Public Transit in Los Angeles – Accessibility and its Role concerning Socio-Economic Inequality

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The role of public transit in Los Angeles County is very special. Being a car-centric region for decades, public transit has had only a minor role in the transport system of the metropolis in Southern California. However, recently city and county officials rediscovered the potential of urban mass transit, resulting in serious extension plans addressing the region's metro system (see Los Angeles County Metropolitan Transit Authority, 2013).

Public transportation systems provide accessibility to residents without being dependent to self-owned means of transport such as a car. This function is very important to particular social groups within the region, especially those who cannot afford owning a car or who deliberately choose not to own a car. Their mobility depends, among other factors such as residential choice, on the efficiency of the public transit system.

This paper aims to analyze the efficiency of the current public transit network (including the modes LRT, bus and taxi) by calculating different accessibility measures. Furthermore, the spatial distribution of accessibility with respect to various socio-economic characteristics is analyzed in order to discuss the relationship between public transit access and social inequality. In particular, the following research questions are tackled: Where are the centers of Los Angeles County with respect to public transit accessibility? Does the current public transit accessibility pattern correlate to other socio-economic patterns? Is accessibility via public transit granted to people who need to rely on it? Which population groups will benefit from future public transit extensions?

Accessibility in this paper is defined as the outbound attractiveness of a spatial unit in LA County on a 5-digit zip code level. Therefore, various partial accessibility indicators, which are well established in literature (see e.g. Gutiérrez, 2009), are applied. In the data collection and calculation process, the research focus lies on work mobility. Consequentially, all travel times are configured such that people are able to arrive at their destination at 10 a.m. PST on a Monday; trip data is obtained from Google Maps. In order to account for work mobility, a workplace weighted average travel time indicator incorporating the workplace attractiveness in form of the number of workplaces in a spatial unit j (WP_j) is calculated according to the following formula:

$$ATT_i^w = \frac{\sum_j^N \text{Travel Time}_{ij} * WP_j}{\sum_{j=1}^N WPj} \quad i,j \in N.$$

Alternatively, a potential indicator weighing workplaces in a spatial unit with its inverse travel time can also be computed:

$$PI_i = \sum_{j=1}^N \frac{WP_j}{\text{Travel Time}_{ij}} \quad i,j \in N.$$

Figures 1 and 2 depict the resulting patterns. Zip code regions without access to public transit are left blank.

