Analyzing Baltimore's Real Property Data

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1 Introduction

At 2.248%, Baltimore City's real property tax rate is currently the highest in the State of Maryland [1]. In addition to its high base tax rate, however, Baltimore City also contains multiple Special Benefits Districts (SBD's) that have legislative authority to levy their own special surcharges on top of the city's real property tax. In these areas, property owners pay an additional tax to fund enhanced public services such as street cleaning, safety patrols, beautification efforts, and community programming that are supplemental to the city's existing public services.

In March 2025, the Midtown Community Benefits District (MCBD), which encompasses parts of the Mount Vernon, Charles North, Bolton Hill, and Madison Park neighborhoods of central Baltimore, was in peril after the City Council failed to renew it during its annual session [2]. This required a local referendum in which homeowners within these four neighborhoods decided whether to renew the MCBD (and its surcharge) or not. Although the MCBD was ultimately renewed with 83% of votes in favor of its continuation [3], an open question that was undoubtedly on the minds of many voters is whether the supplemental services it provides are worth the price tag. For MCBD homeowners in particular, the annual special surcharge amounts to an additional 0.132% of assessed property value [4], which means that their total effective real property tax rises to 2.38%.

One approach towards answering this question is to investigate the empirical question of whether the services that the MCBD and other SBD's provide translate into higher property values in the area. In other words, does the presence of an SBD correlate with measurably higher property assessments or sales prices relative to comparable properties outside such districts? To investigate this question, I examine Open Baltimore's publicly available real property data [5, 6] to analyze residential assessments and sales prices for various populations of properties. Because real estate values tend to be highly skewed, my analysis focuses on median-based inference; specifically, for both sales prices and assessment values, I construct nonparametric bootstrap confidence intervals for the differences in the medians between

1. properties located inside an SBD versus those located outside any SBD;

2. properties within the MCBD versus those located in other SBD's across the city; and

3. MCBD properties in the Mount Vernon neighborhood versus MCBD properties in the Mid-Town Belvedere neighborhood.

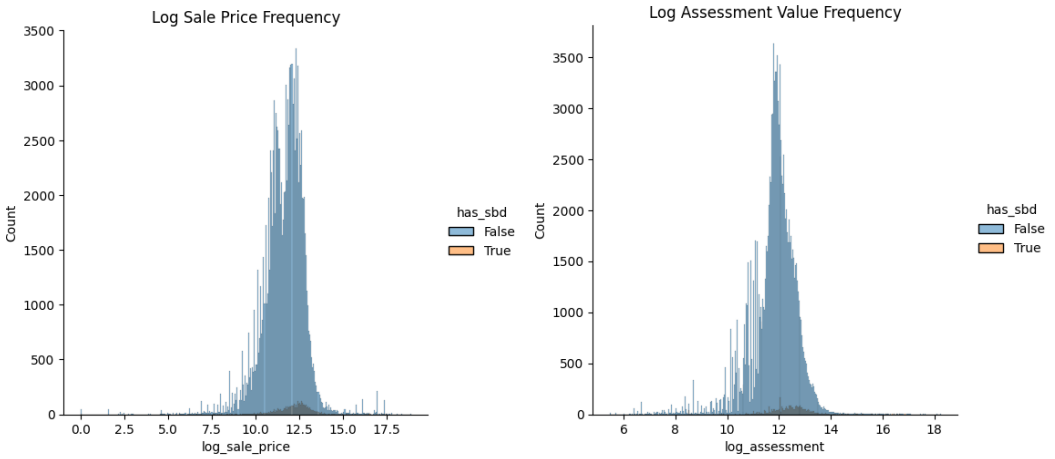
By analyzing the differences in medians between Mount Vernon and Mid-Town Belvedere properties in particular, I also attempt to address a certain ambiguity that exists between these two neighborhoods. Depending on the source, these two areas are either treated as a single, unified neighborhood or as distinct communities. For example, the MCBD explicitly treats the two neighborhoods as just a single, cohesive neighborhood called Mount Vernon [7]. By contrast, Live Baltimore—a major nonprofit that promotes and incentivizes home purchases within the city—identifies Mount Vernon and Mid-Town Belvedere as adjacent but distinctly separate neighborhoods with independent financial profiles and demographic statistics [8]. This inconsistency raises another natural statistical question: do Mount Vernon and Midtown-Belvedere actually represent two distinct populations in terms of property values, or are they better understood as a single unified market?

Across each comparison, my analysis assesses whether differences in median assessment values and median sales prices are statistically significant using nonparametric bootstrap techniques. Ultimately, the goal is to determine whether SBD status and the specific geographic delineation of neighborhoods correspond to meaningful economic differences in property values, thereby offering insight into how neighborhood categorization and SBD designation shape Baltimore's real estate landscape.

