School districting and the origins of residential land price inequality

Yong Suk Lee *

Stanford University, United States

A B S T R A C T

This paper examines how education policy generates residential sorting and changes residential land price inequality within a city. In 1974, Seoul shifted away from an exam based high school admission system, created high school districts and randomly allocated students to schools within each district. Furthermore, the city government relocated South Korea's then most prestigious high school from the city center to the city periphery in order to reduce central city congestion. I examine how residential land prices change across school districts using a first differenced boundary discontinuity design. By focusing on the immediate years before and after the creation of school districts and using general functional forms in distance, I find that residential land prices increase by about 13% points more on average and by about 26% points across boundaries in the better school district. Furthermore, there is evidence of dynamic sorting whereby the increase in neighborhood income attracts other high schools to relocate in the following years.

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1. Introduction

This paper examines how education policy generates sorting and affects urban residential land price inequality. Specifically, I utilize the origins of school districts in Seoul to examine whether shifting student assignment from an exam to a school district based system generates residential sorting by income and alters residential land prices. Traditionally in Seoul, each high school administered its own entrance exam and admitted students based on exam results. In 1974, the central government initiated a reform that abolished the exam based system for a district based system where students would randomly be allocated to schools. The policy rationale for this drastic regime shift was the belief that exam based admission promotes inequality and randomly allocating students within school districts would reduce inequality (Kang et al., 2007; Lee, 2014).

If households desire better schools and high school quality is heterogeneous across districts, higher income households could sort towards and differentially increase residential prices in the better school districts when the regime shifts. The underlying reasoning is that under exam based assignment households compete in test score, which is determined by many factors including student ability, but under district based assignment households compete in housing price, which is predominantly determined by household income. Hence, when districts are created the wealthier households outbid the poorer households, sort towards and potentially increase residential prices more

* Address: Freeman Spogli Institute of International Studies, Stanford University, 616 Serra Street, Stanford, CA 94305, United States.
E-mail address: yongslee@stanford.edu

I. Household to school allocation from the base model

A. Exam based selection

B. District assignment
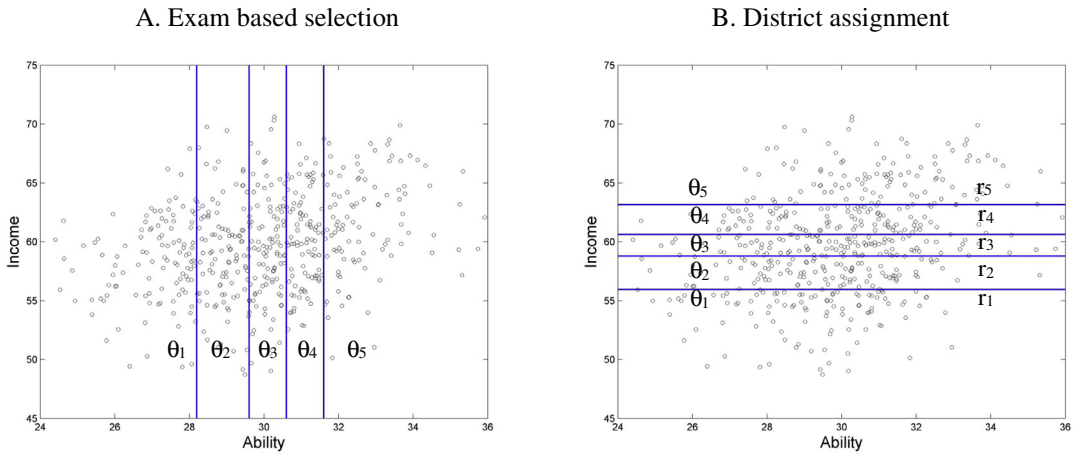
II. Household to school allocation from the extended model

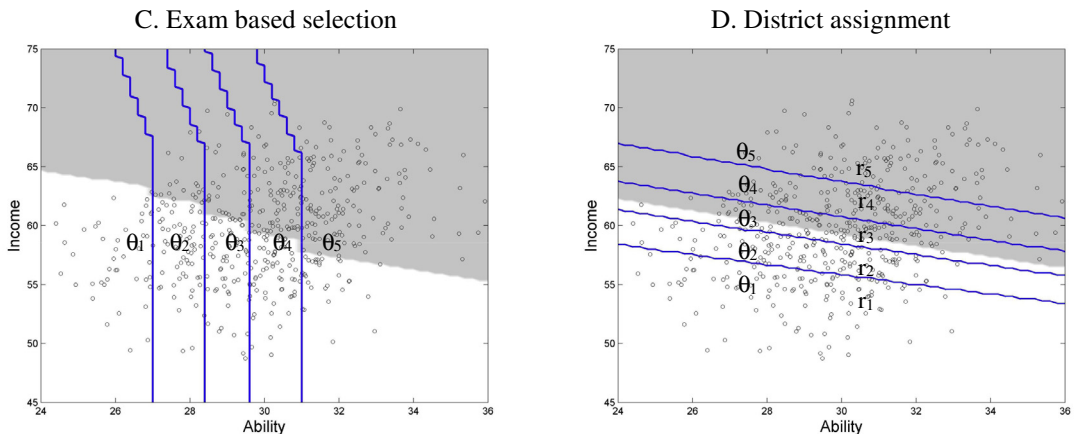C. Exam based selection

D. District assignment

Fig. 1. Equilibrium school allocation – simulation results. *Notes*: Each dot represents a household where the correlation between income and ability is 0.3. The solid line represents the stratification of households to schools. There is one school per neighborhood/district and each school is represented by school quality θ where $\theta_1 < \theta_2 < \theta_3 < \theta_4 < \theta_5$. Under exam based tracking all neighborhoods pay the same price for housing. Rent premium emerges under district assignment and $r_1 < r_2 < r_3 < r_4 < r_5$. The shaded area identifies the households that decide to tutor.

at better school districts. This paper formalizes this intuition in a stylized model and empirically substantiates the prediction on residential land prices.

I examine the change in residential land prices pre and post regime change across newly established school districts in Seoul. Furthermore, a unique event that occurred concurrently with the regime shift helps the identification of residential sorting and price changes. The government relocated then South Korea's most prestigious high school from the city center to the city periphery in order to reduce central city congestion. This event created a mismatch between school quality and pre-existing neighborhood characteristics. I use difference in difference estimation across districts to examine the change in residential land prices at the district level, but also adapt a boundary discontinuity design to control for neighborhood location

and estimate the impact of the reform on the change in residential land prices across boundaries. Economists have used hedonic regressions that include school district boundary fixed effects to estimate household valuation of school quality (Black, 1999; Bayer et al., 2007; Gibbons et al., 2013). These methods rely on the idea that the boundary fixed effects capture the unobserved neighborhood components that would otherwise impact housing prices. I extend this framework to a first differenced analysis and compare outcomes from the same neighborhoods over time. The additional time dimension allows the analysis to relax the assumption that unobserved neighborhood characteristics must be the same for observations across boundaries.

I find that the change in residential land prices in the better school district increases by about 13% points more