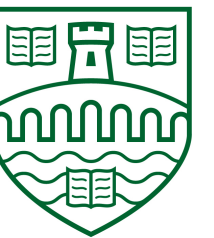


Scotland's Social-Housing Allocation Problem.

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MSc in Big Data

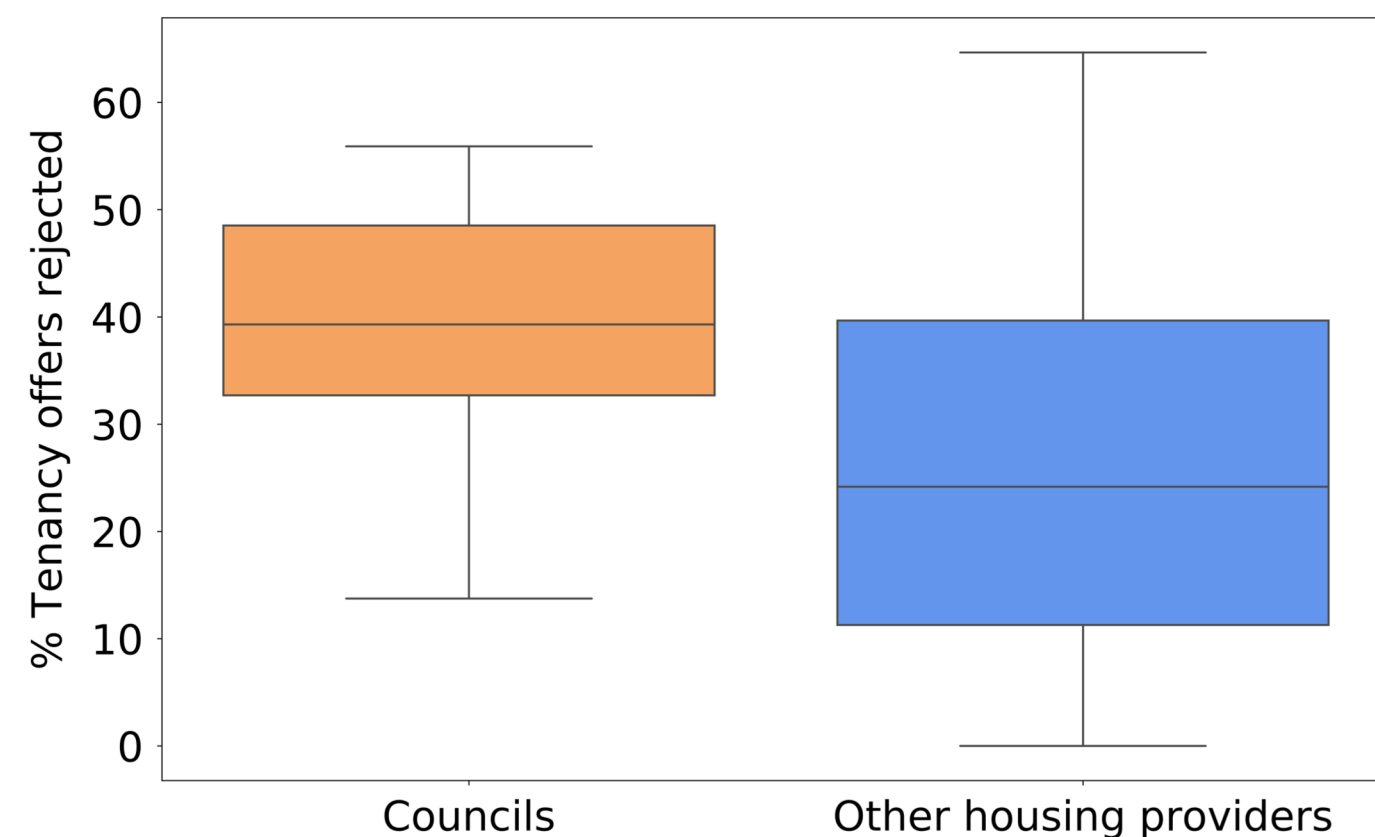


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Motivation

A poorly designed social-housing allocation scheme is leading to a high number of tenancy offers being rejected (see Figure 1).

Figure 1: Evidence of suboptimal allocation [1].



