



Tax Surveillance and Optimization of Hotel Tax Revenues in Surabaya

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ABSTRACT

This study aims to analyze the effect of tax surveillance on hotel tax revenue in Surabaya City. This research applies an explanatory quantitative approach using secondary panel data on hotel tax objects from 2013 to 2024. The unit of analysis is hotel tax object-year. The sample consists of 218 hotel tax objects with 1,918 observations. The dependent variable is hotel tax revenue, transformed into $\ln(\text{tax revenue} + 1)$, while the main independent variable is tax surveillance, measured as a dummy variable based on the installation year for each tax object. The data were analyzed using panel data regression with a two-way fixed effect model and clustered standard errors at the hotel tax object level. The results show that tax surveillance has a positive effect on hotel tax revenue, with a coefficient of 0.3718 and statistical significance at the 10 percent level. This coefficient indicates that after receiving tax surveillance, hotel tax revenue tends to increase by approximately 45.04 percent. Robustness checks also show a consistently positive direction of effect across several model specifications. These findings indicate that tax surveillance can serve as an instrument for local tax intensification by improving transaction monitoring, reducing information asymmetry, and strengthening data-driven tax supervision.

INTRODUCTION

Local taxes play a strategic role in strengthening the fiscal capacity of local governments because taxation is a primary instrument for financing public goods and public services (Hyman, 2021). In a decentralized fiscal system, the ability of local governments to optimize own-source revenue determines fiscal space, service capacity, and the sustainability of local development (Bahl & Bird, 2018). This issue becomes more important in large urban economies, where dense economic activities create broader tax bases in services, trade, tourism, accommodation, food, and beverages. However, a large tax base does not automatically generate optimal revenue. Local governments must ensure that the reported transactions or turnover of taxpayers reflect

actual economic activity. In tax administration, revenue performance is therefore shaped not only by the size of the tax base, but also by taxpayer compliance, reporting accuracy, and the capacity of the tax authority to verify the information submitted by taxpayers (Mardiasmo, 2019).

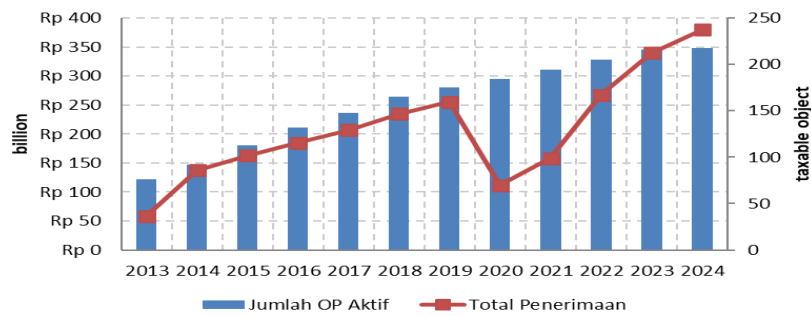
One central challenge in local tax collection is the dependence on taxpayer reporting. In a self-reporting environment, the accuracy of tax revenue depends on transaction recording, turnover disclosure, and the effectiveness of supervision by tax authorities. OECD (2025) emphasizes that assessing the accuracy and completeness of taxpayer information is a core function of modern tax administration. Supervision is therefore not merely an enforcement activity; it is also an instrument for reducing information asymmetry between taxpayers and tax authorities. When transaction information cannot be verified, the risk of noncompliance and underreporting increases, especially in sectors with frequent consumer transactions.

Recent developments in tax administration show a strong shift toward digital supervision. Digitalization can increase transaction transparency, expand audit trails, and strengthen the capacity of tax authorities to monitor compliance. Bellon et al. (2022), for example, show that VAT e-invoicing in Peru increased reported sales, purchases, and tax liabilities. Engström et al. (2025) similarly find that certified electronic cash registers increased reported revenue among firms with direct consumer transactions. These studies are relevant to hotel and restaurant taxes because both are transaction-based sectors where tax revenue is closely linked to daily sales records. Digital monitoring therefore has the potential to improve the reliability of transaction data and narrow the gap between actual activity and reported tax obligations.