2 Data Analysis

To investigate the questions formulated above, I use a publicly available real property data set maintained by the Maryland Department of Assessments and Taxation (SDAT) and accessible through Baltimore City's online Open Baltimore portal. The dataset provides parcel-level details for residential, commercial, and mixed-use properties, including assessment values, location identifiers, occupancy information, physical characteristics, and, where available, information for recently recorded sales. Updated weekly, the data set does not contain significant historical information and is best considered a snapshot of Baltimore's real property market at a specific point in time. For this analysis, I used the November 24th, 2025 edition of the data set, restricting my attention to intact, non-vacant residential properties for which there was a recorded assessment value and a most recent sales price. [1]

[1] It is worth noting that significant data pre-processing and simplification was required to arrive at a data set that was somewhat useful. A cursory analysis of the data set revealed significant inconsistencies and errors throughout, including lot sizes of varying units, square footages and sales prices orders of magnitude different than what they should be, and neighborhood identifiers and zoning codes that are inconsistent with existing legislation. All of the data pre-processing steps that went into this analysis can be found in the GitHub repository that is associated with this project, which is accessible at https://github.com/roryarden/baltimore-real-property.



(a) (b)

Figure 1: Histograms of (a) the log sales price and (b) the log assessment value of intact, non-vacant residential properties in Baltimore City. In each histogram, properties that are located in an SBD are considered independently of those that are not. $n = 132061$ records are plotted in each histogram.

The primary fields of interest in this data set, sales price and assessment value, are extremely right-skewed. This is the case even after considering outliers that are obviously reporting errors, including a 1-bedroom condo in Fell's Point that was erroneously reported to have sold for $300,000,000. Figure 1 shows histograms of the log-transformed sales prices and assessment values of all the properties considered in this analysis, conditioned on whether they are located in an SBD or not. Although the histograms of the original distributions are extremely right-skewed and difficult to interpret, the log-transformed histograms would suggest that the central tendencies of the distributions vary somewhat depending on whether the properties are in an SBD or not. I confirm this by constructing nonparametric bootstrap confidence intervals at the $\alpha = 0.005$ level of significance for both i) the difference in the medians of the sales prices for the SBD and non-SBD populations, $\tilde{S}_{\text{sbd}} - \tilde{S}_{\neg\text{sbd}}$, and ii) the difference in the medians of the assessment values for the SBD and non-SBD populations, $\tilde{A}_{\text{sbd}} - \tilde{A}_{\neg\text{sbd}}$. The results are summarized in Table 1. Given that neither bootstrap confidence interval contains 0, we have sufficient evidence to reject a null hypothesis that the population medians are equal in either case.

Figure 2 shows histograms of both unmodified and log-transformed sales prices and assessment values. This time, however, the sample considered includes only those properties that belong to an SBD in Figure 1. Here, both the unmodified and log-transformed histograms suggest that the central tendencies of sales prices and assessment values may vary depending on which specific SBD is under consideration. To check whether the median sales price and the median assessment value are in fact different between properties within the MCBD and those outside of it, I again construct confidence intervals for the differences of the medians

Statistic	Bootstrap Confidence Interval ($)	Related Figure(s)
$\tilde{S}_{\text{sbd}} - \tilde{S}_{\neg\text{sbd}}$	[86,999.75, 113,000.00]	Figure 1a
$\tilde{A}_{\text{sbd}} - \tilde{A}_{\neg\text{sbd}}$	[99,333.00, 115,633.17]	Figure 1b
$\tilde{S}_{\text{sbd,mcbd}} - \tilde{S}_{\text{sbd,}\neg\text{mcbd}}$	[0.00, 51,140.90]	Figures 2c, 2d
$\tilde{A}_{\text{sbd,mcbd}} - \tilde{A}_{\text{sbd,}\neg\text{mcbd}}$	[41,349.75, 97,050.13]	Figures 2a, 2b
$\tilde{S}_{\text{sbd,mcbd,mv}} - \tilde{S}_{\text{sbd,mcbd,mtb}}$	[90,000.00, 195,501.25]	Figures 3c, 3d
$\tilde{A}_{\text{sbd,mcbd,mv}} - \tilde{A}_{\text{sbd,mcbd,mtb}}$	[38,599.50, 156,801.00]	Figures 3a, 3b

Table 1: Calculated bootstrap confidence intervals at the $\alpha = 0.005$ level of significance for the differences of the medians for both sales prices and assessment values across different subpopulations of the Open Baltimore real property data set.

at the $\alpha = 0.005$ significance level. These results are also included in Table 1. Note that in the case of the sales prices, 0 is in fact contained in the calculated confidence interval, so we would fail to reject a null hypothesis that states the population median of sales prices within the MCBD, $\tilde{S}_{\text{sbd,mcbd}}$, is significantly different from the population median of those originating from SBD's other than the MCBD, $\tilde{S}_{\text{sbd,}\neg\text{mcbd}}$.

