

# Promotional student mobility network reveals the academic hierarchy and educational inequalities

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## Abstract

University education plays a major role in training high-skilled labor and provides a promising path to disrupt the lasting effects of disadvantages. Despite enormous efforts on understanding how education affects post-graduation career mobility, little is known about mobility patterns and potential inequalities at earlier stages of the education pipeline. Based on a large-scale online resume dataset, here we build a promotional student mobility network, capturing student flows from undergraduate to graduate universities in China. Our analysis of this mobility network conveys several findings. First, we find evidence for the academic hierarchy, where the promotional mobility of students is highly stratified, and the ranking of the undergraduate university attended conditions the ranking of the graduate university. Second, while a mechanism model can reproduce the observed patterns, it appears to suggest student's cost-benefit decision-making in pursuing quality education. Third, elite schools in China are highly concentrated in developed cities, showing geographic inequalities in education. Meanwhile, we find that university prestige moderates student mobility such that the positive effect of the city economic gap on student flows is pronounced when the university prestige gap is small. Our results plant a picture of educational stratification and help understand inequalities amid the academic hierarchy.

**Keywords:** Educational inequality; Academic hierarchy; Student mobility; Network science; Computational social science

## Significance

While education may disrupt the transmission of disadvantages, the school attended could in turn condition one's educational opportunity and future career. Yet, little is known about promotional student mobility patterns throughout the education pipeline especially from undergraduate to graduate schools. Here we found that student mobility is highly stratified, with students from non-elite schools having limited upward mobility and being disproportionately more likely to pursue low-ranked elite schools in China, which plants a picture of the academic hierarchy. Furthermore, our analysis revealed a positive impact of economic status on student mobility, suggesting that the concentration of elite schools in developed cities may have exacerbated educational inequalities. These results may inform policies to create a more equal and inclusive education system.