The effect of digital supervision can also be explained through deterrence and perceived detection probability. Taxpayers are more likely to comply when they perceive that transactions, reports, and potential underreporting are easier to detect. Bergolo et al. (2023) show that audit-related information can influence taxpayer behavior through a monitoring or scarecrow effect. Hebous et al. (2023) also find that audits can improve subsequent compliance, particularly among taxpayers previously found to be noncompliant. In this sense, tax supervision works through two channels: an administrative channel that increases the authority's ability to read transaction data and a behavioral channel that increases taxpayers' perceived risk of noncompliance being detected.

In the Indonesian local tax context, tax surveillance is a technology-based monitoring instrument used to record, retrieve, or monitor taxpayer transaction data. It is particularly relevant for transaction-based local taxes such as hotel, restaurant, parking, and entertainment taxes. Technology-based supervision is expected to improve the quality of transaction data, reduce reliance on manual reporting, and help local governments identify discrepancies between potential and realized revenue. Asmara et al. (2025) find that technology-based tax monitoring affects restaurant tax compliance, indicating that digital monitoring can function not only as an administrative tool but also as a determinant of local taxpayer compliance.

Surabaya City provides a relevant empirical setting because it is a metropolitan economy with strong service, trade, tourism, and accommodation activities. Based on official data from Satu Data Surabaya, hotel tax revenue reached IDR 365.26 billion in 2023, while restaurant tax revenue reached IDR 612.73 billion. These figures indicate that consumption and accommodation services are important sources of local revenue. Nevertheless, such fiscal contribution requires an accurate monitoring system so that tax revenue reflects actual transactions rather than merely formal compliance. In the panel data used in this study, hotel tax revenue increased from IDR 58.34 billion in 2013 to IDR 379.57 billion in 2024, while also showing a sharp decline in 2020 due to the pressure of the COVID-19 pandemic on tourism and accommodation. This dynamic pattern suggests that hotel tax revenue is affected by annual shocks and hotel-specific characteristics, making panel data analysis appropriate.

Figure 1 Hotel Tax Revenue in Surabaya City, 2013-2024

Source: Badan Pendapatan Daerah Kota Surabaya (2025)

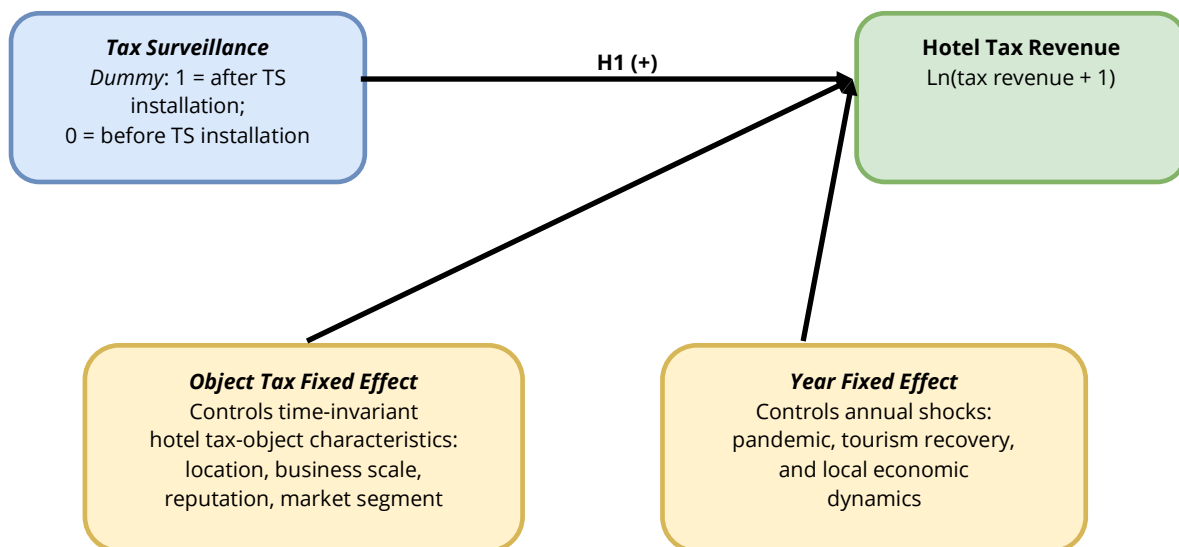
The data also show variation in the timing of tax surveillance installation. Of 229 hotel tax objects in the initial dataset, 186 had received tax surveillance by 2024, while 43 were recorded as receiving it in 2025 and 2026. Installations were implemented gradually from 2018 to 2026, with the largest number occurring in 2023. This variation is important because it allows the study to compare periods before and after the installation of tax surveillance within the same tax object, while also controlling for annual changes. Such a structure is more informative than a purely descriptive analysis of aggregate annual revenue.

