The Economics of Maps (Nagaraj and Stern, 2020)

Since the Age of Discovery, maps have played an important role in human history. Currently, maps are essential for many industries. Among them is transportation, mining, flood insurance and real state. Compared to their potential influence, there is scarce research focused on the consequences of maps on outcomes like racial segregation, over-priced insurance, or tax evasion.

One Sentence Summary

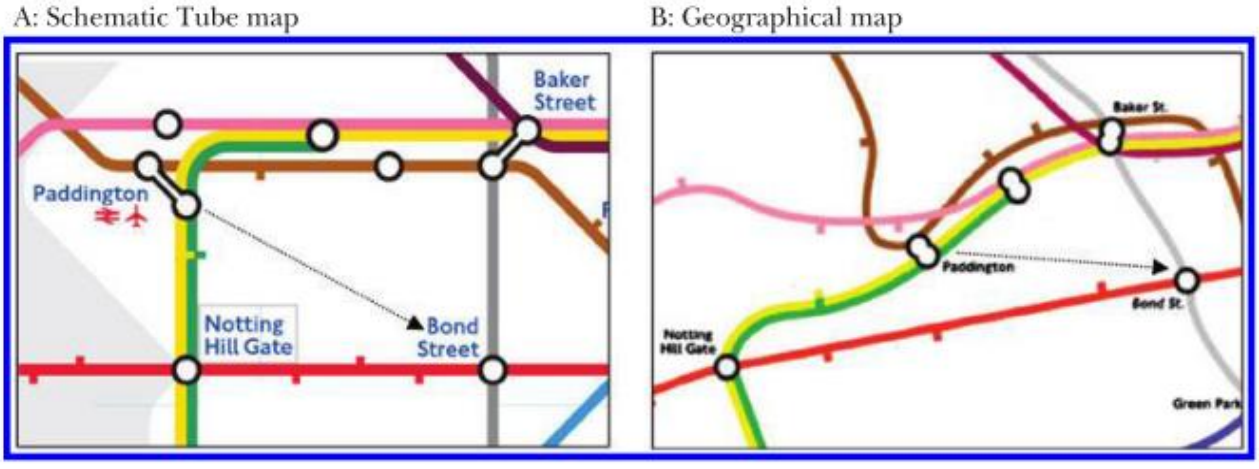
This essay defines maps as a non-rival but excludable good, providing a theoretical economic approach to understand maps. Furthermore, it explains how mapmakers purposely simplify the reality leading to market failures. This simplification is influenced by the institutional context, intellectual property, high costs of gathering data, the demand for maps and map technology innovations.

Main Findings

Maps are a simplification of reality. The citizens in London often utilize the metro or tube maps. Those are characterized by their straight lines and sharp turns, which are far from reality. Sometimes this design could lead to individuals make suboptimal choices. On the left of Figure 1 there is a metro map of a part of London, on the right it's the geographical map of the same metro lines. Imagine traveling from Paddington to Bond Street. Most of the travelers chose to go through Notting Hill Gate instead of Baker Street, even though it is 15% slower. This effect occurs because Notting Hill Gate is represented on the left image as south of Baker Street. However, on right-side of Figure 1 it seems that Baker Street is closer to Bond Street.

The mapmaker's decision of what to present (data) and how to present it (design) could have potential outcomes to human, government and firm decisions. In the authors words: "Not

Figure 1



Source: (Nagaraj and Stern, 2020)

only is the map not the territory or a *mirror of nature* but it is also a potentially biased representation shaped by social, political, and economic forces." The economic and institutional context shape the data and design chosen for a given map. First, the high costs of satellite image services, gathering geographical and landmark data, leads to a non-competitive market. Second, the mapmakers consider the end users preferences. A map for an art museum will try to replicate homogenous preferences, while a city map will try to be as broad as possible. Third, maps are sensitive to intellectual property laws and competition. Strict copyright laws could incentivize original mapmaking but gives more incentives to oligopolistic behaviors. Fourth, maps differ according to the mapmaker's organization type like non-profit or for-profit. For example, a Google Maps (for-profit) provides perimeter information on refugee camps in Jordan, while OpenStreetMap (non-profit) displays streets and services inside the camp[1]. Finally, technology advances can also improve the amount of data and what data can be displayed on maps.

Concluding Remarks

Economists and data scientists use maps to make an illustrative point. Recently, spatial econometrics have introduced the use of maps as data for causal analysis. Yet, there is much to be done to create a competitive map market that incentivizes optimal decision making.

References

- Nagaraj, A., Stern, S., 2020. The Economics of Maps. J. Econ. Perspect. 34, 196–221. https://doi.org/10.1257/jep.34.1.196.

[1] The image of the paper can be viewed in the next link.