Policy Brief

43448 | April 2020

Priya Manwaring and Tanner Regan

Enhancing property tax in Kampala

Successes, challenges, and next steps for increasing municipal revenue

In brief:

- Property tax is a significant source of municipal revenues in Kampala, making up over 35% of own source revenues for the Kampala Capital City Authority. However, there is significant room for improvement. While legal exemptions and limited means of enforcement require legislative change to enhance revenues, in the short run improvements to valuation and efforts to enhance voluntary tax compliance are key.
- Simplicity is key: models which include more characteristics do not yield significantly higher accuracy. Instead, collecting comprehensive data on a smaller number of property features is important for accuracy. Improved accuracy from more complex and sophisticated techniques need to be weighed against transparency for taxpayers.
- It is important to keep in mind the limits to mass valuation, both in terms of accuracy and fairness of predictions. Predictive models tend to systematically overvalue low value properties, and (substantially) undervalue high value properties.
- Now that the city has successfully expanded the tax net for properties, efforts to enhance compliance will be key for long term revenue gains.

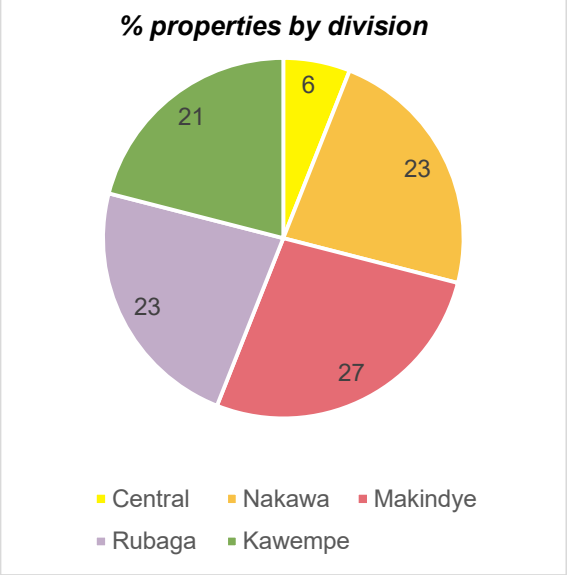
This project was funded by IGC Uganda.

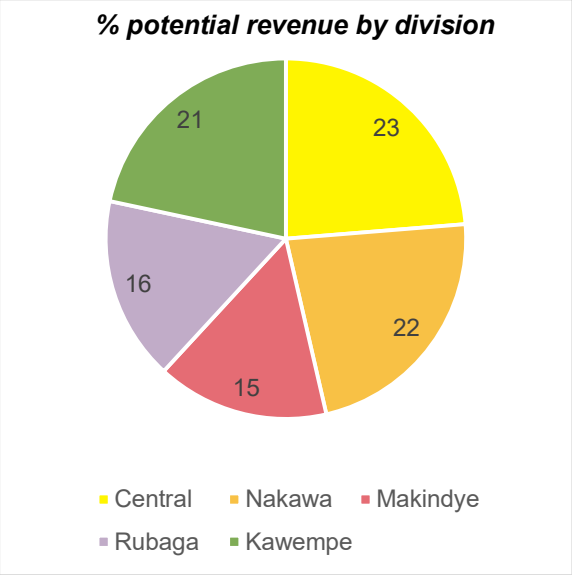
Property tax in Kampala

Property taxes are an important potential source of revenue for cities. Faced with limited municipal revenues and rapidly growing populations, taxes on the value land and property can offer a significant source of funding for cities to provide local services and to tap into financing for larger investments.

Kampala is no exception - property taxes made up over 35% of own source revenues in FY 2018/19. This tax is applied to the rental or business income of commercial, industrial, institutional and residential properties. The city is home to around approximately 350,000 properties across five divisions, of which 125,000 are owner occupied residential properties, and therefore not eligible for the tax.

Figures 1: Percentage of properties by division and potential revenue by division





Recent reforms

Until 2014, a key source of revenue loss in the city was an out-of-date property tax roll, the last version of which was completed and valued in 2006. Not only were dramatic increases in property income values over this period not being recorded and taxed, but all properties that had been built during this period were not included in the tax net. Through an ambitious project funded by the World Bank, the Kampala Capital City Authority (KCCA) has been able to address this by addressing over 350,000 formal and informal properties in the city between 2014-2019. As part of this exercise, GIS and ownership data was collected on all properties in the city, as well as over 50 features affecting property incomes.