Despite the growing literature on tax administration digitalization, several gaps remain. Prior studies have mostly examined national tax instruments, such as VAT e-invoicing (Bellon et al., 2023), electronic cash registers (Engström et al., 2025), or audit-based enforcement (Bergolo et al., 2023; Hebous et al., 2023). These studies provide strong evidence that digitalization and monitoring can improve reporting and compliance, but they are not designed to examine local tax surveillance at the tax-object level. A study closer to local taxation is provided by Asmara et al. (2025), who analyze technology-based tax monitoring in restaurant tax compliance. However, their study uses a PLS-SEM approach based on taxpayer perceptions and does not examine realized local tax revenue using administrative panel data. This study fills that gap by analyzing whether tax surveillance is associated with higher hotel tax revenue at the level of individual hotel tax objects in Surabaya City.

Accordingly, this study aims to examine the effect of tax surveillance on hotel tax revenue in Surabaya City using panel data regression. The empirical contribution lies in using tax-object-year data covering 2013-2024 and constructing a time-varying dummy variable based on the installation year of tax surveillance for each hotel tax object. Practically, the findings are expected to inform local governments in evaluating technology-based tax supervision and strengthening data-driven local tax intensification strategies.

LITERATURE REVIEW

The conceptual foundation of this study is deterrence theory and the broader literature on tax compliance. Allingham & Sandmo (1972) explain that taxpayers make compliance decisions by weighing the benefits of evasion against the probability of detection and potential sanctions. Although tax compliance is more complex than a simple deterrence calculation, the probability of detection remains an important mechanism in shaping taxpayer behavior. Alm (2019) argues that compliance is influenced not only by sanctions, but also by information, administrative design, trust, norms, and the perceived credibility of enforcement. In the context of tax surveillance, digital monitoring can increase the perceived probability that underreported transactions will be detected, thereby encouraging more accurate reporting.

Figure 2 Research Framework

Tax surveillance is also closely related to the information asymmetry problem in local taxation. Hotel tax is a transaction-based tax, which means that revenue depends on the accuracy of reported sales or service transactions. When local governments cannot observe actual transactions, taxpayers may have greater opportunity to underreport their tax base. Digital monitoring reduces this asymmetry by creating more traceable transaction records. This mechanism is consistent with Bellon et al. (2022), who show that e-invoicing improved the reporting of sales and tax liabilities, and with Bellon et al. (2023), who identify spillover effects from e-invoicing reforms on compliance. In transaction-based sectors, the availability of digital records changes the informational position of the tax authority.

