whether estimates are based on the narrow indicator of noble lineage (ANF-registered nobles) or on the broad one (name with a particle), both show that the overrepresentation of descendants of nobles among students at the most prestigious grandes écoles, although in steady decline, remains significant. As shown in Online Appendix Table S-2, these findings hold when the analysis is expanded to include non-native surnames: this yields slightly lower magnitudes but comparable trends of the relative admission rates of nobles, which decline over the period from 11.1 to 5.6 for particle bearers and 14.5 to 7.6 for ANF-registered families.

Beyond overall trends, there are differences of overrepresentation across schools. Using surname with particle as indicator of nobility, Figure II presents relative admission rates for the nobility across school categories and for three specific schools, including Sciences Po Paris. Historically, Sciences Po stood out as the most aristocratically concentrated institution.

14. Online Appendix Table S-2 shows a smaller increase when the full population is considered, including non-native surnames. Given the substantial demographic losses suffered by aristocratic families during World War I (see Section 1), the rise in birth rates among nobles in the 1916-1940 cohort could reflect a deliberate strategy to restore their lineage.

15. Chaussinand-Nogaret (1976) estimated that noble families constituted approximately 0.5% of the French population at the end of the Ancien Régime.

Table 3 – **Individuals of aristocratic lineage in the nine baseline grandes écoles**

		Particle surnames				ANF-registered surnames			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Birth cohort	Global admission rate (%)	Population share (%)	Share among students (%)	Group admission rate (%)	Relative admission rate	Population share (%)	Share among students (%)	Group admission rate (%)	Relative admission rate
1891-1915	0.13	0.36	4.0	1.4	**11.6** [10.4-12.9]	0.12	1.7	1.9	**15.1** [12.8-17.9]
1916-1940	0.14	0.44	4.3	1.4	**10.0** [9.1-11.0]	0.14	1.9	1.9	**13.9** [12.0-16.0]
1941-1965	0.17	0.48	3.7	1.3	**7.9** [7.3-8.6]	0.15	1.8	2.0	**12.0** [10.6-13.6]
1966-1990	0.25	0.59	3.6	1.5	**6.4** [5.9-6.9]	0.20	1.7	2.1	**8.5** [7.6-9.7]
1971-1995	0.22	0.59	3.8	1.4	**6.6** [6.0-7.1]	0.20	1.8	2.0	**8.9** [7.8-10.1]

Note: For both bearers of surnames containing a particle and bearers of surnames registered with the ANF, the table reports their population share, the share of noble descendants among grandes écoles students, and their group admission rate (the percentage of individuals of noble lineage enrolled in at least one school). The relative admission rate is the ratio between this latter rate and the admission rate of individuals without noble lineage. 95% confidence intervals are in brackets. The table also reports the global admission rate for the entire population. Figures refer to the population with a native surname as defined in Section 2. Online Appendix Table S-2 reports robustness results including all surnames, while Online Appendix Table S-3 extends the analysis to all ten schools for both the native and full populations.
Source: GENES data (1911-2015); *Fichiers des noms patronymiques de 1891 à 1990* (1999 edition), INSEE.