Finally, Figure 3 shows histograms that are similar to those in Figure 2 but differ by considering just those properties that belong to the MCBD in particular. Both the unmodified and log-transformed histograms indicate that the central tendencies of sales prices and assessment values may differ depending on which neighborhood within the MCBD is under consideration. To determine whether the median sales price and the median assessment value are distinct between the Mount Vernon and Mid-Town Belvedere neighborhoods in particular, I again construct confidence intervals for the differences of the medians at the $\alpha = 0.005$ significance level. Just as before, these results are also summarized in Table 1. Given that neither bootstrap confidence interval contains 0, we again have sufficient evidence to reject a null hypothesis that the population medians are equal in either case.

3 Conclusion

The first two confidence intervals calculated in Table 1 may provide some reassurance to homeowners residing within SBD's that the presence of an SBD does seem to coincide with a higher median sales price and property assessment value. Given these tests alone, however, we must stop short of making any claims regarding the causality of these results. Beyond just the presence of an SBD, there are many potential reasons as to why SBD neighborhoods experience the higher median sales prices and assessment values that they do, including lower crime, greater amenities, greater walkability, etc. All of these factors should be considered in future work to better understand the role that each of them play in Baltimore home values more broadly.

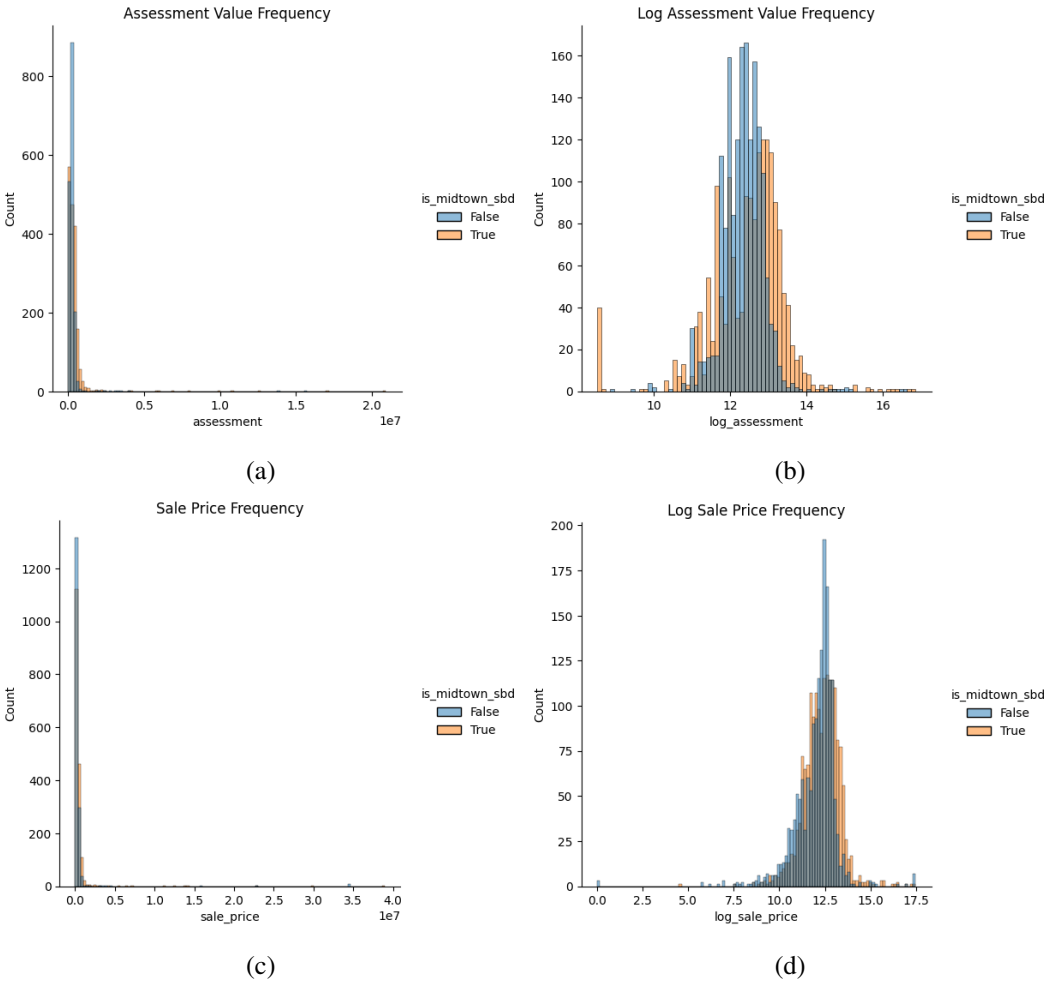


Figure 2: Histograms of (a-b) the assessment value and (c-d) the sales price of properties located within an SBD. In each histogram, properties that are located in the MCBD are considered independently of those that are not. Histograms (b) and (d) report log-transformed data, whereas (a) and (c) report unmodified data. In each histogram, $n = 3415$ records are plotted.