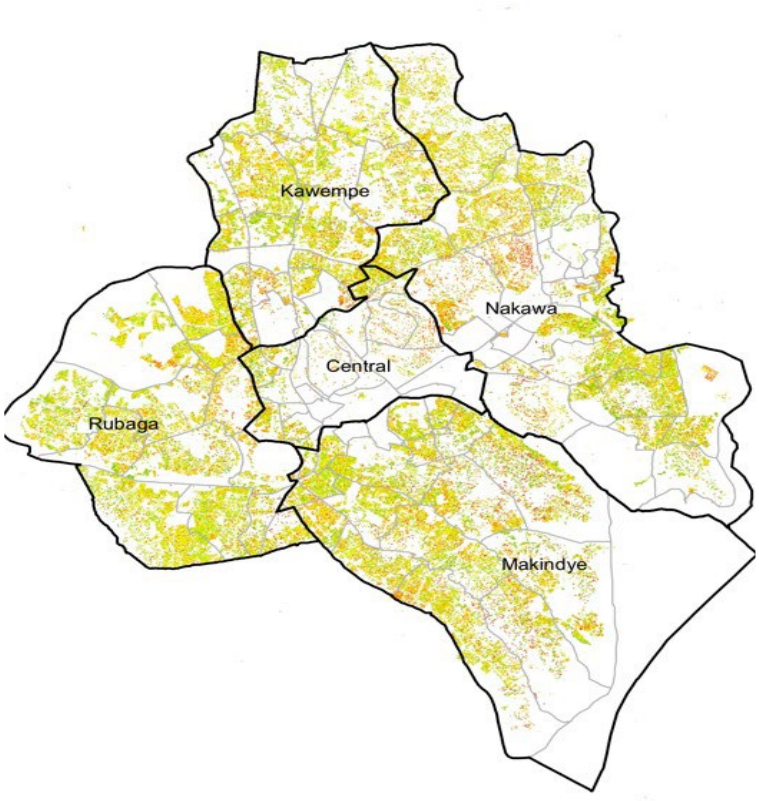
These reforms have increased revenues considerably – potential revenue in Central and Nakawa divisions, for example, has increased from 14 billion in FY 2013/14 to 38 billion in FY 2018/19. With the introduction of updated Central division records in 2017/18, property contributions to own source revenues (OSR) increased from 19.8 to 29.3% in one financial year alone. At the same time, this comprehensive data collection offers a rich source of information from which to understand property tax potential and areas for policy reform.

Ongoing challenges

However, there is significant room for improvement in property tax revenue collection. There are both legal and administrative challenges to increasing property tax revenues:

- On the legal side, exemptions for owner occupied properties represents a significant revenue leakage – removing such exemptions would increase overall revenue potential by 26%. At the same time, legal means of enforcing taxes are weak. While it is theoretically possible to take any property owner to court for non-compliance, the inefficiency of the judicial system makes this an ineffective deterrent.
- On tax administration, low tax morale among taxpayers as well as long term data and staffing requirements of valuing properties also present significant challenges. Now that the KCCA has valued all properties in the city, how can they keep this up to date to accurately track rising values of different properties and their incomes over time? Given fiscal constraints, it is unlikely that the city will be able to regularly repeat the recent exercise of individually valuing property incomes.

Figure 2: GIS data on properties across the city



Our work focuses on shorter term reforms to tax administration. On the request of KCCA, we explore options for mass valuation of properties as well as some key areas for further investigation in enhancing tax compliance in the city.

Options for mass property valuation

In a recent IGC project, we consider the effectiveness of a number of mass valuation models by comparing their accuracy, data requirements, fairness, and ease of understanding with individual

valuation of properties.[1] Our analysis focuses on residential, commercial and institutional properties, which make up 96% of properties in the city. Below are six key lessons from this analysis for policymakers considering mass valuation:

1) Regression models are more accurate than manually calibrated models

Looking at residential properties in the city which make up 80% of all properties, we find that regression models that are developed and calibrated based on existing information on properties and their valuations perform significantly better than 'points-based' models which instead require manually assigning values to different characteristics of properties. While points based models may be marginally easier to explain to taxpayers, it would seem that the accuracy gains from regression analysis make it more appropriate for long term valuation

2) More is not always better – weighing up accuracy vs. cost of data

We consider the accuracy of a number of different regression models which require different numbers of property characteristics. We find that models that include more features affecting property value do not significantly add to accuracy of predictions, with gains from including 'internal' property characteristics that require entering the property particularly small. In fact, for some models, we find that more detailed models actually perform *worse*.

As such, it is important to consider whether the gains in accuracy from adding more property characteristics to models outweigh the added costs of data collection. Our analysis suggests that by not collecting data on internal features of properties, for example, the costs of data collection could be reduced by 16 to 31%.

3) Machine learning offers promise, but comes at the cost of taxpayer understanding

More *complex* prediction techniques based on machine learning offer the most accurate predictions across all property types. However, the added benefit of these methods in terms of accuracy must be weighed against the complexity of these models for taxpayer understanding. It may be more important in raising tax morale, compliance and revenues to have a tax system citizens fully understand.