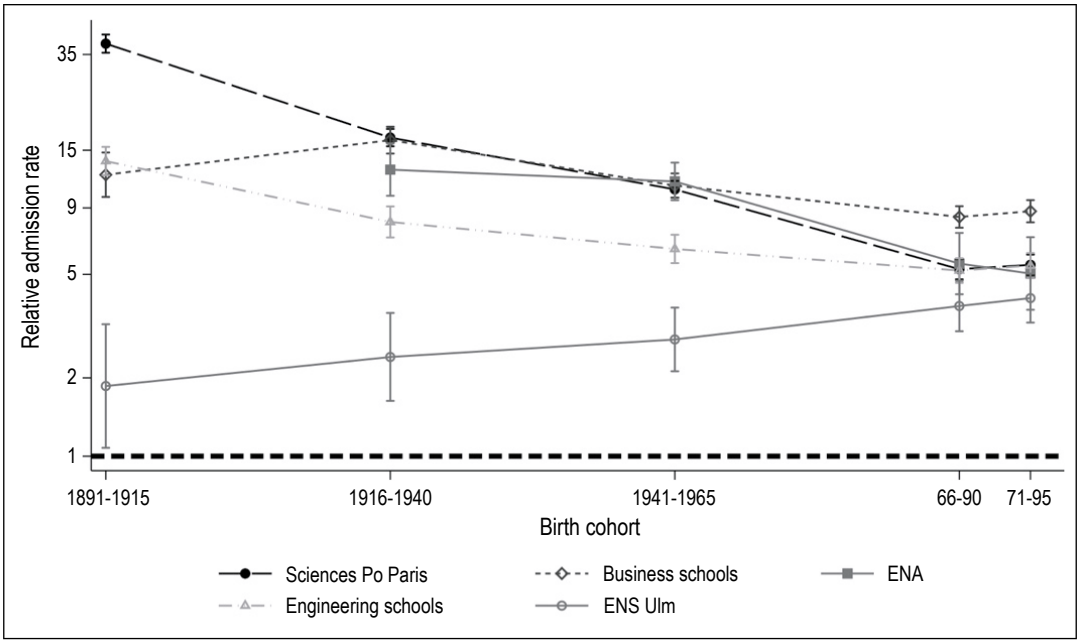
Among the 1891-1915 cohort, individuals with a particle surname were 38 times more likely to enrol than their non-noble counterparts, and ANF-registered nobles had a 51-fold higher likelihood of admission. Although bearers of particles represented only 0.36% of all births in this cohort, they accounted for 12% of Sciences Po Paris students. In this cohort, as many as 5.1% of ANF-registered family members studied at Sciences Po Paris. While noble overrepresentation at Sciences Po declined steadily throughout the 20th century, aligning with other elite schools in recent cohorts, their likelihood of admission nevertheless remains five to seven times higher than that of non-nobles.[16]

Figure II further illustrates how noble families allocated their educational investments across the different grandes écoles. Established in 1945, the École Nationale d'Administration (ENA) initially admitted a substantial number of students with noble lineage, with a RAR of 13 in its early decades. By the 1971-1995 cohort, however, this figure had declined to 5, aligning ENA with other grandes écoles. Conversely, the École Normale Supérieure (ENS) showed low overrepresentation of aristocratic descendants in the early 20th century. This exception gradually faded, and the proportion of noble students eventually reached levels comparable to those of other grandes écoles. Ultimately, business schools have become the institutions with the highest overrepresentation of students from noble backgrounds.

Table 4 presents a more granular breakdown of noble overrepresentation, school by school. Notable differences emerge between the two business schools of our sample. In the two cohorts from the first half of the 20th century, the RAR of ANF-registered nobles was 40.5 and then 36.9 at ESSEC, compared to just 5.5 and 16.1 at ESCP. However, the overrepresentation of noble families converged across both schools starting with the 1941-1965 cohort.[17] A comparable pattern can be observed in engineering schools. In the early 20th century, École Polytechnique (an institution with military status) and Mines Paris enrolled a higher proportion of noble students than other scientific institutions, but these differences gradually faded over time. These convergences likely reflect a broader process of alignment among the different grandes écoles, driven by competitive dynamics and international standardization that have progressively reduced

16. Harsanyi (2005) also highlights the strong presence of noble families in Paris's faubourg Saint-Germain, the district where Sciences Po is located.
17. ESSEC's foundation by Jesuits in 1907 is a notable particularity, as most grandes écoles were originally secular. Although governance was transferred to the Chamber of Commerce of Versailles in 1980, its religious origins may have contributed to its early appeal among noble families.

Figure II – **School differences in the relative admission rates of individuals with aristocratic lineage**



Note: Aristocratic lineage is identified using surnames with a particle. The vertical axis uses a logarithmic scale, with 95% confidence intervals represented by the vertical bars. Online Appendix Figure S-IV replicates this Figure using ANF-registered surnames.
Source: GENES data (1911-2015); *Fichiers des noms patronymiques de 1891 à 1990* (1999 edition), INSEE.

