

Rasgos, mecanismos, desafíos y respuestas de la relación espacial empleo-vivienda desde una perspectiva de red

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Resumen: Con datos de señalización móvil de Shanghái, el estudio construye una red empleo-vivienda y analiza nodos, aristas y organización general. Los resultados muestran una estructura de un núcleo y múltiples clústeres, donde la distancia y el precio de la vivienda determinan la intensidad de los flujos. Las simulaciones apoyan estrategias de asequibilidad residencial y descentralización del empleo.

Palabras clave: empleo-vivienda; red compleja; desplazamientos; asequibilidad de vivienda; Shanghái

1 Revisión de literatura

Los indicadores clásicos de equilibrio empleo-vivienda subestiman los flujos entre unidades. La perspectiva de red define unidades espaciales como nodos y desplazamientos como aristas dirigidas.

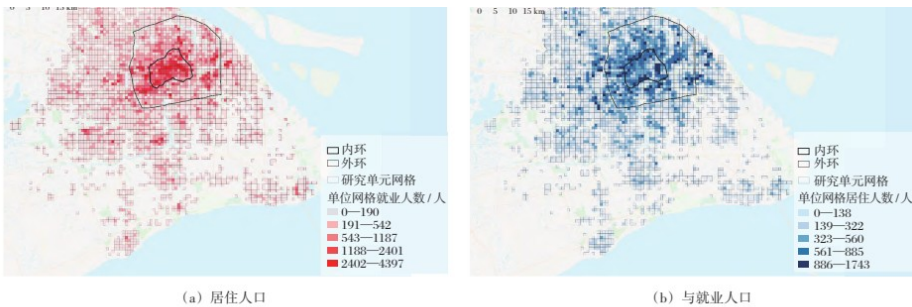


图1 居住人口与就业人口的分布特征

Fig. 1 Spatial distribution of residential and employment populations

2 Diseño y datos

El estudio usa una cuadrícula de 1 km y datos de China Unicom de octubre de 2023, validados con el censo y complementados con precios de vivienda.

3.3 一主与多团: 职住网络的空间组织

随着 r 值从 1 降低到 0.1, 组团数量 形成逻辑。

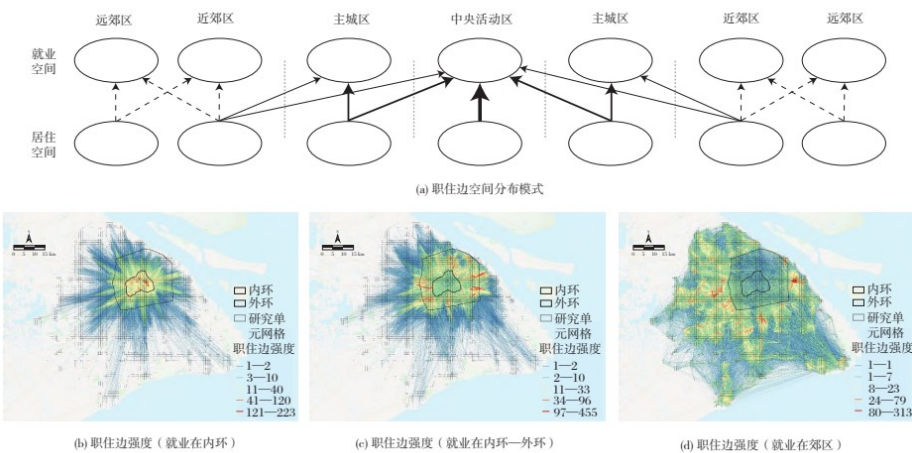


图2 上海市职住边空间分布模式及强度分布特征

Fig. 2 Spatial patterns and intensity of jobs-housing edges in Shanghai

3 Características de la red

El empleo está más concentrado que la residencia. Las aristas hacia el centro son centrípetas, mientras que las suburbanas son más locales. El conjunto forma un núcleo central y varios clústeres.

