

CERF Fellow Report

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Name: Thies Lindenthal

Faculty: Land Economy

E-Mail: htl24@cam.ac.uk

Research Title and Abstract:

Unique Assets, Quality Uncertainty and Noisy Prices

This project estimates real estate asset uniqueness along previously not quantifiable dimensions, including shape, size, architecture, perceived beauty, maintenance or shape similarity. This richer picture of individual buildings and their comparability to other properties will improve any estimates of fundamental value. More interestingly, though, it will reveal distributions of transaction values in relation to fundamental value. Since uniqueness of the assets co-determines the availability of information from comparable sales, I hypothesise that uniqueness is also linked to the absolute deviations of sales prices from fundamental values: If little is known about fundamental value, then sales prices will contain more noise.

Research findings to Date:

The new research programme is ongoing and has produced two working papers and one research grant (CDBB, £25K):

- *"Machine Learning, Building Vintage and Property Values"* (with Erik B. Johnson)
This project will be presented at two relevant conferences in our field
 - Urban Economics Association, Annual Meeting (NYC, Oct. 2018)
 - ASSA, Annual Meeting (Atlanta, Jan. 2019)
- *"Predicting Price Coarseness"* (with Carolin Schmidt, ZEW Mannheim)
- *Centre for Digital Built Britain (CDBB) project "Machine Learning and AI in the Built Environment"*

- This project improved the foundations for applying tried-and-tested machine learning (ML) approaches to the built environment. This mini project reduced the cost of creating and deploying ML systems by creating versatile and extendable API's, data management infrastructure and mobile apps. A future version of the API's might be commercialised in areas like mortgage origination, insurance claim processing or property tax (non-UK, though) estimation

Links to your research outputs:

- Working Paper "*Machine Learning, Building Vintage and Property Values*"
<https://www.lindenthal.eu/wp-content/uploads/2018/04/manuscript.pdf>
- "*Machine Learning and AI in the Built Environment*", Final report.
https://www.cdbb.cam.ac.uk/Downloads/ResearchBridgeheadDownloads/CDBBMiniProjectFinalReportThiesLindenthal_edited.pdf

Publications generated during the CERF fellowship(s)

- Lindenthal, T. "Beauty in the Eye of the Home-Owner: Aesthetic Zoning and Residential Property Values" (2017). *Real Estate Economics*.
- Lindenthal, T., Eichholtz P. and D. Geltner (2017). "Land Assembly in Amsterdam, 1832-2015". *Regional Science and Urban Economics*.
- Lindenthal, T. (2017). "Estimating Supply Elasticities for Residential Real Estate in the UK", in: Huang, B., Cao K. and E. Silva (Eds.) *Comprehensive Geographic Information Systems: Socio-economic applications*. Elsevier.

Seminars, conference presentations (since Aug. 2016)

- Participated in CERF Cavalcade (23.5.2018) with "Unique Assets, Quality Uncertainty and Noisy Prices"
- ASSA/American Real Estate and Urban Economics Association (AREUEA) Annual Meeting, Chicago (Jan. 2017). Presented research paper titled "Beauty in the Eye of the Home-Owner: Aesthetic Zoning and Residential Property Values"

Press releases and other academic activities

- I am co-organiser of the *Cambridge/NUS/Florida Real Estate Finance and Investment Symposium* which will be held at the University of Florida, on Oct. 25th/26th. This

symposium is linked to a special issue at the *Journal of Real Estate Finance and Economics*.

I am an editor for this special issue.

Comments