Table 4 – **Relative admission rates of individuals with aristocratic lineage, by school**

Bearers of surnames with a particle					
Cohort	1891-1915	1916-1940	1941-1965	1966-1990	1971-1995
Sciences Po Paris	**38.5** [35.6-41.8]	**16.7** [15.5-18.1]	**10.6** [9.8-11.4]	**5.2** [4.8-5.7]	**5.4** [5.0-6.0]
ENA	-	**12.6** [10.0-15.9]	**11.3** [9.6-13.4]	**5.4** [4.2-7.2]	**5.0** [3.7-6.9]
ENS Ulm	**1.8** [1.1-3.2]	**2.4** [1.6-3.6]	**2.8** [2.1-3.7]	**3.7** [3.0-4.7]	**4.0** [3.3-5.0]
ESPCI Paris	**3.1** [1.6-6.1]	**4.6** [2.9-7.4]	**6.3** [4.4-9.1]	**2.8** [2.0-4.3]	**3.2** [2.3-4.6]
Polytechnique	**14.9** [13.0-17.2]	**9.1** [7.8-10.7]	**6.7** [5.8-7.9]	**6.1** [5.4-7.1]	**6.2** [5.4-7.2]
Ponts et Chaussées	**8.3** [6.0-11.7]	**4.8** [3.3-7.1]	**6.7** [5.4-8.5]	**5.5** [4.6-6.8]	**6.2** [5.2-7.5]
Télécom Paris	**6.2** [2.8-14.1]	**5.2** [3.5-7.9]	**3.9** [3.0-5.3]	**4.0** [3.3-5.0]	**3.8** [3.0-4.9]
Mines Paris	**18.0** [13.7-23.8]	**9.3** [7.0-12.4]	**5.3** [4.0-7.3]	**4.9** [3.9-6.2]	**5.4** [4.3-6.9]
ESSEC	**34.2** [27.3-42.9]	**24.9** [21.4-29.1]	**11.1** [9.7-12.8]	**8.6** [7.7-9.7]	**9.1** [8.1-10.4]
ESCP	**4.0** [2.7-5.9]	**11.0** [9.3-13.0]	**11.0** [9.7-12.6]	**8.0** [7.2-9.0]	**8.3** [7.4-9.4]
Nine baseline schools	**11.5** [10.4-12.9]	**10.0** [9.1-11.0]	**7.9** [7.3-8.6]	**6.3** [5.9-6.9]	**6.5** [6.0-7.1]
All 10 schools	**23.2** [21.6-25.0]	**13.5** [12.6-14.5]	**9.3** [8.6-9.9]	**5.9** [5.4-6.3]	**6.1** [5.6-6.5]
Bearers of surnames registered with the ANF					
Cohort	1891-1915	1916-1940	1941-1965	1966-1990	1971-1995
Sciences Po Paris	**51.3** [45.5-57.9]	**23.1** [20.6-26]	**14.9** [13.3-16.8]	**6.5** [5.7-7.6]	**6.7** [5.9-7.8]
ENA	-	**16.9** [12.1-23.7]	**17.9** [14.3-22.6]	**6.2** [4.0-9.8]	**6.4** [3.9-10.6]
ENS Ulm	**0.4** [0.1-3.1]	**3.8** [2.2-6.7]	**4.0** [2.7-6.1]	**5.2** [3.8-7.3]	**5.9** [4.4-8.0]
ESPCI Paris	**3.2** [1.0-10.1]	**4.8** [2.2-10.9]	**11.6** [7.3-18.7]	**4.2** [2.4-7.4]	**3.9** [2.3-6.9]
Polytechnique	**21.0** [17.1-25.8]	**11.0** [8.7-14.1]	**9.4** [7.4-12.1]	**8.3** [6.8-10.2]	**8.5** [7.0-10.5]
Ponts et Chaussées	**10.0** [6.0-16.8]	**6.1** [3.5-11]	**8.0** [5.6-11.5]	**7.3** [5.5-9.8]	**7.7** [5.9-10.3]
Télécom Paris	**9.5** [3.1-30.0]	**7.6** [4.2-13.9]	**4.9** [3.1-7.9]	**5.0** [3.7-6.9]	**4.5** [3.2-6.5]
Mines Paris	**21.6** [14.2-33.0]	**8.9** [5.5-14.8]	**8.1** [5.1-12.8]	**7.7** [5.6-10.6]	**7.8** [5.4-11.3]
ESSEC	**40.4** [28.7-57.1]	**36.9** [29.7-45.9]	**17.4** [14.3-21.2]	**12.0** [10.1-14.3]	**12.8** [10.7-15.4]
ESCP	**5.5** [3.1-9.9]	**16.1** [12.5-20.9]	**16.5** [13.7-20.1]	**10.1** [8.6-12.1]	**10.9** [9.1-13]
Nine baseline schools	**15.1** [12.8-17.9]	**13.8** [12.0-16.0]	**12.0** [10.6-13.6]	**8.5** [7.6-9.7]	**8.8** [7.8-10.1]
All 10 schools	**31.2** [27.9-34.9]	**18.7** [16.8-20.8]	**13.4** [12.1-14.9]	**7.8** [6.9-8.6]	**7.9** [7.1-8.9]