Empirical studies on electronic fiscal devices also support this argument. Engström et al. (2025) demonstrate that electronic cash registers increase reported revenue among firms with direct consumer transactions. Mascagni et al. (2021) find that electronic sales registration machines in Ethiopia improved tax revenue, although taxpayer responses varied across contexts. These findings suggest that digital devices can strengthen tax administration, but their impact depends on implementation quality, taxpayer adaptation, and enforcement follow-up. For local hotel taxes, tax surveillance may therefore affect revenue by improving transaction visibility and changing taxpayer reporting behaviour. Studies on audit and monitoring further explain why tax surveillance may influence revenue. Bergolo et al. (2023) show that audit signals can influence compliance through a monitoring effect. Hebous et al. (2023) find that audits improve subsequent compliance, while Kotsogiannis et al. (2024) show that tax audits can have a dynamic impact on reported income and tax liabilities. Kotsogiannis et al. (2025) further demonstrate that e-invoicing can improve VAT payments and audit efficiency. These studies imply that monitoring instruments become more effective when they generate actionable information for enforcement. In local tax administration, tax surveillance can function as a continuous data-based monitoring mechanism that supports risk analysis, clarification, and audit selection. Nevertheless, digital supervision is not automatically effective. Kasper and Alm (2022) emphasize that the compliance impact of audits depends on audit effectiveness, while Kasper and Rablen (2023) show that post-audit compliance can increase or decrease depending on taxpayers' updated perceptions of future monitoring. Lancee et al. (2023) also indicate that enforcement must be perceived as fair to avoid resistance. Okunogbe & Santoro (2023) argue that information technology can support tax mobilization through tax base identification, compliance facilitation, and compliance monitoring, but its benefits depend on infrastructure, user adoption, and institutional capacity. Therefore, tax surveillance should be

understood as part of an integrated tax administration system rather than a stand-alone technical device. Based on this theoretical and empirical foundation, this study expects tax surveillance to improve hotel tax revenue. The mechanism is twofold, first, tax surveillance increases the visibility and verifiability of hotel transactions; second, it raises the perceived probability of detection among taxpayers. The research framework positions tax surveillance as the main independent variable and hotel tax revenue as the dependent variable, while controlling for unobserved hotel-specific characteristics and annual shocks through a two-way fixed effect model. Therefore, the hypothesis is formulated as follows:

H1: Tax surveillance has a positive effect on hotel tax revenue in Surabaya City.

METHODS

Data Collection Method

This study employs an explanatory quantitative approach because it examines the effect of tax surveillance on hotel tax revenue using numerical data and statistical analysis. As stated by Creswell & Creswell (2023), quantitative research is appropriate for testing theories or relationships among variables through numerical measurement and statistical procedures. The study uses secondary data, which refer to data that have been collected by other parties and can be reused for research purposes (Sekaran & Bougie, 2020). The data were obtained from the administrative records of hotel tax objects in Surabaya City, including Tax Object Number (NOP), tax object name, initial year of registration, year of tax surveillance installation, type of monitoring device, and annual hotel tax payments during the 2013–2024 period.

Table 1 Sample Selection Funnel

No .	Screening Criteria	Number of Tax Objects
1	Hotel tax objects recorded in the initial dataset for the 2013–2026 period	229
2	Hotel tax objects with Tax Object Number (NOP) and information on the initial year of tax object registration	229
3	Hotel tax objects excluded because their initial active years fall outside the research period, namely 2025–2026, and therefore do not represent active hotel tax activity during 2013–2024	(11)
	Hotel tax objects included in the 2013–2024 research period (final sample)	218

The population consists of all hotel tax objects recorded in the administrative database with information on tax surveillance installation. The initial dataset includes 229 hotel tax objects, and the sampling technique applies a census method followed by a filtering process based on the active period of each tax object. Observations before the initial year of tax object registration were excluded because they did not represent active hotel tax activity. After filtering, the final sample consists of 218 hotel tax objects with 1,918 tax object-year observations.

Operational Variables

The variables in this study consist of one dependent variable, namely hotel tax revenue, and one main independent variable, namely tax surveillance. The operational definitions of each variable are presented in Table 2.

