**An example of estimating neighborhood per capita income**

We first assume that the per capita income of a neighborhood is proportional to its average house rent in Beijing:

$$y_{\mathrm{i}}/y_j = r_{\mathrm{i}}/r_j \qquad (1)$$

where $y_i$ and $y_j$ are the per capita income of neighborhood *i* and *j* respectively; and $r_{\mathrm{i}}$ and $r_{\mathrm{i}}$ are the average house rent of neighborhood *i* and *j* respectively. Per capita income of neighborhood *i* can be related to house rent by:

$$y_i = \frac{y_j r_i}{r_j} \qquad (2)$$

Total income of a district equals the total income of the neighborhoods which located in the districts:

$$\sum_{i=1}^{i=k} n_i y_i = NY \qquad (3)$$

where $Y$ is the per capita income of the district in which neighborhood *i* is located; $n_i$ is the population of neighborhood *i*; N is the population of the district in which neighborhood *i* is located; and $k$ is the number of neighborhoods in the district. Integrating equation (2) yields:

$$\sum_{\mathrm{i}=1}^{\mathrm{i=k}} n_i y_i = \sum_{i}^{i=k} n_i \frac{y_j r_i}{r_j} = \frac{y_j}{r_j} \sum_{i}^{i=k} n_i r_i = NY \qquad (4)$$

The per capita income of neighborhood can be obtained from:

$$y_i = \frac{NYr_i}{\sum_{\mathrm{i}=1}^{k} n_i r_i} \qquad (5)$$

**An example of estimating per capita income of a neighborhood:**

Y=4755.745 USD

| Neighborhood_ID | Distrit_ID | $n_i$ | $r_i$ (USD/ m$^2$) | $n_i$*$r_i$ | $y_i$ (USD)= $\frac{NYr_i}{\sum_{\mathrm{i}=1}^{k} n_i r_i}$ |
|---|---|---|---|---|---|
| 110102011000 | 110102 | 67888 | 22.38 | 1519072.44 | 6716.84 |
| 110102012000 | 110102 | 95433 | 18.82 | 1795671.34 | 5648.17 |
| 110102014000 | 110102 | 46385 | 18.72 | 868465.99 | 5620.24 |
| 110102001000 | 110102 | 51477 | 18.30 | 942188.23 | 5494.19 |
| 110102007000 | 110102 | 116543 | 17.56 | 2047070.96 | 5272.61 |
| 110102009000 | 110102 | 130925 | 17.43 | 2282064.45 | 5232.20 |
| 110102003000 | 110102 | 95497 | 17.10 | 1633357.34 | 5134.18 |
| 110102010000 | 110102 | 116768 | 15.60 | 1821346.84 | 4682.18 |
| 110102015000 | 110102 | 30547 | 15.13 | 462138.16 | 4541.33 |
| 110102013000 | 110102 | 36997 | 15.12 | 559369.03 | 4538.49 |
| 110102016000 | 110102 | 43455 | 14.53 | 631293.53 | 4360.85 |
| 110102017000 | 110102 | 73692 | 14.35 | 1057717.77 | 4308.53 |
| 110102019000 | 110102 | 95737 | 13.51 | 1293323.51 | 4055.15 |
| 110102018000 | 110102 | 51877 | 12.08 | 626677.81 | 3626.18 |
| 110102020000 | 110102 | 179536 | 11.09 | 1990894.50 | 3328.71 |
| | | N= $\sum_{i=1}^{k} n_i$ =1232757 | | $\sum_{\mathrm{i}=1}^{k} n_i r_i$ =19530652 | |

Table S1: Studies published during 2005-2016 on the relationship between neighborhood park access and socioeconomic conditions.

| **No** | **Country** | **Study area** | **Analysis unit** | **Park access calculating methods** | **Conclusion *** | **Reference (in the manuscript)** |
|---|---|---|---|---|---|---|
| 1 | Australia | Brisbane | Household | Household survey | 1 | [1] |
| 2 | Australia | Brisbane | Individual | Visitor survey | 5 | [2] |
| 3 | Australia and China | Brisbane (Australia) and Zhongshan (China) | Household | Household survey | 1 | [3] |
| 4 | Iran and Tehran Province | Tehran City | Geometric census block | Euclidean distance | 2 | [4] |
| 5 | Israel | Tel Aviv | Individual | Minimum Euclidean distance, coverage (based on accessible park size and population) | 1 | [5] |
| 6 | Japan | Yokohama | 1 km census grid | Container (number and size of parks) | 1 | [6] |
| 7 | South Africa | Cape Town | Socio-economic area | Flow map analyses (based on network analysis distance) | 1 | [7] |
| 8 | UK | Glasgow City, Scotland | Data zone | Container (number of parks) | 3 | [8] |
| 9 | USA | Greensboro, North Carolina | Census tract | Park quality | 1 | [9] |
| 10 | USA | Los Angeles | Census tract | Container based on buffering (park size) | 1 | [10] |
| 11 | USA | Santa Clara County, California | Census tract | Buffering | 1 | [11] |
| 12 | USA | Los Angeles | Individual | Visitor survey | 1 | [12] |
| 13 | USA | Bridgeport | Census tract | Buffering, park quality | 3 | [13] |
| 14 | USA | six cities: Rockford, Bloomington, Decatur, Urbana-Champaign, Peoria, and Springfield | Census block groups | Network analysis distance | 3 | [14] |
| 15 | USA | four cities: Albuquerque, Chapel, Hill/Durham, Columbus and Philadelphia | Individual | Park quality | 3 | [15] |
| 16 | USA | New York | Census tract | Buffering | 4 | [16] |
| 17 | USA | New York City | Census block groups | Container (number and size of parks), park quality | 4 | [17] |
| 18 | USA | Phoenix, Arizona | Census block | Buffering, park quality | 4 | [18] |

| No | Country | Study area | Analysis unit | Park access calculating methods | Conclusion * | Reference (in the manuscript) |
|---|---|---|---|---|---|---|
| | | | groups | | | |
| 19 | USA | Phoenix, Arizona | Census block groups | Buffering, walkability, park quality | 4 | [19] |
| 20 | USA | Baltimore, Maryland | Census block groups, census tract | Buffering (number and size of parks) | 4 | [20] |
| 21 | USA | Entire USA | Census tract | Population weighted distance (based on Euclidean distance) | 4 | [21] |
| 22 | USA | six states: CA, IL, MD, MN, NC, NY | Census tract | Container (number of parks), park quality | 4 | [22] |
| 23 | USA | Maryland | Census block groups | Container (number and size of parks) | 4 | [23] |
| 24 | USA | Nation, US | County | Buffering | 6 | [24] |

* We summarized conclusions into six types, denoted by numbers 1-6.
1: Disadvantaged socioeconomic groups have less access to parks.
2: Disadvantaged socioeconomic groups have more access to parks.
3: There's no significant relationship between park accessibility and socioeconomic characteristics/ there's no significant difference in park accessibility among different socioeconomic groups.
4: Some studies report the relationship in a complex way.
5: The distance decay model for younger people as a proportion of the population was much flatter than it was for older people.
6: Access to exercise opportunities was most notably associated with no leisure-time physical activity (r = −0.47), premature death (r =−0.38), and obesity (r = −0.3)

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