THE PRICE OF CROWDING: MODELING THE RENTAL MARKET FOR OVERCROWDED HOUSING IN SHANGHAI

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Introduction

Real Estate is driving China's economy. But with housing prices climbing for decades now, the size and importance of China's real estate market is increasingly watched with concern. The rise of "ghost cities" of empty housing developments has received wide-spread attention in the midst of housing shortages; fears of a property bubble are growing loud.

The research we present here highlights a different side of China's urbanization story: the informal and hidden housing markets that have been forming to meet real demand.

Making use of new data strategies and directing our attention to an often overlooked demographic, this study uncovers a housing submarket, which shows the great length people are willing to go to take part in China's urban economies. The country's planned cities lack visible squatter settlements, but informal markets have still formed in response to the un-met demands of the millions of migrants still coming to the cities. Here, we document the market for bed spaces or 群租房 (group rentals) in Shanghai. Group rentals are essentially formal commercial and residential units that have been illegally converted to overcrowded dormitories where rent is charged by the bed. To maximize rent extraction, landlords typically pack these units with beds, even placing them in bathrooms, kitchens, and walk-in closets.

Data Analysis

Over the course of five months, we collected, cleaned, analyzed, and mapped more than 33,000 online postings advertising bed spaces for rent in Shanghai. In addition, we collected real market data through shopping. We investigate the target demographic, the potential role of gender, and revealed preferences of renters in this housing submarket. Furthermore, we were able to test the quality of scraping internet data by comparing results with our field survey market data.

We employed hedonic modelling, spatial analysis, and simple qualitative text analysis of advertisement texts to study the market for bed spaces in Shanghai.

We found that this market targets students and recent graduates (70%) who are either looking for a job (65%) or are already employed (76%). Advertisers are "picky": roughly one third mentions traits that are unwanted such as drunkenness, gambling, nosiness and night shift worker; white collar workers are mentioned as preferred in roughly 20% of the ads, and 11% even explicitly mention "being obedient." The fact that advertisers specifically mention desired and undesired tenant traits points towards a sellers' market. During our fieldwork we found these claims reiterated.

Mapping this market reveals a doughnut like clustering of group rentals around Shanghai's inner city (Figure 1). This market has not been able to penetrate the city's historic center, which is dominated by old-style public rental housing,

commercial buildings, and luxury developments. Still located close to the urban center, at a distance of about 6.5 km from the CBD, this pattern suggests a sharply increasing discount on the willingness to substitute personal space for proximity to center.

Group rentals tend to be on the edge of what is considered Shanghai's urban core (on average about 4.4 kilometers away from the city center), with very good access to public transit (Table 1). Affordability is accrued by crowding on average 24 people (i.e. 12 bunk beds) into three-bedroom apartments. The average rent for a bed is 850 Yuan (approx. 123 USD); a bed in a room on average shared by six people. Most apartments have rooms separated by gender, but more beds – overall – are rented to men (59%).

The market data strongly suggests the rational pricing of crowding. Looking at the bed price frequency distribution by people per room, we find that beds in rooms with more people tend to be less

Figure 1: Mapping+ of site visits, matched advertisements, and web-scraped advertisements

- • Site Visits [n=177]
- • Matched Online Advertisements [n=132]
- ● Survey Locations [n=11]

- • Scraped Online Advertisements [n=3144]
- Spatial Selection [~6.5km radius around center]

+ Maps produced by authors with the help of ArcMap 10.4 and mapbox.com

expensive. Both crowding variables (people per room and people per apartment) are important price determinants: Adding another bunk bed to a room yields a rent price decrease of 3-9%; adding another bunk bed to the apartment, irrespective of the room in question, decreases the rent by 2-4%. Additionally, bathrooms and the ability to cook are highly values property-based amenities.

Does Gender Play a Role?

We tested for gender rent price discrimination by employing a variety of different gender dummy variables in the hedonic regression models. We found that while women do not pay more for the same group rentals, women pay on average approximately 70 Yuan more for a bed than their male counterparts; but these beds also tend to be in less crowded rooms and apartments. Whether female migrants' choices are gendered at the supply end or whether the data reveal gendered preferences cannot be answered conclusively with the data at hand.

Quality of Scraped Internet Data

Since we used online advertisements to locate our site visits for the survey, we have a subset of online data for which we can compare real and advertised information one-to-one. We found systematic discrepancy between what is advertised on the internet and what actual market prices are. In our fieldwork we discovered that without exception, when we tested responding to these ads, brokers asked to meet us on the street and took us to the real unit which had a different price and location. The beds were on average 43% more expensive and location 323 meters

Table 1: Hedonic Regression Results+, Survey Data [n=747]

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Dist. to CBD (km)	-0.037*** (-5.07)	-0.026*** (-4.11)	-0.023*** (-4.06)	-0.018*** (-3.64)	-0.018*** (-3.69)	-0.018*** (-3.78)	-0.018*** (-5.28)
Dist. to Subway (km)	-0.0776 (-1.27)	-0.0628 (-1.22)	-0.0114 (-0.25)	-0.0377 (-0.93)	-0.0406 (-1.03)	-0.0393 (-0.99)	-0.0547 (-1.91)
Subway Lines	0.0291* (2.51)	0.0314** (3.22)	0.0199* (2.26)	0.030*** (3.91)	0.028*** (3.71)	0.028*** (3.74)	0.007 (1.27)
People per Room		-0.075*** (-17.43)	-0.047*** (-9.24)	-0.027*** (-6.54)	-0.027*** (-6.84)	-0.024*** (-6.79)	-0.015*** (-4.87)
People per Apartment			-0.013*** (-13.15)	-0.019*** (-19.46)	-0.018*** (-19.62)	-0.018*** (-19.63)	-0.011*** (-13.83)
Number of Bathrooms				0.244*** (15.11)	0.230*** (14.69)	0.231*** (14.73)	0.123*** (10.11)
Dummy Lower Bunk					0.127*** (7.43)	0.126*** (7.37)	0.106*** (8.50)
Dummy Fem. Room						-0.0032 (-0.19)	
Dummy Cooking							0.397*** (25.43)
N	743	743	743	743	743	742	743
Adj. R-sq	0.058	0.332	0.458	0.586	0.614	0.615	0.795
F	16.25	93.17	126.5	175.9	169.8	148.7	360.0

+ In all model specifications the logarithm of the monthly rent price per bed is the dependent variable.

from the advertised location; generally, real group rentals were farther away from the city center than advertised. .

Conclusion

Rentals are an important housing source, especially for new migrants to urban centers. However, until recently, data availability and the informal character of it have prevented this market activity from being studied rigorously. Our study uses new data strategies to uncover the vast market for bed spaces in Shanghai, an informal rental market that caters to Chinese migrants. The findings of this paper also highlight the importance of groundtruthing when working with remotely collected data.

For more details, please see the full working paper available at: https://lusk.usc.edu/research-briefs.

Selected References

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