

A Heuristic Robust Approach for Real Estate Valuation in Areas with Few Transactions

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SUMMARY

The demand for reliable market values in real estate valuation has been increasing over the last decade. One reason is the last subprime crisis, which was caused by a false assessment of the real estate market. The German market transparency is mainly realised by results of analysing purchase prices. Often, the purchases are analysed with a regression approach, which allows for an adequate examination of the real estate market. The results are only reliable in areas with large numbers of purchases. However, in areas with only few transactions the solution of regression is not satisfactory – even if applicable. A small number of purchase prices cannot represent the heterogeneity of the real estate market. Furthermore, the purchase prices may contain outliers. Especially in areas with few transactions, the detection of outliers is a challenging task, because the number of purchases is small. In addition, each detected outlier reduces the sample size. An alternative for dealing with outliers is the application of robust estimation approaches, which handle outliers by down-weighting their influence on the estimated values.

This study presents two different robust approaches for estimating reliable real estate values in areas with few transactions. The first approach uses non-informative robust Bayesian regression techniques. The normal distribution of the likelihood data is replaced by a Student's t-distribution to ensure the robustness. The second approach is based on the RANSAC (random sample consensus) algorithm. A typical application is the segmentation of geometric shapes out of 3D point clouds. The main advantage of RANSAC in comparison to other robust estimation approaches is its high breakdown point. RANSAC allows up to 50% outliers in the data.

The two robust approaches are carried out with a closed loop simulation. Real purchase prices are used to create the simulation data. This allows for reproducing the characteristics of the real data in the simulation. Furthermore, the simulation data includes also outliers. The results of the two robust

estimators are compared based on the real regression coefficients and on the known observations.

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