The Geography of Educational Opportunity:
School Proximity and College Attendance in Contemporary China

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EXTENDED ABSTRACT

Research Objective: This study examines the proximity of which type of education enhances college attendance in China, and why.

The concept "geography of educational opportunity" suggests that where individuals live affect their educational outcomes. Recent literature has demonstrated that the geographic proximity of college (such as the number of colleges within commuting distance) enhances college attendance in the United States. But not all differences in proximity affect college attendance. We argue that the causal role of proximity is crucially shaped by the educational institution and family logic of schooling the child generation. We thus focus on the questions of what proximity matters and why. The question of what requires a distinction of different types of schools and measures of proximity. The question of why investigates the underlying mechanism how geographic proximity shapes educational opportunity.

Theoretical Hypotheses

College Proximity Hypothesis

Recent studies in the economics of education consistently suggest that distance is a barrier of access to higher education. Geographic proximity to higher education institutions has positive effects on college application decision (Griffith and Rothstein 2009; Turely 2009; Mangan, Hughes, Davies and Slack 2010) and college attendance (Card 1995; Andres and Looker 2001; Do 2004; Frenette 2004, 2006; Turely 2009; Spiess and Wrohich 2010). The creation of a local university is associated with a large increase in college attendance among local youth (Frenette 2009). This view may be called the *College Proximity Hypothesis*. Prior studies suggest that college proximity matters because local colleges provide (a) financial and non-economic benefits, as students can live at home during college; (b) information about tertiary education or role model for local youth; hence influence the youth's educational aspirations.

Gateway Access Hypothesis

This study proposes *Gateway Access Hypothesis* which emphasizes the critical role of spatial proximity to the gateway to college, viz. upper secondary schools, especially vocational schools.

The new hypothesis specifies how school proximity shapes college attendance, by making three types of conceptual distinctions in the context of China: (a) schooling *opportunity* (as afforded by a government) versus individual's *access* to the opportunity (as forded by a family); (b) *college destinations* versus *gateways* to college; (c) *vocational* versus *academic* upper secondary education. This hypothesis suggests that proximity to vocational upper secondary schools facilitates college attendance. If a student lives close to vocational upper secondary schools, he/she can capitalize on the local vocational opportunities, and therefore staying in the pipeline for college.

Data and Method

Two types of data

We have created a new database by combining 2 data sets. (1) *School address data* from organizational censuses, which provide school addresses and founding dates that allow us to estimate the spatial distribution of secondary schools and colleges over time. (2) *individual-level data* from the 2012 Chinese Labor Dynamic Survey (CLDS), which is the first wave of a nationally representative panel survey with over 16,000 respondents. CLDS provides detailed address on the place of residence for respondents when they were in secondary school. The analysis sample is thus based on respondents born 1970-1986, assumed to be the 1988-2006 college admission cohorts.[1]

Variables

The proximity of college (academic/vocational upper secondary schools) is measured by the number of colleges (academic/vocational schools) within a county for a specific year.[2] Each person in the micro-level data is matched with the proximity of different types of schools according to his/her schooling admission year and schooling county. The admission years for college and upper secondary education (including vocational and academic education) are presumably the years when a person was aged 18 and 15, respectively. The dependent variables are college attendance (binary, and ordinal variables), and the attendance of upper secondary education. This study also controls parental education, cohort, gender, and *hukou* at birth.

Statistical Model

The statistical analysis is based on binary and ordinal logistic regression models. A test-based generalized ordered logit model (Williams 2006) is used to examine whether the data are consistent with the proportional odds assumption of a standard-ordered logit model.

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[1] Respondents in this cohorts started school after the Cultural Revolution thus are not affected by its complications.
[2] The measure is based on an assumption that schools within a county are usually within commuting distance for students living in the same county.

Main Results

(1) The results do not reconcile with the predictions of the College Proximity Hypothesis.

Models 1-3 of Table 1a compare the proximity effects of college with academic and vocational upper secondary schools. College proximity seemly positively predicts the college attendance (Models 1-2), but it become small and statistically insignificant after controlling for the proximity of vocational schools (Model 3).

(2) The results provide supporting evidence for the Gateway Access Hypothesis.

Models 4-6 from Table 1a show that the proximity of vocational school has significantly positive effect on college attendance. Model 7 further addresses the question that whether this vocational proximity mainly increase access to junior colleges. A test based on a generalized ordered logit model (LR Chi-squared test) strongly suggests that the proportional odds assumption is valid for Model 4. It means that the vocational proximity facilitates not only the attendance of junior college but also four-year university with a lower probability.

(3) The results from Table 1b offer affirmative evidence for the Gateway Access Hypothesis.

We go one step further to examine the mechanism of the Gateway Access Hypothesis: whether the proximity of vocational education facilitates the attendance of upper secondary education. The results from Table 1b suggest that the proximity of vocational schools (but not academic schools) increases the attendance of upper secondary education.

Conclusion

In this study, we synthesis the College Proximity Hypothesis, and propose a new hypothesis--Gateway Access Hypothesis in investigating the geography of opportunity in college attendance. In order to examine the competing hypotheses, we combine official statistics with micro-level survey data, and directly measure the proximities of different types of schools. The empirical findings do not reconcile with College Proximity Hypothesis, but support Gateway Access Hypothesis. The evidence suggests access to college is uneven, and the opportunity for higher education is spatially structured.

This study draws attention to the role of geographic context in determining educational opportunity, an understudied factor in the educational research, especially in China. We are in the process of collecting GIS data to better measure school proximities, and examine the geographic context in educational outcome in future research.

Table 1a. Binary Logit Models of College Attendance: Comparing the Proximity Effects among College, Academic, and Vocational Upper Secondary Schools (N=4,935)

| | Attendance of Higher Education | | | | | | |
| | Binary | | | | | | Ordinal |
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7[b]
Proximity of Schools[a]							
College	0.028***	0.028***	0.007				
	(0.008)	(0.008)	(0.009)				
Academic		-0.001		0.001	-0.006		
		(0.004)		(0.004)	(0.004)		
Vocational			0.026***		0.032***	0.029***	0.027***
			(0.006)		(0.005)	(0.005)	(0.005)
Latent R-squared	0.329	0.328	0.338	0.325	0.339	0.339	0.336

Table 1b. Binary Logit Models of Attendance of Upper Secondary Education: Comparing the Proximity Effects of Academic and Vocational Upper Secondary Schools (N=4,935)

| | Attendance of Upper Secondary Education | |
	Model 1	Model 2
Proximity of Upper Secondary Schools[a]		
Academic	0.006	
	(0.003)	
Vocational		0.047***
		(0.005)
Latent R-squared	0.300	0.342

Data source: CLDS2012, Census of Organizations in China 2001 and 2004. The analysis sample is restricted to the 1988-2004 college admission cohorts. CLDS sampling weights are applied. All the models also control parental education, *hukou* at birth, cohort, and gender, the coefficients and estimated intercepts are not presented for parsimony.

Notes: a. The measures for proximity of different types of schools are measured by the number of schools. See main text for details.
b. The dependent variable of the ordinal logit model is college destinations: no college, junior college, or four-year university. A test-based generalized ordered logit model (Williams 2006) shows that the data are consistent with the proportional odds assumption of a standard-ordered logit model (p= 0.68)

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05