Given difficulties and costs associated with data collection and the importance of transparency in valuation for taxpayers, we find that a simple model based on 5 external characteristics of properties might be most advisable for valuation over time in Kampala.

4) Models are only as good as your data

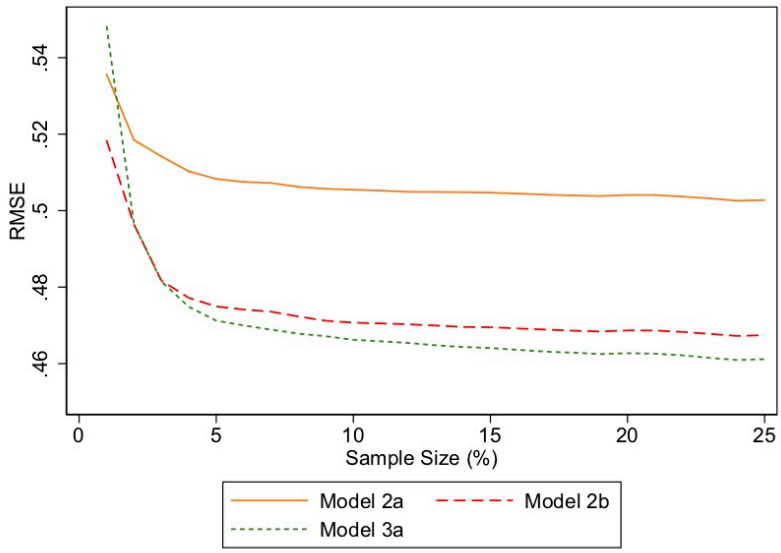
In many cases, there is missing data on particular features of a property. Our analysis shows that the differences in model accuracy that come from having missing data are significantly greater than differences resulting from adding or subtracting property features from the models.

[1] As there is no available market data on rental markets, accuracy and fairness are evaluated in comparison to individual KCCA valuations

5) Only a relatively small amount of property value data is needed for mass valuation models

How many properties need to be individually valued in order to effectively predict values for the entire city? This is a key question for the application of mass valuation models. The fewer properties that need to be individually valued, the cheaper the valuation process will be. However, accuracy will suffer with too few properties. Our analysis shows that for residential properties, only 5% of properties need to be valued for calibration to be effective. For commercial properties where there are fewer properties overall, this percentage rises to about 10%, and for institutions, 20%. This can be seen in Figure 3 where the average error falls with sample size for each of the residential models.

Figure 3: Out of calibration sample average error by sample size, residential properties