Table 2. Variable Measurement

Variable	Operational Definition	Measurement	Source
Hotel tax revenue	Annual tax payment made by each hotel tax object.	Rupiah per tax object per year; transformed into $\ln(\text{revenue} + 1)$ in the main model.	Surabaya hotel tax administrative data, 2013-2024
Tax surveillance	Digital monitoring status based on the installation year of tax surveillance.	Dummy: 1 for the installation year and subsequent years; 0 for years before installation.	Administrative data on tax surveillance installation
First active year	The first year in which the hotel was recorded as an active tax object.	Used to filter active observations.	Surabaya hotel tax administrative data
Installation year	The year in which tax surveillance was installed in each hotel tax object.	Used to construct the tax surveillance dummy.	Surabaya hotel tax administrative data

The dependent variable in this study is hotel tax revenue. Hotel tax revenue is measured based on the annual hotel tax payment made by each tax object. Because hotel tax revenue varies substantially across tax objects, the revenue variable is transformed into a natural logarithm form, namely $\ln(\text{tax revenue} + 1)$. This transformation is used to reduce the influence of extreme values, minimize differences in scale across tax objects, and allow observations with zero revenue to remain included in the estimation. The independent variable is tax surveillance. This variable is constructed as a dummy variable, with a value of 1 for the period after the installation of tax surveillance and a value of 0 for the period before the installation of tax surveillance. This variable distinguishes tax objects that have received tax surveillance from those that have not, while also capturing changes in monitoring status based on the installation year for each hotel tax object. This study also considers time effects and the fixed characteristics of each tax object through a panel data model. Differences in time-invariant characteristics across hotels, such as location, business scale, service class, reputation, and market segment, are controlled using cross-section fixed effects. Meanwhile, annual changes such as the Covid-19 pandemic, tourism recovery, and broader economic dynamics are controlled using period fixed effects.

Data Analysis Technique

The data analysis technique used in this study is panel data regression. Panel data regression is selected because the data combine a cross-sectional dimension, represented by hotel tax objects, and a time-series dimension, represented by the 2013–2024 observation years. Wooldridge (2020) explains that panel data allow researchers to observe the same units over several periods, making it possible to control for unobserved heterogeneity across units. In this study, the panel approach is relevant because each hotel tax object has different characteristics and its tax revenue is observed repeatedly over time.

The basic research model is formulated as follows:

$$\ln \text{Revenue}_{it} = \alpha + \beta_1 \text{TaxSurveillance}_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

$\ln \text{Revenue}_{it}$ refers to the natural logarithm of hotel tax revenue plus one for tax object i in year t . $\text{TaxSurveillance}_{it}$ is the tax surveillance dummy variable for tax object i in year t . μ_i represents the fixed effect of each hotel tax object. λ_t represents the year fixed effect. ε_{it} denotes the error term.

The analysis was conducted through several stages. First, the data were arranged in a tax object-year panel format. Second, descriptive statistical analysis was conducted to describe the characteristics of the data, the distribution of tax surveillance installation, and the trend of hotel tax revenue. Third, panel model selection was conducted using the Chow test, Lagrange Multiplier test, and Hausman test, or an alternative approach when the Hausman test was unstable. Gujarati (2014) explains that model selection in econometrics should consider the suitability of the data structure and the characteristics of the error term to avoid biased estimation results. Fourth, diagnostic tests were conducted to identify indications of heteroskedasticity, autocorrelation, cross-sectional dependence, and multicollinearity. Fifth, the final estimation was conducted using the best model by controlling for tax object effects and year effects. To maintain the robustness of the results against potential heteroskedasticity and autocorrelation, the estimation uses clustered standard errors at the hotel tax object level. Sixth, robustness checks were conducted using several alternative specifications, including a model with tax revenue in level form, a model using only observations with positive tax payments, and a model excluding the pandemic period.

Hypothesis testing is conducted by examining the direction of the coefficient, probability value, and level of statistical significance. If the coefficient of tax surveillance is positive and statistically significant, tax surveillance can be stated to have a positive effect on hotel tax revenue. Conversely, if the coefficient is not statistically significant, there is insufficient statistical evidence to conclude that tax surveillance affects hotel tax revenue during the research period.