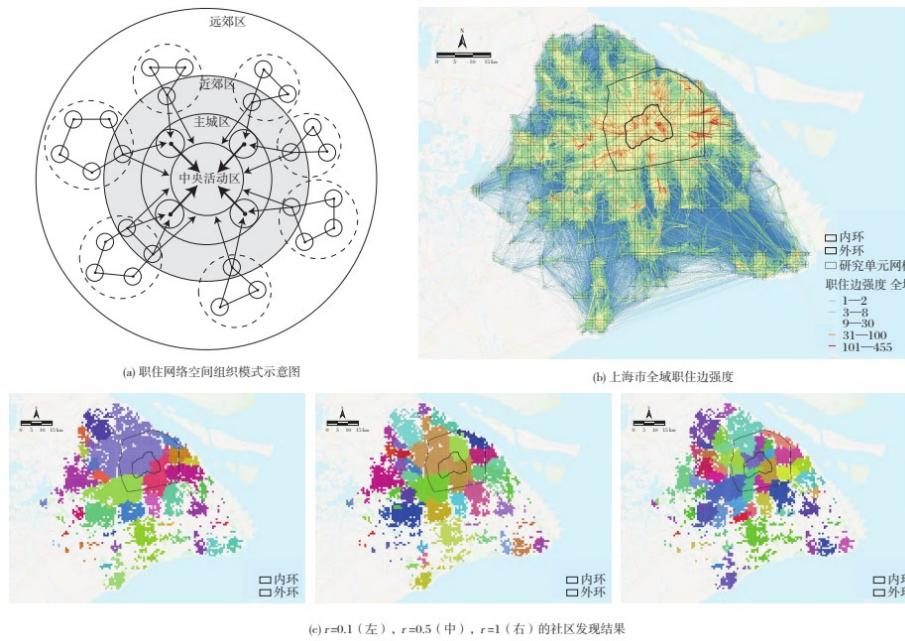


Fig. 3 Network organization, edge intensity, and community-detection results

4 Mecanismos

La formación de aristas sigue una ley de potencia. Distancia y precio de vivienda reducen la intensidad de los vínculos; el empleo central y el gradiente monocéntrico de precios estructuran la red.

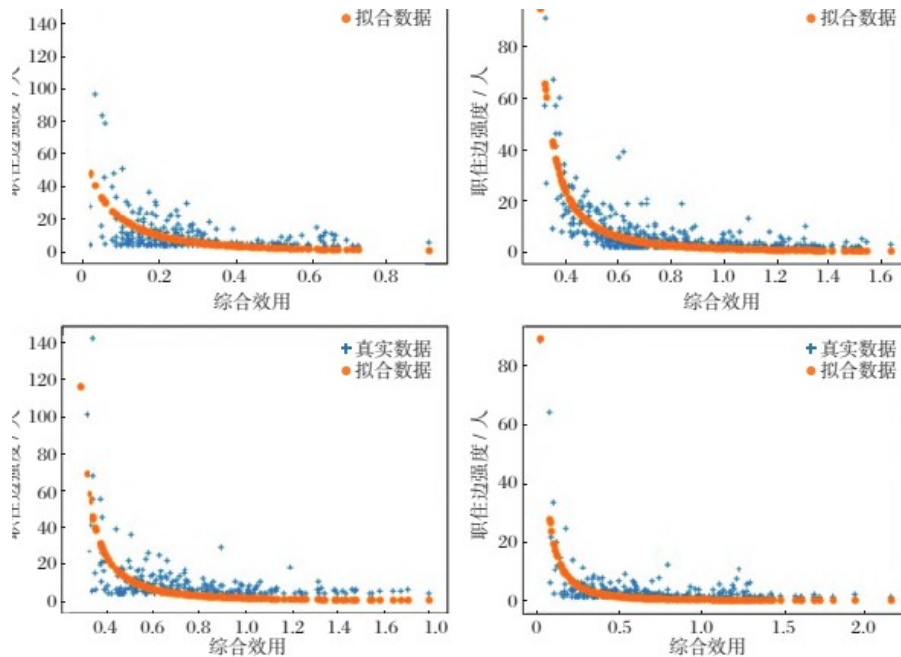


Fig. 4 Model fits for the six largest employment nodes

5 Desafíos

Los problemas principales son separación espacial, cuellos de botella de transporte e inequidad social, especialmente pobreza de tiempo en grupos de bajos ingresos.

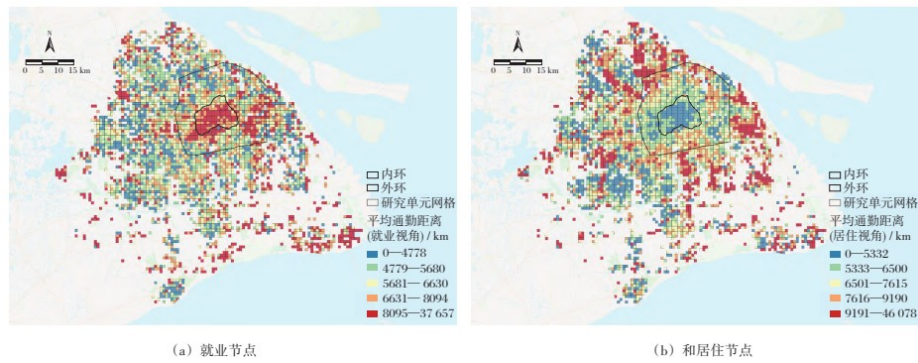


图5 就业节点（左）和居住节点（右）平均通勤距离
Fig.5 Average commuting distance of employment nodes (left) and residential nodes (right)

6 应对 不纳入场景考虑范围。 距离分布呈现出中间低、四周高的典型模式。然而，随着就业多中心化趋势的

Fig. 5 Average commuting distance of employment and residential nodes

6 Respuestas

Las simulaciones indican que mejorar asequibilidad residencial y descentralizar empleo reduce distancias medias y equilibra flujos.