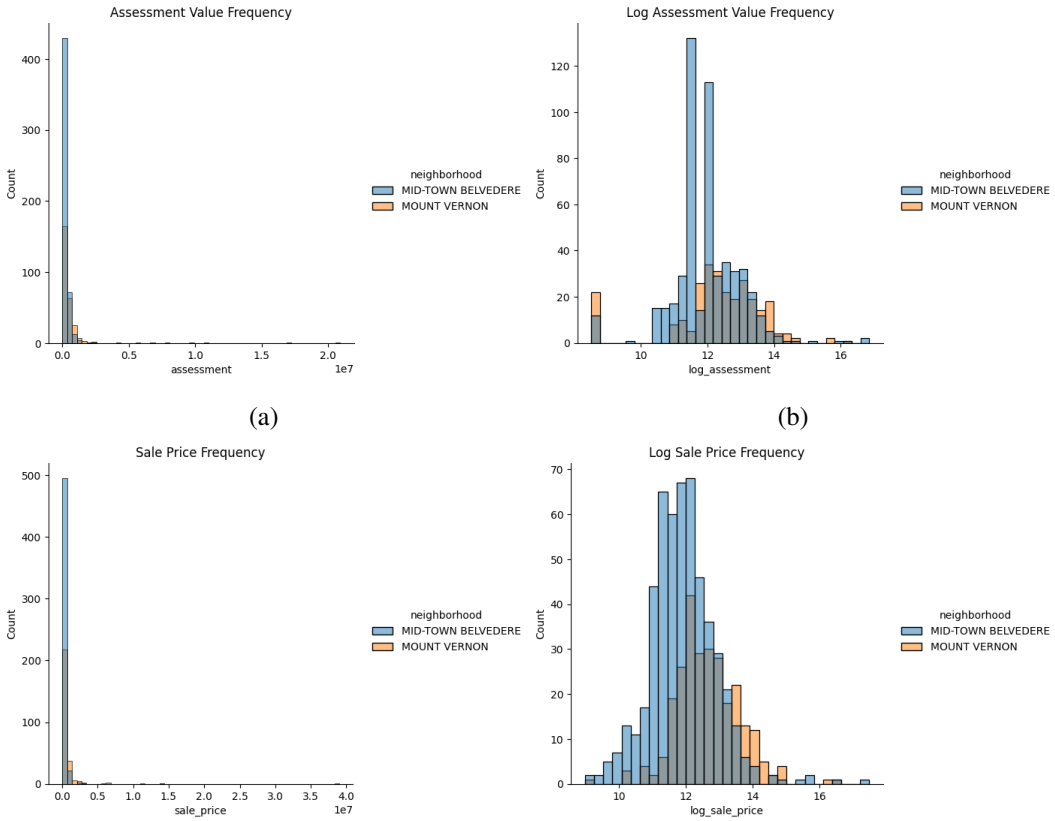


Figure 3: Histograms of (a-b) the assessment value and (c-d) the sales price of properties located within the MCBD. In each histogram, properties that are located in the Mount Vernon neighborhood are considered independently of those that are located in the Mid-Town Belvedere neighborhood. Histograms (b) and (d) report log-transformed data, whereas (a) and (c) report unmodified data. In each histogram, $n = 792$ records are plotted.

The second set of confidence intervals in Table 1 indicate that although the difference in median assessment values between MCBD properties and non-MCBD properties is statistically significant, the difference in median sales prices is not. This is a surprising result, as we may expect the behavior of assessment value to mimic that of the sales price (and vice versa). More work should be done to understand the source of this idiosyncrasy identified here.

Finally, the third set of confidence intervals in Table 1 provide some evidence that, at least as far as real property is concerned, the Mid-Town Belvedere neighborhood may be appropriately referred to as a separate neighborhood in its own right, distinct from the adjacent Mount Vernon neighborhood. Specifically, both the median sales price and the median assessment value in Mount Vernon are much larger than those found in Mid-Town Belvedere. Using this same data set, more work could potentially be done to understand whether the differences identified here are due to physical features of the Mid-Town Belvedere properties themselves that lead to lower median sales prices and assessment values (e.g., a lower mean square footage), or if there is some external factor that is driving home values lower (e.g., higher crime).

References

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