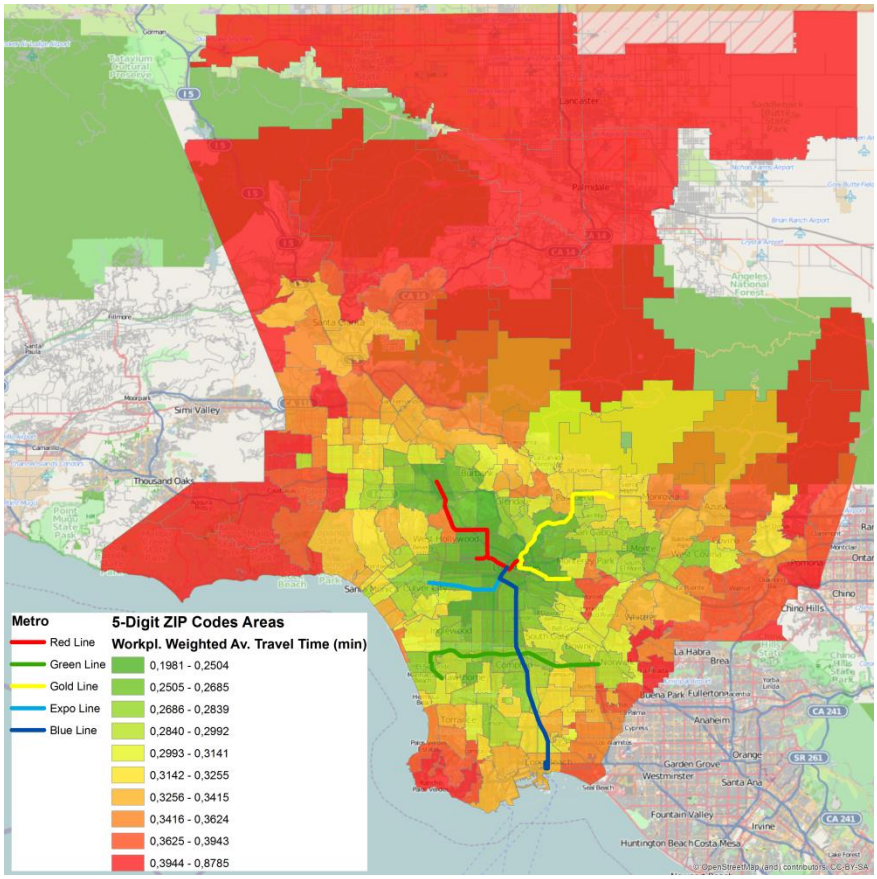

Figure 1 - Workplace Weighted Average Travel Time for Los Angeles County (OSM, Google and Census 2010 data)

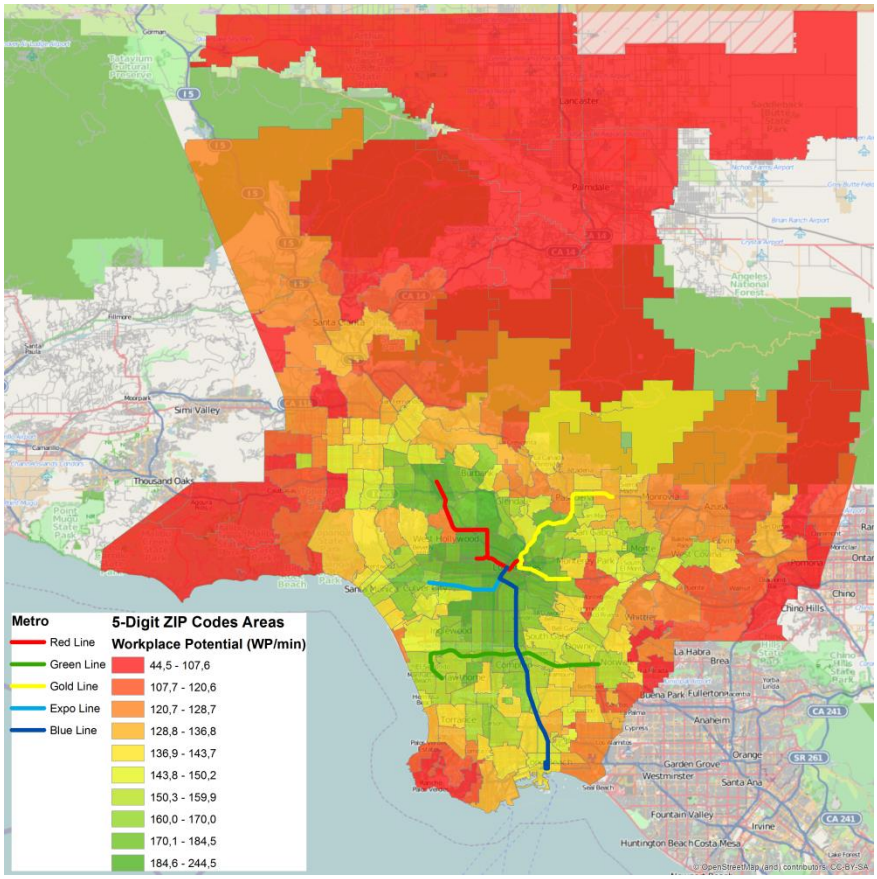

Figure 2 - Workplace Potential for Los Angeles County (OSM, Google and Census 2010 data)

The patterns show the centrality of Los Angeles County, which seems to correlate strongly with access to LRT lines. Using Figures 1 and 2 the first research question can be answered.

In order to tackle the second and third question, statistical methods are then applied to identify correlations with various socio-economic conditions of the regions. Following this identification process, the effects of future LRT network extensions can be analyzed. The question if, as a result, social inequality persists or reduces will be discussed at the end of the paper. However, due to the early stage of this paper, no results can be shown here yet.

References

Gutiérrez, J. (2009) Transport and Accessibility, In: Kitchin, R. and R. Thrift (eds.) International Encyclopedia of Human Geography, Elsevier, Oxford, pp. 410-417.

Los Angeles County Metropolitan Transit Authority (2013) Projects and Programs, URL: http://www.metro.net/projects/ (12.3.2013).