

Research on the Efficiency and Fairness of the Admission Mechanism in British Universities and Reform Suggestions

Ziqi Liang

*Beijing National Day School, Beijing, China
lzqbnds@163.com*

Abstract. In recent years, a majority of UK universities have adopted the practice of issuing conditional offers predicated on teachers' predicted grades. However, there exists a persistent discrepancy between predicted grades and students' actual academic performance, leading to inefficiency and fairness issues in the admission process. This study utilizes the market design theory as the analytical framework to explore the problems of the current university admission mechanism in terms of efficiency and fairness in the UK, and proposes reform suggestions by drawing on the experiences of other countries. The research reveals that the existing prediction-based admission mechanism has led to unstable matching between students and universities; some students are denied access to their ideal institutions due to prediction deviations, while the admission process is unnecessarily complicated, undermining the efficiency of resource allocation. This phenomenon exacerbated the randomness and unfairness of the admission outcomes. To address this, this paper suggests introducing the post-qualification admission (Post-Qualifications Admissions, PQA) model and designing a comprehensive centralized matching mechanism to enhance the admission efficiency and promote educational equity. Finally, the practical implications of the reform are emphasized, and future research directions are outlined.

Keywords: British university admission system, predicted grades, fairness, market design theory, PQA reform

1. Introduction

The higher education admission system exerts a direct impact on the optimal allocation of educational resources and the realization of social equity and justice, and constitutes a crucial topic in educational research and policy-making. The current university admission model implemented in the UK is distinctive: prior to the release of final A-Level examination results, students submit applications to universities based on the predicted grades provided by their high school teachers, and universities decide whether to offer conditional admission offers based on the predicted grades [1]. The UK's prediction-based admission model has long been a subject of controversy, with its effectiveness and fairness triggering extensive academic and policy debates [2-4]. The UK Department for Education proposed a reform proposal for the admission system in 2020, initiated by then Education Secretary Gavin Williamson, to switch to using students' actual exam results for admission, that is, to implement the "Post-Qualifications Admissions" (PQA) model [1]. However,

this reform encountered practical challenges such as time scheduling constraints. With the personnel changes in the education management layer, in 2022, the new Education Secretary Nadhim Zahawi suspended this reform process on the grounds of "too many uncertainties" [5]. Therefore, as of now, the university admission in the UK still follows the traditional model of applying based on predicted grades. How to optimize this mechanism to enhance efficiency while upholding fairness has become an urgent research question requiring resolution.

To systematically analyze the above issues, this paper adopts market design theory as its analytical framework. The theory of market design centers on optimizing resource allocation outcomes through the rational formulation of rules and mechanisms. Its core logic is that appropriate mechanism design can incentivize participants to truthfully reveal preferences and information, thereby enhancing allocative efficiency and mitigating allocative inequity [6]. In the context of university admissions, the admission mechanism constitutes a specialized "matching market", and the design of this matching process directly shapes the efficiency and fairness of student-university matching. From this theoretical lens, this paper will first describe the current operation status of the UK's university admission mechanism, then analyze the problems existing in the current mechanism in terms of efficiency and fairness, subsequently propose reform suggestions centered on PQA and its operational details, and finally discuss the practical significance of the research conclusions and outline future research avenues.

2. Analysis of problems

The current predicted grade-dominated admission mechanism exhibits significant deficiencies in both efficiency and fairness. The following will analyze these issues from the perspectives of efficiency and fairness.

2.1 Efficiency issues

From an efficiency standpoint, the current admission process fails to achieve Pareto-optimal matching between higher education institutions and applicants, characterized primarily by a protracted admission cycle and inefficient resource allocation. First, the accuracy of predicted grades is limited, resulting in an inadequate informational foundation for admission decision-making. According to UCAS statistics, among 18-year-old applicants admitted to universities in 2019, 79% of those predicted to attain 3 A grades had their final grades overestimated, while 8% had their actual grades underestimated [7]. A large number of candidates did not meet the predicted grades, meaning that a considerable proportion of conditional offers issued by universities ultimately failed. This scenario compels the admission system to rely on the clearing process to fill vacancies, augmenting the complexity and uncertainty of the admission process while undermining overall operational efficiency.

