# Bright Lights, Big City

Urbanisation is taking place around the world as increasing amounts of people are living in and migrating to urban areas. Even in countries like India in which the majority of people still live in rural areas, the largest population growth is currently taking place within cities. With the intensification of people in urban areas, many challenges such as sustainability, economic growth, poverty reduction, and increasing infrastructure and transportation capacities have also increased. To help create recommendations and solutions for large urban areas to deal with the many problems that they face today, think tanks like the Martin Prosperity Institute are constantly analysing regions in relation to numerous indicators. This is difficult though as data collection at subnational and urban levels is difficult or completely lacking in many countries. Even in Canada, research on our urban areas is extremely difficult due to the cancelation of the long form survey. In order to try and better study urbanisation especially in regions in which data is not readily available, the MPI and colleagues have examined Nighttime light (NTL) data from the U.S. Air Force's Defense Meteorological Satellite Program/Operational Linescan System. This Insight will provide a quick look into the findings from the research paper *Night-Time Light Data: A Good Proxy Measure for Economic Activity?*.

The paper *Night-Time Light Data: A Good Proxy Measure for Economic Activity?* looks at the relationship between NTL and numerous variables capturing economic activity to determine whether NTL data can be accurately used as a proxy measure for economic activity or population across the world. The analysis used in this paper focuses on Sweden because of the fine-grained micro data available for Swedish establishments and individuals. By merging this detailed demographic and economic data with the NTL data the paper examines the relationship between specific levels of economic activity and light emissions. The full list of variables included in the analysis can be found in the paper.

The two types of NTL data applied are Saturated Light in which the light values range from 0 to 63 and Radiance data with light values from 0 to 846. The authors matched very specific Swedish locational population and establishment density data to both types of light data and found that the night time light did in fact match up. Where there is a greater amount of light, there are also greater population and establishment densities, making night time light a suitable measure for urbanization. While both types of light data proved to be reasonable, the Radiance light data is indeed a more accurate measure than the Saturated data. While the Saturated data is good for recognizing metros on a map, it is almost impossible to look for patterns within a metro using this data. This is because an inability to show variation within areas that exhibit high amounts of light. For example, a large metro like New York would appear to be as bright as a smaller metro as the saturated data does not provide variation within high values of light. The Radiance data allowed for larger variation within regions that exhibit high amounts of light, to the point where downtown cores could be identified, and larger cities could be differentiated from smaller ones.

Due to the lack of accurate and comparable measures of economic activity across the world, the aim was to test night time light data as an accurate proxy measure of urbanisation. By combining the light data with the extremely detailed Swedish data we have found that night time light is an
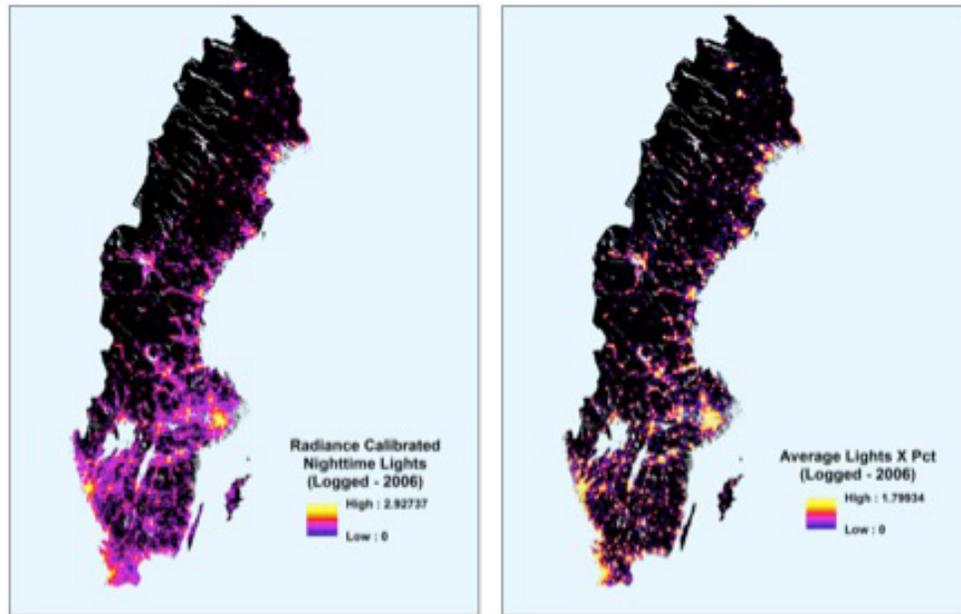
accurate measure for population and establishment density. Out of the two types of light data, Radiance light produced the most accurate results. We have also tested economic indicators in relation to night time light, and to see those results, read the full paper found here. As cities and metros become more urbanised, the need to understand and study them becomes imperative to help examine the prosperity, development and growth of the places in which most of the world's population lives. There will always be limits to analysing many urban areas due to data limits, but we here at the MPI believe that night time light data can be used for studying urbanisation. We will continue to experiment with night time light data to see what other discoveries we can make.

The Martin Prosperity Institute at the University of Toronto's Rotman School of Management is the world's leading think-tank on the role of sub-national factors—location, place and city-regions—in global economic prosperity. We take an integrated view of prosperity, looking beyond economic measures to include the importance of quality of place and the development of people's creative potential.