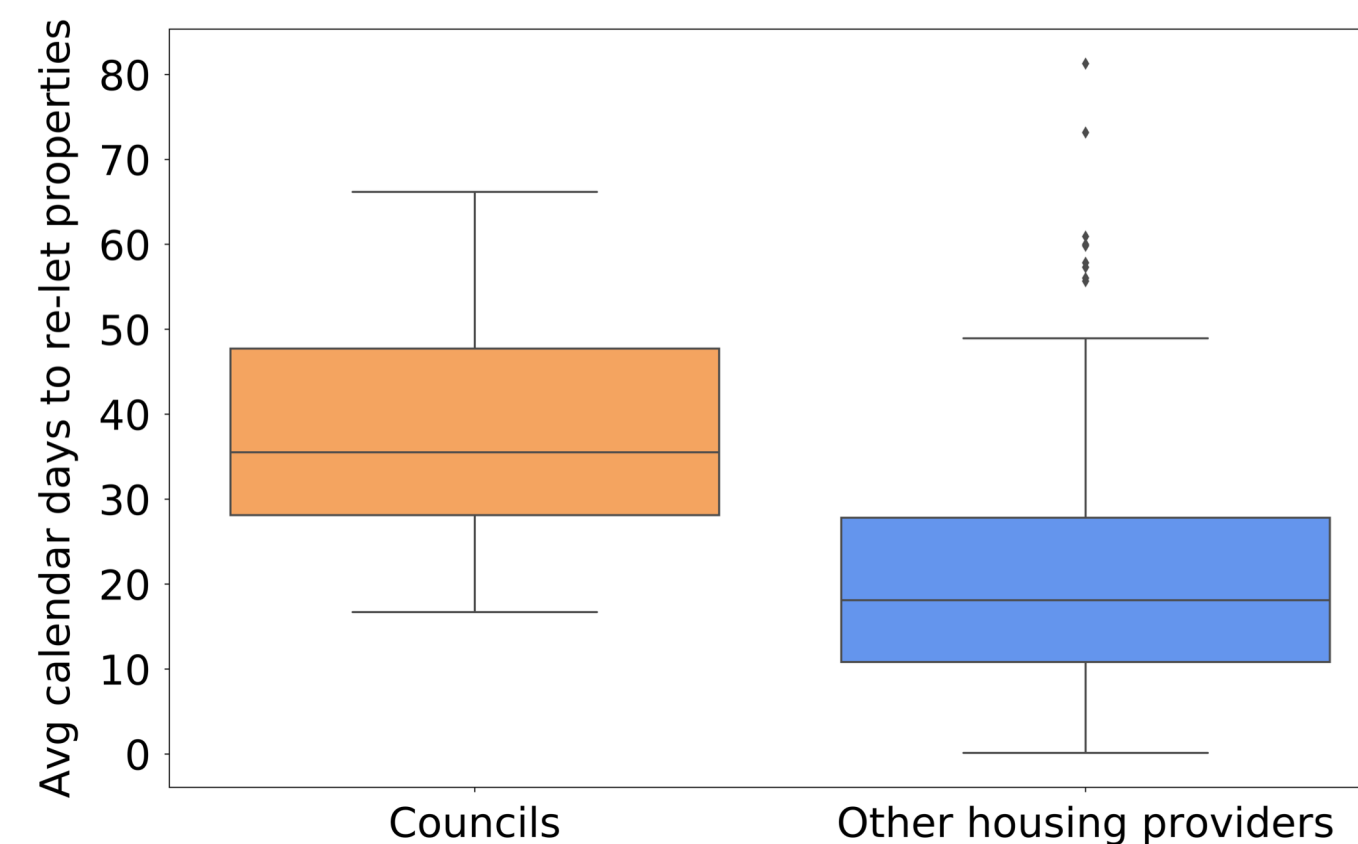
Reasons for rejections:

- Long-term effects of Right To Buy scheme.
- Lack of a choice-based letting scheme.
- Circumstantial changes while awaiting tenancy offer.

Consequences:

- Long waiting times.
- Increases in re-letting times (see Figure 2).
- £19,840,381 total rental income loss through void properties in 2017/2018 [1].

Figure 2: Substantial welfare losses [1].



Determinants of household satisfaction

The Scottish Household Survey provides detailed information of households' socio-demographic, cultural, environmental and dwelling attributes [2].

- Community: strong association with neighbourhood satisfaction.
- Subjective perception: residents of poorly rated neighbourhoods can still be satisfied with their households [3].
- Choice: people who experience freedom in the choice of their dwelling are going to be more satisfied [3].

Models of allocation

We propose and investigate two models for the matching of tenants to housing units.

- (a) Maximise Property-Applicant similarity score based on the most predictive attributes of household satisfaction:

$$Sim(P, A) = \sum_{j=1}^k w_j * d(P_j, A_j),$$

where d is a metric dependent on the nature of the attributes while w_j weighs the relative importance of attribute j to the applicant.

- (b) Maximise predicted household satisfaction of a supervised learning model.

References

- [1] Scottish Housing Regulator. *AFS data – all social landlords dataset, 2017/2018*. <https://www.scottishhousingregulator.gov.uk/find-and-compare-landlords/statistical-information>.
- [2] Ipsos MORI, Scottish Government. (2019). *Scottish Household Survey, 2016*. [data collection]. 2nd Edition. UK Data Service. SN: 8333, <http://doi.org/10.5255/UKDA-SN-8333-2>
- [3] Permentier, M., Bolt, G., & van Ham, M. (2011). Determinants of Neighbourhood Satisfaction and Perception of Neighbourhood Reputation. *Urban Studies*, 48(5), 977–996. <https://doi.org/10.1177/0042098010367860>