

Abstract

This paper exploits daily infrared images taken from satellites to track economic activity in advanced and emerging countries. We first develop a framework to read, clean, and exploit satellite images. Our algorithm uses the laws of physics (Planck's law) and machine learning to detect the heat produced by cement plants in activity. This allows us to monitor in real-time whether a cement plant is working. Using this information on around 500 plants, we construct a satellite-based index tracking activity. We show that using this satellite index outperforms benchmark models and alternative indicators for nowcasting the production of the cement industry as well as the activity in the construction sector. Comparing across methods, we find neural networks yields significantly more accurate predictions as they allow to exploit the granularity of our daily and plant-level data. Overall, we show that combining satellite images and machine learning allows to track economic activity accurately.

Keywords: Big data, data science, machine learning, construction, high-frequency data

JEL codes: C51, C81, E23, E37