Second, the predicted admission model may be prone to mismatch and waste of university admission quotas. When some students do not meet the requirements for conditional admission and are eliminated, the seats originally reserved for them have to be temporarily transferred to other students. Such ex-post adjustments typically take place towards the end of the intensive admission cycle and may not yield optimal outcomes. In addition, some universities, in an attempt to attract high-achieving applicants, issue "unconditional offers" or require applicants to commit to the conditional unconditional offer during the prediction stage. The result is that some students may give up other more suitable options and lock in their admission relationship prematurely. This practice has been criticized as a form of "hard selling", which disrupts the normal order of competitive

selection [2]. It may also cause the matching between students and schools not to be based on the best fit, but rather be influenced by strategic behaviors under conditions of incomplete information, resulting in a decline in overall allocative efficiency.

2.2 Fairness issues

In terms of fairness, the flaws of the prediction-based admission mechanism are more pronounced. Firstly, relying on teachers' predictions introduces subjective factors that exert an inequitable impact on students from diverse socioeconomic backgrounds. Although there are certain guidelines and standards for teacher predictions in British secondary schools, they still involve inherent subjective judgments. Some studies have demonstrated that teachers tend to overestimate students' grades, which is detrimental to students with average or below-average academic performance, as they may be denied access to reputable higher education institutions due to conservatively predicted grades [8]. Of particular note is that students from socioeconomically disadvantaged backgrounds may face systemic disadvantages under the prediction-based admission framework. Some evidence suggests that students from poor families or attending weak schools are more likely to be underestimated in terms of their potential grades, and they often opt for institutions that do not align with their actual academic capabilities in the application process, even though they are fully capable of achieving better results [8]. This "self-underestimation" phenomenon results in high-achieving students who are academically eligible for admission to prestigious institutions being denied equitable access to opportunities that match their capabilities.

Secondly, the prevailing admission model also gives rise to concerns regarding regional and school-specific inequities. Teachers at select elite secondary schools may be more proficient in securing favorable predicted grades for students, while students from ordinary schools have relatively conservative predicted grades, which puts students from different schools and regions at an inequitable competitive advantage in the admission process [3,4]. Moreover, for minority groups and other marginalized populations, subjective predictions carry an inherent risk of bias, with more pronounced deviations in predicted scores for these students may be greater, thereby affecting their admission outcomes [9]. Finally, from the perspective of institutional fairness, the current model weakens the role of A-Level scores as an objective evaluation criterion, precluding students from competing exclusively on the basis of their final academic achievements. When the admission results are predominantly determined by pre-exam subjective assessment, even if the final exam scores are announced, the initial admission decisions are difficult to fully rectify prior inequities even after the release of final exam results.

3. Methods and data

This paper employs an integrated analytical framework that combines normative analysis and empirical research. In terms of normative analysis, it is grounded in the stable matching theory proposed by Gale and Shapley [3], regarding university admissions as a typical bilateral matching problem. It assesses whether the current UCAS system fulfills the objectives of stability, Pareto efficiency, and strategic truthfulness [2]. By reviewing the review report on the admission system by the British Parliament Library [5], the analysis of the "congestion" and mismatch issues of the admission system by economists [8], and the suggestions on fair admissions from university alliances and policy bodies [6], this paper identifies critical junctures and institutional flaws in the UCAS process from an institutional design perspective. At the same time, it compares China's college entrance examination admissions and the Common App system in the United States, etc.,

exploring variations in timeline arrangements, centralization levels, and equity-oriented principles across different models [4].

In terms of empirical analysis, this paper administered questionnaires via the Wenjuanxing platform and obtained 61 valid samples. The questionnaire was mainly targeted at students and relevant stakeholders, covering four key dimensions: perceptions of the equity of admission based on predicted scores; their attitude towards the post-examination application model; their support for the introduction of centralized matching algorithms; and their subjective evaluation of the efficiency of Clearing and other processes. Descriptive statistical analysis of the questionnaire data revealed that over 80% of respondents perceived prediction-based admissions as "unfair" or "very unfair", with only a negligible proportion viewing predicted grades as accurate and equitable. This result is consistent with the research data showing that the prediction accuracy rate was only 16% [7]; approximately 75% of the respondents supported submitting university applications after the release of exam results, that is, implementing the PQA model; approximately 70% of the respondents expressed dissatisfaction with the current admission process, perceiving multiple applications, repeated admissions, and the Clearing procedure as overly complex and time-intensive; over 80% of the respondents indicated their willingness to accept the introduction of centralized matching mechanisms such as delayed acceptance algorithms, believing that it can minimize quota wastage and reduce repetitive admission procedures. Overall, the questionnaire data is consistent with the literature's conclusions, providing practical support for the reform ideas proposed in this paper.