RESULTS

Table 2 presents the descriptive statistics. The average hotel tax revenue is IDR 1.30 billion, with a standard deviation of IDR 2.98 billion. The standard deviation is larger than the mean, indicating substantial variation in revenue across hotel tax objects. This supports the use of $\ln(\text{revenue} + 1)$ in the main estimation to reduce the influence of extreme values. The mean value of the tax surveillance dummy is 0.29, indicating that approximately 29 percent of observations are in the post-installation period.

Table 3. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Hotel tax revenue (IDR)	1,918	1,301,870,681.9 1	2,978,865,777.5 4	0.00	25,706,153,463.0 0
$\ln(\text{Revenue} + 1)$	1,918	19.10	2.90	0.00	23.97
Tax surveillance dummy	1,918	0.29	0.46	0.00	1.00
COVID-19 dummy	1,918	0.20	0.40	0.00	1.00
Time trend	1,918	6.48	3.24	0.00	11.00

The model selection results indicate that fixed effects are more appropriate than a pooled model because hotel tax objects differ in unobserved characteristics that may affect revenue. Year effects are also required because hotel tax revenue is affected by annual conditions such as the COVID-19 pandemic, tourism recovery, and broader economic dynamics. Diagnostic tests indicate heteroskedasticity, autocorrelation, and cross-sectional dependence; therefore, the final estimation uses clustered standard errors at the hotel tax object level.

Table 3 presents the main hypothesis test using the two-way fixed effect model. Tax surveillance has a positive coefficient of 0.3718 with a probability value of 0.0744. This result indicates a positive effect at the 10 percent significance level. Because the dependent variable is $\ln(\text{revenue} + 1)$, the coefficient corresponds to an estimated percentage effect of approximately 45.04 percent. Thus, after receiving tax surveillance, hotel tax revenue tends to be higher than before installation, after controlling for hotel fixed effects and year fixed effects.

Table 4. Main Regression Result: Two-Way Fixed Effect Model

Variable	Coefficient	Clustered Std. Error	t-statistic	Prob.
Tax surveillance	0.3718	0.2074	1.7930	0.0744
Estimated percentage effect	45.04%			
Observations	1,918			
Number of tax objects	218			

Note: The dependent variable is $\ln(\text{hotel tax revenue} + 1)$. The estimated percentage effect is calculated as $(\exp(\beta) - 1) \times 100$. Standard errors are clustered at the hotel tax object level.

Table 4 reports robustness checks. The coefficient of tax surveillance remains positive across all specifications. In the model using only positive payment observations, the coefficient is 0.4509 and significant at the 1 percent level, corresponding to a 56.98 percent estimated effect. When COVID-19 years are excluded, the coefficient remains positive, although it is not statistically significant. When tax surveillance is treated as effective starting one year after installation, the coefficient increases to 0.5170 and is significant at the 5 percent level. These results suggest that the positive association between tax surveillance and hotel tax revenue is relatively consistent, although its statistical strength varies across specifications.

Table 5. Robustness Checks

Model	Dependent Variable	Coefficient	Clustered SE	Prob.	Percentage Effect
Two-way FE	$\ln(\text{Revenue} + 1)$	0.3718	0.2074	0.0744	45.04%
Positive payments only	$\ln(\text{Revenue})$	0.4509	0.0949	0.0000	56.98%
Excluding COVID-19 years	$\ln(\text{Revenue} + 1)$	0.4021	0.2529	0.1133	49.50%
TS starts one year after installation	$\ln(\text{Revenue} + 1)$	0.5170	0.2319	0.0268	67.70%