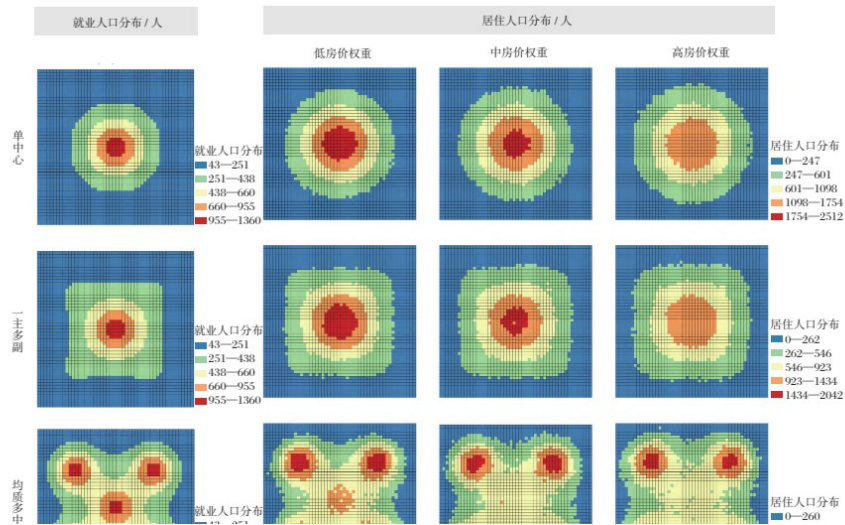


Fig. 6 Simulated employment and residential population under alternative scenarios

7 Conclusiones

La perspectiva de red vincula forma espacial, mercado residencial y empleo, aportando una herramienta para planificar relaciones empleo-vivienda más equitativas.

图6 不同场景下的就业人口、居住人口分布
Fig.6 Distributional patterns of working and residential population under different scenarios

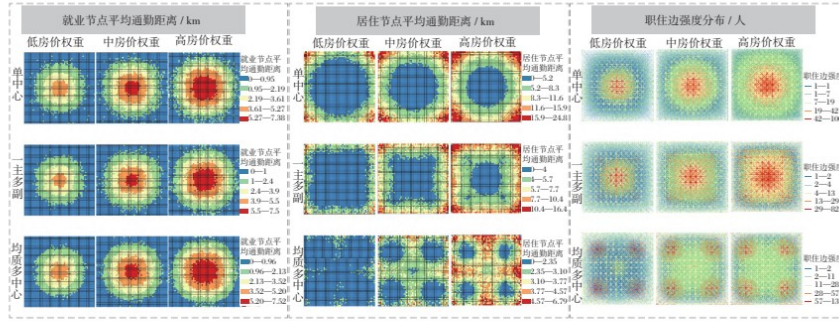


图7 不同场景下的就业节点平均通勤距离、居住节点平均通勤距离及职住边强度
Fig.7 Average commuting distances of employment nodes, residential nodes, and job-housing edge intensity under different scenarios

“一主多副”结构下那样突出。住房价格可接受程度的变化对职住网络的结构特征亦具有一定的影响。尽管这一变化不会直接导致职住网络边的结构特征发生显著改变，但其向心趋势

减弱。
6.2 应对策略
6.2.1 住房价格接受程度提升：多维度策略组合

接受程度提升能直接促进居民就近居住，减少空间平均通勤距离和减弱向心流强度。一是持续强化保障性住房体系建设。针对上海市当前情况，应进一步加大保障性住房的投资与建设力度，确保住房

Fig. 7 Average commuting distances and edge intensity under different scenarios

表1 不同场景下节点平均通勤距离的均值
Tab.1 Mean commuting distance of nodes across scenarios

场景	低房价权重		中房价权重		高房价权重	
	就业节点	居住节点	就业节点	居住节点	就业节点	居住节点
单中心	1.06	5.50	1.68	7.16	2.26	8.26

Tabla 1 Mean node commuting distance across simulation scenarios

1. The ring-based zones are the central activity area inside the Inner Ring, the main city between the Inner and Outer rings, and suburbs outside the Outer Ring. 2. The terms central activity area, main city, and new city follow the Shanghai Master Plan (2017-2035). 3. Comprehensive node city follows the same plan.

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