Note: 95% confidence intervals are shown in brackets. For each panel, the last two lines aggregate results for the nine baseline grandes écoles and the full sample of ten schools (including Sciences Po Paris).
Source: GENES data (1911-2015); *Fichiers des noms patronymiques de 1891 à 1990* (1999 edition), INSEE.

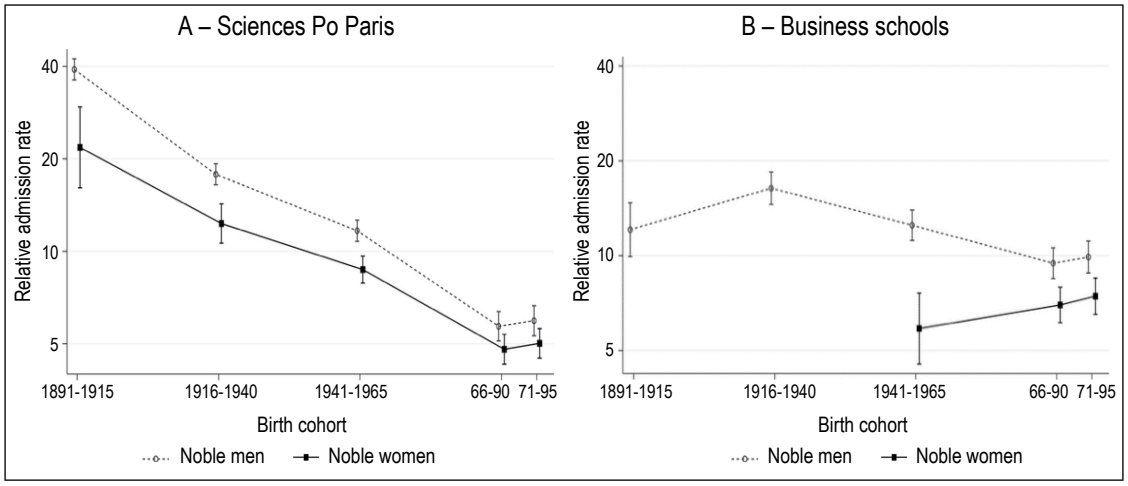
differences in their curricula, recruitment, and positioning (Bourdieu, 1989).[18]

Historically male-dominated, the grandes écoles have undergone a process of feminization over the past decades. The question arises as to how this change has been reflected in aristocratic spheres, where educational strategies are traditionally distinct for girls and boys. Figure III compares the noble advantage for men and women at Sciences Po Paris (Panel A) and in business schools (Panel B), where noble families have been the most represented across cohorts.[19] The results reveal a clear male advantage: the relative admission rates are higher for men than for women, but the gap has also progressively narrowed across cohorts.

While prior research suggests that intergenerational transmission of elite education is not strongly gendered – and may even slightly favour daughters (Benveniste, 2023) – these findings are consistent with historical studies of gendered educational strategies in noble families. De Saint-Martin (1993), for instance, noted that even in the mid-20th century, noble families systematically ensured that their sons attended high school, while doing so for daughters was often discouraged or regarded as inappropriate.

18. Several factors may explain the growing uniformity among institutions, including adaptation to market demands, curriculum standardization in line with international norms and standards, the increasing influence of global rankings and accreditations, and the homogenization of recruitment practices for both students and faculty. More recently, the consolidation of concours into shared examination pools across multiple schools may have further reinforced this trend by encouraging institutional convergence.
19. Relative admission rates were calculated separately for men and women, comparing noble men to non-noble men and noble women to non-noble women. This approach thus accounts for differences in gender diversity between schools.

Figure III – **Gender differences in relative admission rates of aristocrats**



Note: Aristocratic lineage is identified using surnames with a particle. Business schools of Panel B include ESCP and ESSEC. The vertical axis uses a logarithmic scale, with 95% confidence intervals represented by the vertical bars. Online Appendix Figure S-V replicates this Figure using ANF-registered surnames.
Source: GENES data (1911-2015); *Fichiers des noms patronymiques de 1891 à 1990* (1999 edition), INSEE.