DISCUSSION

The findings indicate that tax surveillance is positively associated with hotel tax revenue in Surabaya City. This is consistent with deterrence theory because digital monitoring increases the visibility of taxpayer transactions and raises the perceived probability of detection. In transaction-based taxes such as hotel tax, the main administrative challenge is not the absence of economic activity, but the difficulty of verifying whether reported revenue matches actual

transactions. Tax surveillance helps reduce this information gap by creating a more observable transaction trail. The findings are also consistent with the literature on digital tax administration. Bellon et al. (2023) show that e-invoicing reforms improved reporting and produced compliance spillovers. Engström et al. (2025) find that electronic cash registers increased reported revenue among consumer-facing firms, while Mascagni et al. (2021) show that electronic sales registration machines can improve tax revenue. These studies support the logic that digital records can improve the accuracy of reported tax bases. In the Surabaya hotel tax context, tax surveillance may operate through a similar mechanism by increasing the traceability of hotel transactions and improving the authority's ability to compare reported revenue with monitored transaction data. The results also align with studies on audit and monitoring. Bergolo et al. (2023) show that audit information affects compliance through a monitoring effect, while Hebous et al. (2023) and Kotsogiannis et al. (2024) demonstrate that audits can improve subsequent reporting behavior. Kotsogiannis et al. (2025) further show that digital reporting systems can improve VAT payments and audit efficiency. Although tax surveillance is not identical to a formal audit, it provides continuous data that can support audit selection, taxpayer clarification, and risk-based monitoring. Therefore, its positive relationship with hotel tax revenue is consistent with the broader evidence that better monitoring strengthens compliance and revenue mobilization.

At the same time, the main result is significant only at the 10 percent level. This suggests that tax surveillance is not automatically effective simply because a device is installed. Kasper and Kasper & Alm (2022) and Kasper and Rablen (2023) indicate that the effect of audits and monitoring depends on taxpayers' perceptions of enforcement effectiveness. Lancee et al. (2023) further shows that enforcement needs to be perceived as fair to avoid resistance. In the local tax setting, the effectiveness of tax surveillance likely depends on device reliability, data integration, staff capacity, follow-up procedures, and communication with taxpayers. Without consistent use of the data, the deterrence effect may weaken.

The robustness checks provide additional insight. The stronger result in the positive-payment sample suggests that the effect of tax surveillance is more visible among active taxpayers with ongoing payment behavior. The stronger coefficient when tax surveillance is counted from the year after installation suggests a possible lag effect. Installation may require technical adjustment, system integration, taxpayer adaptation, and administrative follow-up before it affects revenue. Okunogbe & Santoro (2023) argue that tax technology can help identify tax bases, facilitate compliance, and monitor compliance, but its effectiveness depends on infrastructure, adoption, and institutional capacity. This interpretation is also consistent with Chan et al. (2023), who find that increased monitoring in Indonesia can improve reporting, although taxpayer responses may be strategic.

The study therefore contributes to the local tax literature in two ways. First, it extends prior studies on digital tax instruments, which mostly focus on national tax systems such as VAT e-invoicing, electronic fiscal devices, or audit programs, to the context of local hotel taxes. Second, it uses administrative panel data at the tax-object level rather than perception-based survey data. This allows the analysis to capture differences across hotels and changes over time. The findings suggest that tax surveillance can support local tax intensification, but its success depends on whether the government uses the generated data for continuous monitoring, risk analysis, taxpayer clarification, and enforcement follow-up.

The contribution of this study lies in its use of administrative panel data at the level of individual hotel tax objects. Many local tax studies rely on aggregate annual revenue or descriptive effectiveness ratios, which cannot separate the effect of policy instruments from differences across taxpayers or time-specific shocks. By using object and year fixed effects, this study provides a more refined empirical test of tax surveillance in local taxation. Although the findings should not be interpreted as definitive causal evidence, they offer an important empirical indication that digital monitoring is associated with higher hotel tax revenue when implemented and followed up within a data-driven administration system.