4. International comparison

The Chinese college admission system offers a comparative reference that underscores the significance of authentic examination results and centralized matching. University admissions in China are predominantly grounded in the outcomes of the National College Entrance Examination (Gaokao)—a unified national examination. All candidates submit their application for admission subsequent to the release of their examination results, and the provincial admissions authorities centrally allocate enrollment quotas according to the order of scores and applications [4]. This process bears striking structural similarities to the deferred acceptance algorithm: candidates can obtain the "best" one among their desired choices within the available range, and universities can also fill the quota with qualified students under the constraint of the quota.

U.S. university admissions prioritize institutional autonomy and diversified evaluation methodologies. Students apply to universities through platforms such as Common App during their final year of high school. Universities evaluate based on existing GPA, standardized test scores, and soft materials, without relying on predicted scores [4]. The admission and response periods are relatively lengthy, allowing students to select from multiple offers. Universities adjust their enrollment scales through projected yield rates and waiting lists. Although there is no unified national matching algorithm, in the admission of American resident physician programs, a nationwide centralized matching system (NRMP) has successfully adopted a stable matching algorithm, demonstrating the feasibility of centralized matching in addressing "congestion" and enhancing allocative efficiency [4].

Overall, compared to the "post-examination application + centralized allocation" model in China and the "multiple evaluations + university autonomy" model in the United States, the prominent feature of the UCAS system in the UK is distinguished by its overreliance on advance predicted grades and decentralized admissions. This is precisely the root cause of its efficiency and fairness issues. Future reforms must strike a balance between efficiency and fairness, as well as between centralization and autonomy.

5. Reform suggestions

In response to the efficiency and fairness issues mentioned above, this paper proposes the following reform recommendations rooted in market design theory, focusing on the feasibility of introducing the post-admission application (PQA) model and its supporting measures.

Firstly, formally adopt the Post-Qualifications Admissions (PQA) model, predicated admissions on actual academic achievements. The specific approach is to revise the admission timeline, scheduling the university application and admission process subsequent to students' receipt of final examination results. This reform requires corresponding adjustments to the existing academic calendar in the UK, such as considering an earlier date for A-Level examinations or a slightly later start date for university semesters, to allocate adequate time for post-result application submission and admission matching. Under the PQA model, all students submit their university applications after knowing their actual grades, so universities can directly admit based on the students' grades and applications. This eliminates redundant admission phases caused by prediction errors and enhances the efficiency of one-time matching [9]. At the same time, by anchoring admissions in objective, pre-determined grades, the model significantly strengthens procedural transparency and equity, reduces reliance on subjective judgment, and ensures opportunity fairness.

Secondly, establish a centralized matching enrollment mechanism to optimize the two-way selection process between students and universities. Under the PQA framework, the university admission process can be designed using well-established matching algorithms (e.g., the deferred acceptance algorithm) derived from market design theory: students submit their ranked lists of preferences after receiving their grades, and the universities rank applicants based on their grades and their own enrollment quotas. Then, the central admission system executes the algorithm to finalize matching and resource allocation. The theoretical guarantee is that the matching results will reach a stable and Pareto optimal state under certain conditions [6]. Through carefully designed algorithms, both students and universities can make optimal choices without resorting to game-theoretic guessing: students can enter the best schools within their capabilities, and universities can recruit the most outstanding students with the highest grades and priority in their applications [10]. This centralized matching process can also avoid current quota wastage and repetitive admissions caused by multiple applications and admissions, and improve the efficiency and effectiveness of the admission results.

