

## Is Sky the Limit for Compact Urbanism?

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### Abstract

In contrast to the car-dependent urban sprawl, the compact urban form generates less carbon footprints, minimizes energy consumption and provides more efficient public service, better social interaction and walkability. If density is well planned and managed, such as the “Jacobs Density,” compactness will empower city to become more livable and sustainable. Nevertheless, if an urban area is overly densified or crowded, negative consequences, such as overly inflated real estate price and recurrent congestion will be inevitable results. To that end, this study focuses on probing issues as to should there be a limit for compactness and what that limit might be. The concept of the proposed optimal density is hinged at the macroscopic level seeking a compromised level of density to balance socioeconomic attributes related to quality of living in a metropolitan urban area. These socioeconomic attributes include (1) *Green City index*, (2) *housing prices* and (3) *travel time index*, which are selected due mainly to their significance with residents’ quality of living and ample correlation with the population density. A Minimax mathematical programming problem is established and solved iteratively until a steady-state compromised solution is found. It was found that, except New York City, the population densities in the majority of MSAs are projected to increase, with the expectation that the Green City index can be substantially increased to enhance the quality of life and city sustainability. As a consequential trade-off, however, the housing prices and the average travel time during the peak period are projected to increase as well.

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