

The challenge of residential land valuation

Land valuation is important for multiple reasons. It is central to land taxation, two-rate taxation of land and buildings, taxation of land value increments and public land leasehold systems. Examples of papers published in the *Journal of European Real Estate Research (JERER)* on these topics include [Grover *et al.* \(2017\)](#), who examine how the barriers to the successful implementation of value-based property tax reforms in emerging European economies can be overcome, and [Korthals Altes \(2019\)](#), who investigates land pricing in the context of the extension of public leaseholds in Amsterdam. Public leaseholds are found in some parts of Europe, including Finland, Sweden and The Netherlands. With respect to taxation of land value increments, [Wyatt \(2018\)](#), in a paper also published in *JERER*, considers the provision of affordable housing in England. Beyond the benefits with respect to property taxation and leasehold administration, decomposing the value of properties into their land and structure components is essential for understanding house price dynamics and understanding the role of land price changes over time. It is important to measure land price changes accurately if we want to understand the drivers of such changes.

For various reasons, it is extraordinarily challenging to estimate land values for improved properties in an efficient and accurate manner. The reasons pertain mostly to the insufficient number of land transactions in areas that are already developed and the difficulties related to extracting the value of the land from transactions on improved properties. The Lincoln Institute of Land Policy has supported research on this topic for decades and recently commissioned multiple teams of researchers to explore various alternative methods for residential land valuation. All researchers were provided with the same property data from Maricopa County, Arizona, USA. We participated in that project by comparing the usefulness of hedonic, depreciated cost and “land leverage” techniques. One aim of the project was to focus on methods that can be implemented relatively easily in practice, so we did not consider more complex approaches such as machine learning ([Mayer *et al.*, \(2019\)](#)).

In addition to their use for valuation of improved properties, hedonic models can be used for land valuation. It is difficult or impossible to use hedonic models of improved properties to value land because certain variables typically capture a combination of land and improvement values, when in theory they may relate to only one or the other. For example, lot size and floor area are typically collinear, and either one of these may be picking up impacts of the other. Hence, the use of hedonic models for land valuation generally requires a sample of transactions of vacant land and lots sold for redevelopment purposes (teardowns). In practice, the estimation of such models is hampered by insufficient transactions pertaining to vacant and redevelopment land in the more central locations of cities, even though the overall sample of land sales for a metropolitan area may be quite large. The depreciated cost method has been used to estimate the value of land as a residual but is not commonly used as a mass appraisal technique for residential land. The land leverage approach involves matching vacant land sales with subsequent transaction prices once the parcels have been developed. For each pair of sales, the historical land price is inflated over the period between the vacant land and improved property transactions, and this inflated price allows us to estimate the ratio of land to total property value (land leverage).

Our hedonic approach focuses on vacant land transactions, using data for the entire county as well as one submarket with a relatively large number of land sales. We conclude that this method



does not perform well within sample and, hence, would be inaccurate as a means for out-of-sample prediction. We then apply depreciated cost analysis to improved properties that transacted and also conclude that the within-sample performance is less than satisfactory. Finally, we implement the land leverage method by matching vacant land and subsequent improved property transactions, calculating the land leverage ratio and then estimating a model with that ratio as dependent variable. We then use that model to predict land leverage for all other single-family properties. We conclude that this method has potential for practical application.

Future research could explore the benefits of using the land leverage method in other regions, such as European countries where accurate estimation of land values is needed. It would also be useful to develop and explore other methods for land valuation, which could yield better results. For example, machine learning techniques may produce more accurate estimates of value. No doubt this topic will continue to challenge valuers and academic researchers for many years into the future.

The current issue contains papers that contribute to knowledge about real estate price formation and affecting valuation. Ismail, Warsame and Wilhelmsson analyze the effect of segregation on house prices, whereas Dalland, Hammervold, Karlsen, Oust and Sønstebo evaluate real estate auctions. Two further papers are devoted to examining real estate funds: Su and Taltavull de la Paz analyze risk and rewards associated with Spanish REITs, whereas Morri, Perini and Anconetani identify the determinants of the rise in equity real estate funds in Europe. The theoretical perspective is also covered in two papers. Palm and Andersson discuss anchor effects in appraisals, whereas Lisi presents a search-and-matching model that can help explain the behavior of housing markets. Cooke, Appel-Meulenbroek and Arentze discuss the specific drivers of corporate real estate decision making, and finally, Hoesli analyzes the contents of the papers published in the journal over the past 12 years.

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References

- Grover, R., Törhönen, M.-P., Munro-Faure, P. and Anand, A. (2017), "Achieving successful implementation of value-based property tax reforms in emerging European economies", *Journal of European Real Estate Research*, Vol. 10 No. 1, pp. 91-106.
- Korthals Altes, W.K. (2019), "Land pricing upon the extension of leases in public leasehold systems", *Journal of European Real Estate Research*, Vol. 12 No. 1, pp. 97-111.
- Mayer, M., Bourassa, S.C., Hoesli, M. and Scognamiglio, D. (2019), "Estimation and updating methods for hedonic valuation", *Journal of European Real Estate Research*, Vol. 12 No. 1, pp. 134-150.
- Wyatt, P. (2018), "Can land value uplift deliver affordable housing? Experiences from England", *Journal of European Real Estate Research*, Vol. 11 No. 1, pp. 87-101.