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Knowledge and Visual Analytics

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The goal of this project was to help bring awareness of housing affordability issues in the United States and to create an interactive visualization that captures the challenges faced by potential homeowners today. To do this, we developed 7 housing affordability indices (HAI), or methods, that were used to address problems with the measurement of housing affordability. These methods built on the national HAI standard set by the National Association of Realtors (NAR) to be more easily reproduced and understood. By comparing these methods across 539 metropolitan statistical areas (MSA - each with a population of 50,000+ connected by a Census-designated urban area) from 2009 through 2019, we were able to see that income adjustments for rent expenses in larger metro areas had the greatest impact at reducing the number of people in unaffordable housing while cost of living adjustments further increased the affordability of MSA outside of major population centers.

From our choropleth map of income per capita at the county level we could see that the amount of income we have accrued over the last several decades has increased rapidly and that, under traditional financial practices, some locations have highly unrealistic maximum monthly payments (using 28% rule). Additionally, data from the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), and U.S. Census Bureau shows that gains from income have not kept pace with the increasing cost of goods and services, including median home values. We focused on the 10-year timespan of 2009 through 2019. This was wide enough to paint a clear picture that regardless of the method of measurement, income gains were much greater in more affordable MSA. This held true even in cases where median income was at or double the national average because costs were often much higher in these areas as well. Importantly, when the average amount of debts and obligations are subtracted from median incomes (such as education, car payments, payday loans, and other consumer debts), no MSA in the United States is considered affordable.

A combination of R, Shiny, and Plotly were used to develop this interactive shiny web app using publicly available data that is reliable and regularly updated. It is important that we continue to reevaluate what is considered affordable since our visuals show that minimum and maximum median income across all metro areas is spreading. This shifting of the concentration of wealth is likely responsible for the widening housing affordability gap and it is occurring in less time today than in recorded history for the American housing market. In order to make the right decisions about housing for the public and policymakers alike, we must measure how affordable housing is correctly while avoiding mistakes of previous decades.