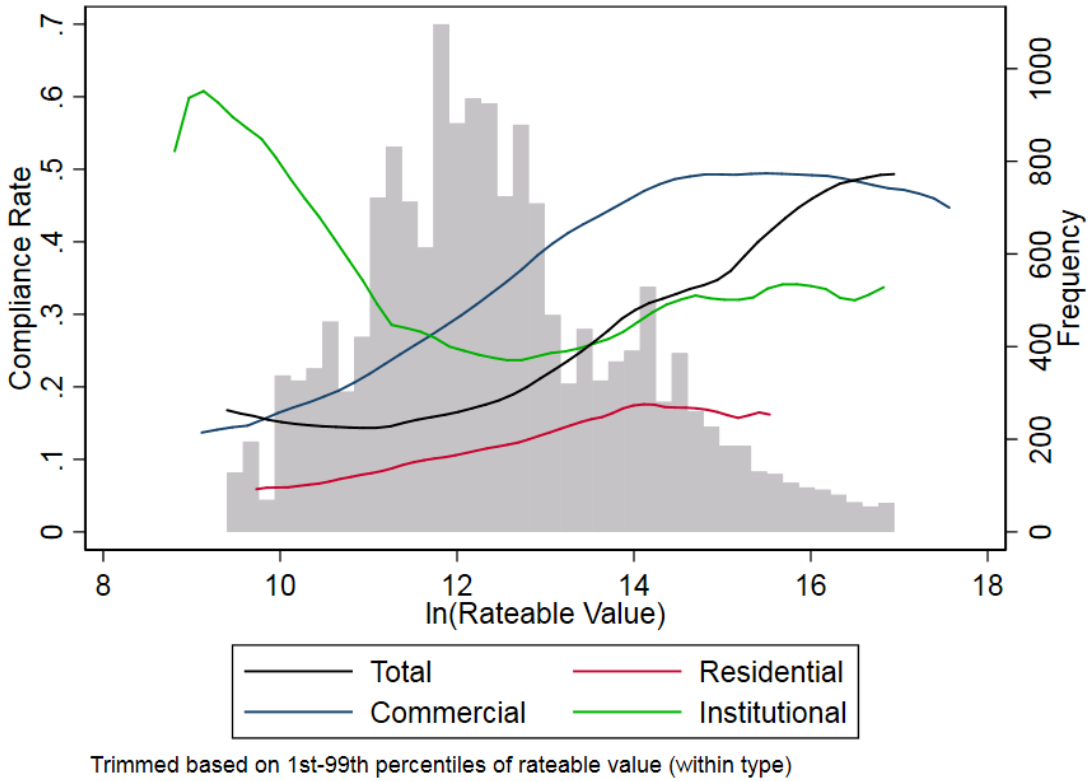


6) The limits of regression analysis

One key policy conclusion from our analysis is that the models tested so far still have notable limitations in terms of accuracy and fairness – most residential models only predict about half the data within 25% of expert assessments; for commercial and institutional properties, even less.

A particular challenge is that regression models tend to systematically overvalue low value properties and substantially undervalue high value properties- in general, these models are inequitably distributing the tax burden. To reduce the inequitable effects of mass valuation, it could be valuable to consider progressive tax rates and/or limiting overvaluation by reducing all valuation estimates by a fixed percentage before taxation.

Figure 4: Residential model 2a, calibrated with a 5% sample by division



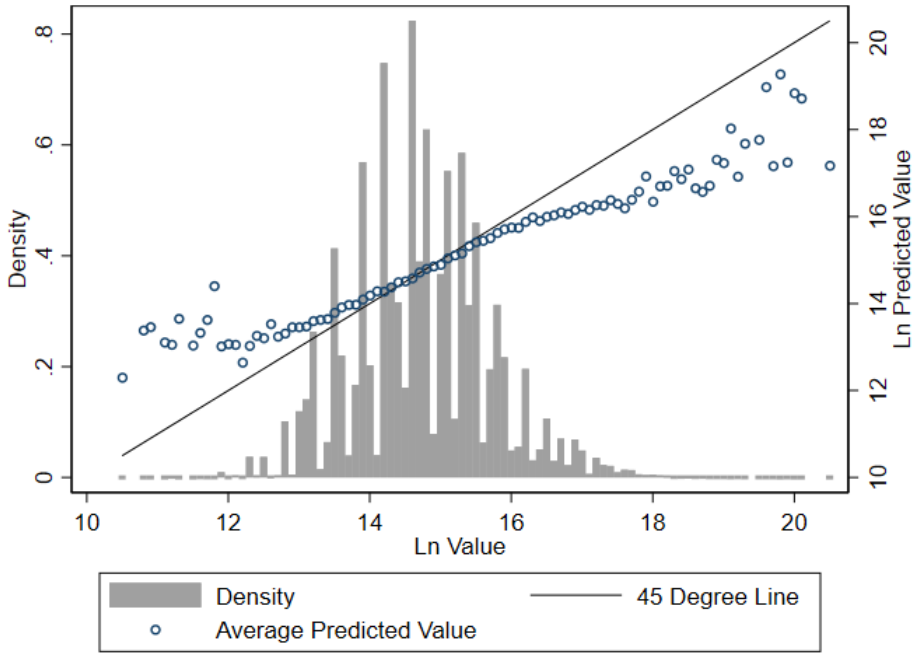
The density bars refers to the number of properties that fall within each value 'bin', the dots mark the average predicted value in each value bin, and the 45 degree line marks where these predicted values would fall if they were always perfectly accurate on average. At low values the average predictions fall above the 45 degree line, demonstrating overvaluation of low value properties. At high values the average predictions fall below the 45 degree line, demonstrating undervaluation of high value properties.

Enhancing compliance

However, valuation is only part of the story. As discussed above, a key constraint to property tax collection is tax compliance. The KCCA both monitors and enforces property tax compliance, which can be measured in real time through the new eCitie system. Currently, property tax compliance is low; only 30% of properties complied with the tax in FY 2018/19.[2]

[2] Source: KCCA eCitie property tax billing and payment data 2018/19

Figure 6: Tax compliance in Central division vs rateable value and property type



As can be seen in the graph above, compliance rises with rateable value. This may be due to government focus on targeting high valued taxpayers, the higher opportunity cost for high valued properties to be 'locked up' if non-compliant, or simply because high valued properties are owned by individuals with a higher capacity to pay. The first two reasons may be less relevant for residential properties, where government targeting is more politically difficult, and the threat of lockups is lower.

Next steps for analysis

Considering that changing means of enforcement is not only politically but also legally challenging, there instead appears to be significant potential for policies to improve tax morale for compliance in Kampala. Conducting a systematic survey of tax morale across the city would offer a valuable description of tax morale and help identify potentially effective tax compliance policies. Future work will consider:

- The elasticity of tax compliance to tax liabilities: how much does a 1% increase or decrease in tax liability affect taxpayer payments?
- Policies that could be implemented to enhance voluntary compliance in the city