

CERF Fellow Report

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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 working papers and two (modestly sized) research grants (CDBB, £25K; ZEW SEEK EUR 75K):

- *"Machine Learning, Architectural Style and Property Values"* (with Erik B. Johnson)

This project has been presented at three relevant conferences in our field

- Urban Economics Association, Annual Meeting (NYC, Oct. 2018)
- ASSA, Annual Meeting (Atlanta, Jan. 2019)
- Weimer School Session, Homer Hoyt Institute (Jan 2019, Singer Island, Florida). This conference is by invitation only and I am honoured to have been selected to participate.
- This paper is currently under review at the Journal of Urban Economics

- *"The Odd One Out: Predicting Price Coarseness"* (with Carolin Schmidt, ZEW Mannheim)
 - Accepted for presentation at ASSA 2020
 - Presented at Weimer School May Session, Homer Hoyt Institute (May 2019, Singer Island, Florida). Conference was on "New data and tools in real estate research"
- *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
- Research grant (EUR 75K) from *Strengthening Efficiency and Competitiveness in the European Knowledge Economies (SEEK)* at the ZEW – Leibniz Centre for European Economic Research. Joint application with Carolin Schmidt.
 - Follow-up to the CDBB project to improve ML transfer learning in image recognition, specialised to the the built environment. Real estate research will finally get computer vision models that have been fully retrained with building data instead of general purpose models.
 - The funding will be used to support a new PhD starting under my supervision in September, IT infrastructure and travel.
- New working paper *"Implications of Irreversibility for the Valuation of Urban Land: Applications to House Price Dynamics and Volatility"* (with John M. Clapp)
- Other working papers (not directly related to CERF project)
 - *"Exogenous Demand Shocks and Liquidity of Turkish Residential Real Estate"*, with Tuğba Güneş
 - *"Local market power in residential property markets"*, with Joseph Ooi
 - *"500 Years of Urban Rents, Housing Quality and Affordability"*, with P. Eichholtz and M. Korevaar (submitted for review)

https://www.researchgate.net/publication/328278380_500_Years_of_Urban_Rents_Housing_Quality_and_Affordability

Links to your research outputs:

- Working Paper "*Machine Learning, Architectural Style and Property Values*"
https://github.com/thies/paper-uk-vintages/blob/master/text/manuscript_assa.pdf
- "*Machine Learning and AI in the Built Environment*", Final report.
https://www.cdbb.cam.ac.uk/Downloads/ResearchBridgeheadDownloads/CDBBMiniProjectFinalReportThiesLindenthal_edited.pdf
- "*The Odd One Out: Predicting Price Coarseness*"
<https://www.dropbox.com/s/apzo3r4uvqxnk7/The%20Odd%20One%20Out.pdf?dl=0>

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)

- UCL conference: "The Case of Affordable Housing: a global perspective on financing and institutional ownership", presented "*500 Years of Urban Rents, Housing Quality and Affordability*"
- Weimer School May Session, Homer Hoyt Institute (May 2019, Singer Island, Florida), presented "*The Odd One Out: Predicting Price Coarseness*"
- Weimer School Session, Homer Hoyt Institute (Jan 2019, Singer Island, Florida). Presented "*Machine Learning, Building Vintage and Property Values*"

- ASSA/American Real Estate and Urban Economics Association (AREUEA) Annual Meeting, Chicago (Jan. 2019). Presented “*Machine Learning, Building Vintage and Property Values*”
- Urban Economics Association, Annual Meeting (NYC, Oct. 2018). Paper “*Machine Learning, Building Vintage and Property Values*”
- ReCapNet conference. Presented “Local market power in residential property markets”. (Nov 2018, Mannheim)
- 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 was held at the University of Cambridge, on Sep. 26-27th, 2019. 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.
- I initiated a session on “Machine Learning and Real Estate” at the ASSA meeting in San Diego, which I will chair. Also, one of my papers (“The odd one out”) will be on the conference programme.

Comments

- I passed my probation period successfully.