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This study highlights the overrepresentation of noble families in France's elite higher education system, even two centuries after the Revolution. The use of two surname-based indicators of noble lineage (bearing a particle and registration with the Association d'entraide de la Noblesse Française) allows for either a broad or a narrow definition of aristocratic status. Applied to data on elite school students and aggregated data on surnames, these two indicators enable tracking how admission rates for individuals from noble families have evolved relative to those of the rest of the population.

Among cohorts born between 1891 and 1995, bearers of particle surnames accounted for around 0.5% of the French population but 4% of grande école students (excluding Sciences Po Paris), reaching up to 12% at Sciences Po Paris in the 1891-1915 cohort. Despite a decline in their overrepresentation over time, descendants of aristocratic families remain, in the most recent cohorts, six to nine times more likely than others to attend the nine grandes écoles considered. This decline results from the combination of relatively stable admission rates among nobles compared to rising admission rates among children of commoners.

More broadly, these findings show that despite the abolition of historical aristocratic privileges, inequalities between children from noble and from commoner families have not vanished. Noble families instead adapted early to the Republican educational landscape in which prestigious degrees became crucial for accessing elite positions. This dynamic aligns with the model of capital conversion as described by Bourdieu. As de Saint-Martin (2015) argues, noble families maintain their status through a combination of symbolic, cultural, social, and economic capital, which is manifested in their aristocratic titles, estates, academic credentials, networks, and wealth. While symbolic capital remains central to noble identity, its capacity to confer advantage depends on its strategic transformation into forms of capital with contemporary value, particularly elite academic credentials.

Beyond education, this aristocratic advantage is also preserved through the key mechanisms of family lineage and homogamy (de Saint-Martin, 2015). Historically, noble families have relied on dense, exclusive family networks to consolidate power, wealth, and influence across generations (Haldén, 2020). Kinship ties not only enhance the returns on elite degrees through social capital (Kramarz & Skans, 2014), but also serve as a channel for securing prestigious positions in politics, business, and the civil service (O'Brien, 2024). This interconnected web of families ensures both resilience and continuity for the former nobility at the top of the social hierarchy.

The analysis also reveals a gendered pattern in the noble overrepresentation, with noble sons showing higher relative admission rates than noble daughters, although this gap has gradually narrowed over time. As unions between graduates of the same institutions have become more

common (Goux & Maurin, 2003; Ford, 2020) and as elite education – particularly grandes écoles – increasingly fosters endogamous unions (Bouchet-Valat, 2014), the unequal presence of aristocratic men and women in these institutions suggests that exclusive social practices still exist today. For example, because educational assortative matching may be insufficient to maintain aristocratic lineage, events such as *rallyes* (formal coming-of-age social events encouraging matches) can serve as vehicles for preserving noble bloodlines (de Saint-Martin, 1985).

Though it would require additional data collection, future research could provide deeper insight into patterns of elite continuity, in particular the social mechanisms underlying this noble advantage, its magnitude relative to that observed for other social groups, as well as the internal hierarchies within the nobility. A more fine-grained classification of the nobility could distinguish long-established aristocratic lineages from families ennobled in the 18th or early 19th centuries, as well as higher-ranking noble families (e.g., descendants of dukes or princes) from those holding lower titles, thereby refining our understanding of internal hierarchies within the aristocracy. Furthermore, in order to better disentangle a possible status- or culture-based effect of nobility from that of cultural, social, or economic capital, information on parents' educational attainment or income would help shed light on the mechanisms underlying the overrepresentation of students of noble descent in the most prestigious grandes écoles. Finally, comparing the magnitude of this overrepresentation with that observed for other social groups would help better assess its significance.

By integrating long-standing social hierarchies and distinctions into the broader literature on educational inequality and social mobility, this study suggests that such legacies still contribute to shaping access to elite degrees. Rather than a straightforward disappearance of noble privilege, our results are consistent with a process of strategic reconfiguration, whereby aristocratic families adapt to evolving institutional landscapes to maintain their presence in elite circles. These enduring legacies of history thus seem to continue to shape access to elite positions in French society. □

Link to the Online Appendix:
www.insee.fr/en/statistiques/fichier/8743921/ES548_Benveniste_Online-Appendix.pdf

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