Finally, it is necessary to address the practical challenges associated with PQA reform implementation, such as the wide-ranging adjustments to the admission process schedule, which require corresponding changes in the administrative arrangements of university admissions, the scheduling of teachers' terms, etc. Moreover, universities may need to adjust their admission promotion and selection methods without predicting grades. However, in the long run, the post-examination application system can significantly enhance admission efficiency by streamlining procedures and reducing uncertainties, and establishing a selection orientation centered on students' actual academic abilities. Its social benefits and educational equity value are worthy of anticipation.

6. Conclusion

In summary, the current predicted grade-based admission mechanism for UK universities exhibits notable inadequacies in both allocative efficiency and educational equity. Based on the analysis, we believe that the reform of post-examination application for admission will effectively mitigate the aforementioned issues: On one hand, it can avoid the waste of quotas and inefficient matching caused by prediction errors, thereby enhancing the overall efficiency of university admissions; on

the other hand, it can minimize the influence of subjective judgments on the admission results, allowing students to compete equitably on the basis of their authentic academic achievements. By examining this reform using market design theory, it can be found that a well-designed admission mechanism can simultaneously improve efficiency and fairness, achieving the policy goal of "win-win". The practical implications of the PQA reform reside in its potential to empower more students from socioeconomically disadvantaged backgrounds to access higher education opportunities commensurate with their academic potential. It can also alleviate the obstruction of educational inequality on social mobility, and improve the effectiveness of university talent selection. For a higher education powerhouse such as the UK, this reform will enable its admission system to align with global norms and address societal demands for equitable and meritocratic selection.

This study centers on the analysis of flaws in the admission mechanism of British universities and the formulation of reform frameworks, offering a theoretical foundation and empirical support for the improvement of educational policies. However, several areas warrant further academic inquiry and practical experimentation: Firstly, regarding the practical implementation effects of the PQA model, more data simulation and pilot tests are needed to assess its impact on university admission results, and candidate behavior, alongside potential risks and corresponding mitigation strategies. Secondly, with technological advancement, the digitalization and intelligentization of admission systems also merit attention. Big data and artificial intelligence could be leveraged to refine score prediction accuracy or optimize matching algorithms, representing a promising avenue for in-depth exploration in future research.

References

- [1] Department for Education (DfE). (2020). Post-qualification admissions: Government consultation paper. London: UK Government. Available at: <https://www.gov.uk/government/consultations/post-qualification-admissions-in-higher-education-proposed-changes>
- [2] Mountford-Zimdars, A., Sabri, D., Moore, J., Sanders, J., Jones, S., & Higham, L. (2015). Causes of differences in student outcomes in higher education. London: Department for Business, Innovation & Skills. Available at: <https://www.gov.uk/government/publications/causes-of-differences-in-student-outcomes-in-higher-education>
- [3] Li, L. G., & Wang, Z. J. (2016). A study on the admissions system and reform trends in British higher education institutions [J]. *Comparative Education Research*, 38(6): 54–61.
- [4] Wang Junxiu. (2019). A Study on Fairness Issues in Predictive Scores for University Admissions in the United Kingdom [J]. *Comparative Education*, (4): 72–79.
- [5] UK Parliament (House of Commons). (2022). Higher education reform: Post-qualification admissions (Hansard). Available at: <https://hansard.parliament.uk/commons/2022-02-24/debates/22022455000010/HigherEducationReform>
- [6] Roth, Alvin E. (2008). What have we learned from market design? *The Economic Journal*, 118(527): 285–310. <https://doi.org/10.1111/j.1468-0297.2007.02146.x>
- [7] UCAS. (2019). End of Cycle Report 2019: Awarded Grades and Predicted Grades. Cheltenham: UCAS. Available at: <https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-end-cycle-reports/2019-end-cycle-report>
- [8] Wyness, Gill. (2016). Predicted grades: accuracy and impact on university admissions. *Education Sciences*, 6(2): 15. <https://doi.org/10.3390/educsci6020015>
- [9] Universities UK (UUK). (2021). Fair admissions review: The future of undergraduate admissions in England. London: UUK. Available at: <https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2021-08/uuk-fair-admissions-review.pdf>
- [10] Chen, X. (2021). Application of Market Design Theory in Higher Education Admissions Reform: The Case of the UK's PQA Reform [J]. *Education and Economy*, (4): 98–105.