The Impact of New Subway Construction on Development Patterns and Land Values in Beijing

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Introduction

Recent construction on the Beijing subway has been occurring at a very rapid pace—more than 500 kilometers of track were constructed across the city from 2007—2013. A total of 9 new subway lines opened during this period, with new lines opening up in both the center of the city and all across the city’s suburban fringe. Future expansion plans for the Beijing subway are equally ambitious; by 2020, officials expect the city’s subway to grow to over 1000 km in length, making it the world’s largest by a significant margin. It is clear that Beijing officials realize the importance of an excellent subway system for a global city of its size and stature.

In light of these massive investments in subway infrastructure, it is particularly important for the long term viability of the city that development patterns in Beijing shift dramatically from the auto-centric development that proliferated during the city’s rapid expansion in the 1990’s. For the new subway lines to truly be a worthwhile investment, Beijing officials need to work to ensure that development patterns in the future are truly focused around capturing the value of the city’s increasingly abundant transit infrastructure.

Methodology

Quantitative – Point-Based Analysis

Employed the following Hedonic Pricing (HP) model to estimate the impact of proximity to subway entrances on real estate values, when controlling for other possible explanatory values such as construction year, Floor Area Ratio (FAR) and Green Area Ratio:

\[ p_i = a_0 + \sum_{k=1}^{m} a_k x_{ki} + \beta_d d_i + e_i \]

Where:
- \( p_i \): Average price of the ith residential unit, Yuan/m²
- \( x_{ki} \): The kth attribute of the ith residential unit
- \( d_i \): Distance to the nearest metro station in meters (m)
- \( e_i \): random error term
- \( a_0, a_k, \beta \): coefficients to be estimated.

Quantitative – Blocks-Based Analysis

Demarcated blocks using a combination of Baidu Maps and Satellite Imagery to analyze data about developments on a polygon level. The following statistics were computed for each block and analyzed spatially:
- Average Value, Yuan / m²
- Average Construction Year
- Average Floor Area Ratio
- Block Density: Total Building Area / Total Block Area
- Land Productivity: Total Building Area * Average Value / Total Block Area

Case Study – Wangjing, NE Beijing

The Wangjing region in the Chaoyang District on the NE fringe of Beijing was the first case study selected for analysis. Wangjing is located at the current western terminus of Subway Line 15 (opened in 2010), including its intersection with Subway Line 13 (opened in 2002).

Wangjing is a rapidly growing region—close to 50% of the development in the analysis area was constructed after 2007, when the Subway Line 15 was first publicly announced. Prior to this point, most development in Wangjing had been concentrated along the highways to the region’s south and east. Since the announcement of Line 15, much of the development has shifted towards the center of the region in the vicinity of the 3 subway stops.

A total of 103 residential and 45 commercial developments were identified for analysis within the Wangjing region. The per sq. meter values of these developments, along with the (Z-Score) results of a Getis-Ord Gi* hot spot analysis, are mapped below.

Case Study – Guomao, SE Beijing

The Guomao region in the Haidian District in the SE region of Beijing was the second case study selected for analysis. It is located at the intersection of Subway Line 1 (Beijing’s oldest and busiest) and the Loop Line 10 (Opened fully in 2010; already among the system’s busiest lines). Subway Line 6 (also completed in 2010) runs along the northern boundary of the region.

Guomao is known by some as Beijing’s “New CBD”, due in part to it’s high density of foreign firms. Unlike Wangjing, significant development existed in the Guomao region even before new subway construction in the region (likely due to it’s location on the 3rd Ring Road). Infill development has still been occurring steadily in the region—nearly 30% of the developments in the area have been built since 2007.

A total of 77 residential and 96 commercial developments were identified for analysis within the Guomao region. The per sq. meter values of these developments, along with the results of a Getis-Ord Gi* hot spot analysis, are mapped below.

References


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