Turning real estate data into decision-making tools

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David Geltner (left), a professor of real estate finance, and postdoc Alexander van de Minne are helping translate masses of data into predictive tools for investors. Credit: Tom Gearty

The unprecedented amount of commercial real estate information being

generated today presents new opportunities for analysts to develop models that translate masses of data into predictive tools for investors. Recognizing that potential, the MIT Center for Real Estate (CRE) has launched the Real Estate Price Dynamics Research Platform (REPD Platform) to explore models and analytics that can lay the foundation for providing real-world solutions. The platform builds on CRE's earlier work in the field of commercial property price index development.

The lead researcher for the platform is postdoc Alexander van de Minne, with David Geltner, professor of real estate finance, serving as principal investigator. Geltner is the lead author of "Commercial Real Estate Analysis and Investment," a standard graduate textbook in the field.

"Real estate investment has always been a world with a lack of good empirical data," says Geltner, a pioneer in the development of transaction price based commercial property price and investment performance indices over a decade ago. "But with the digital revolution, there's an explosion of data aggregators, information companies, and other sources of empirical data relevant to commercial real estate investment."

In addition to the increase in data availability, Geltner says, the other crucial component for the REPD Platform has been the advancement of econometric capability to handle the new data. Econometrics, a toolkit of statistical methods used by economists to test hypotheses using real-world data, provides a means to turn enormous quantities of data into actionable information.

The aim of the platform, whose research and analysis will be available to the public, is to advance real estate investment-related analytics in such areas as price and rent indexing (how prices change over time) and automated valuation models. These can ultimately have a real-world impact by improving investment and management decisions. One feature

that distinguishes the REPD Platform from most other property investment research is the application of Bayesian techniques, as distinguished from classical statistics. By employing Bayesian econometrics, researchers are able to use prior knowledge and economic theory to help inform the statistical analysis, which Geltner says makes the analysis more efficient.

Van de Minne says that this is important because of a seeming paradox: "Even though we have much more data than we've ever had before in commercial real estate, we still find ourselves typically in situations of scarce data."

This occurs because the analysis of investment properties is subject to a host of variables, including market and submarket location as well as varying data sources, which make the study of real estate pricing very challenging. Geltner adds that because the values of properties are so market specific—with market rents tied to the value of the asset—"you've really got to track locally."

"What is going on in San Francisco in terms of asset pricing may be totally different from what is going on in Dallas," he says. "And even what's going on in the Dallas central business district is different from what's going on in North Dallas."

Van de Minne, using the analogy of how an insufficient number of property sales within a given period can produce skewed results, says there are inherent flaws in using a classical statistical model for real estate price indexing.

"If you're looking at a price index that has only two data points [property sales], for instance, and you try to use that sample to tell us that prices went down 85 percent in one quarter, can you really take that conclusion seriously?" he asks. "So what our models allow us to do is to still use that

information, but to weigh that data against our a priori knowledge."

Although the primary focus of the REPD Platform is on commercial property asset prices, related subjects are being explored, such as rents and space market dynamics, with the platform already being used to study office markets in India. The platform also engages with other research organizations within CRE, including the Real Estate Innovation Lab and the newly created China Future City Lab, which focuses on China's rapidly growing urban areas. The researchers also collaborate with academics from other disciplines within MIT, such Youssef M. Marzouk, the director of the Aerospace Computational Design Laboratory.

The REPD Platform was seed funded with a gift from long-time CRE industry partner Real Capital Analytics Inc. In classic MIT "mens-et-manus" fashion, the platform serves as a bridge between pioneering academic research and industry practice.

"This is an academic entity in an academic institution, so we're not particularly driven by 'Is there a profit?' in producing this information product," says Geltner. "We're more about discovering fundamental things about the real estate investment industry—the markets and how they work."

The function of the platform is not purely academic either, says van de Minne.

"We are interested in the actual needs of people in the industry," he says. "We want to have an impact, so we're not just living in an academic bubble."

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