From a policy perspective, the results support the use of tax surveillance as part of a broader local revenue strategy. However, the instrument should be targeted and risk-based. Hotels with large revenue potential, inconsistent payment patterns, or significant gaps between reported revenue and monitored transactions should receive closer follow-up. At the same time, the government should maintain fairness and transparency by communicating the purpose of tax surveillance, data use procedures, and taxpayer rights. This is important because compliance is more sustainable when enforcement is perceived as credible and fair, rather than arbitrary or purely punitive.

The findings further suggest that local tax digitalization should not be evaluated only by the number of devices installed. A more meaningful evaluation should consider whether the devices are active, whether the data are complete, whether transaction records are integrated with reporting systems, and whether discrepancies are followed up. The effectiveness of tax surveillance depends on the entire supervision chain: installation, data capture, data validation, risk analysis, taxpayer communication, and enforcement. This chain-based perspective is consistent with the argument that technology improves tax mobilization only when embedded in institutional capacity and administrative routines.

The specification excluding COVID-19 years also provides a useful interpretation. Although the coefficient remains positive, it loses statistical significance. This result does not necessarily weaken the main finding. Instead, it suggests that the hotel sector was highly sensitive to extraordinary shocks during the pandemic and recovery period. Hotel tax revenue reflects both administrative compliance and real economic activity. During periods of mobility restriction, low occupancy, and tourism disruption, even perfect monitoring would not necessarily increase revenue if the underlying transaction volume declined. Therefore, the use of year fixed effects is essential because it controls for common annual shocks that affect all hotel tax objects. The relatively modest statistical strength of the main model can also be explained by the timing of installation. In practice, the year of installation may include technical preparation, device configuration, data synchronization, and adaptation by both taxpayers and tax officers. Therefore, the effect of tax surveillance may not be fully realized in the same year. The robustness check that treats tax surveillance as effective starting one year after installation provides important evidence for this interpretation. The coefficient becomes larger and statistically significant at the 5 percent level, suggesting that tax surveillance may require an implementation period before it produces a stronger revenue effect.

The positive coefficient of tax surveillance should also be interpreted as an administrative effect rather than a purely mechanical effect of technology. Tax surveillance does not directly create taxable transactions; rather, it improves the capacity of the local tax authority to observe, verify, and respond to reported transactions. Thus, its contribution to revenue depends on whether monitored data are translated into administrative action. If the authority uses the data only for passive recording, the impact may be limited. If the data are used for discrepancy analysis, taxpayer clarification, and risk-based audit selection, the deterrence and compliance effects become stronger. This explains why the main result is positive but not very strong at the 5 percent level. Another implication of the descriptive findings is the strong heterogeneity of hotel tax objects. The standard deviation of hotel tax revenue is substantially higher than the mean, indicating that the sample includes hotels with very different revenue capacities. Some hotels may be large business or tourism-oriented establishments, while others may operate as smaller accommodation providers. This heterogeneity is important because a simple comparison of average revenue before and after tax surveillance may be misleading. The panel approach helps reduce this concern by controlling for time-invariant differences across hotels, such as location, service class, brand reputation, and market segment. In this regard, the two-way fixed effect model provides a more conservative and analytically appropriate estimation than a pooled comparison.

CONCLUSION

This study examines the effect of tax surveillance on hotel tax revenue in Surabaya City using panel data from 2013 to 2024. The findings show that tax surveillance has a positive effect on hotel tax revenue. In the two-way fixed effect model, the coefficient is positive and significant at the 10 percent level, indicating that revenue tends to be higher after tax surveillance is installed. Robustness checks also show a consistently positive direction, especially when the analysis focuses on positive-payment observations and when tax surveillance is treated as effective one year after installation. These results imply that tax surveillance can be a relevant instrument for local tax intensification, particularly in transaction-based taxes such as hotel tax.

For the Surabaya Local Revenue Agency, tax surveillance should not be treated merely as a transaction recording device. It should be integrated into a data-driven supervision system in which monitored transaction data are routinely processed, compared with taxpayer reports, and used for risk analysis, clarification, audit selection, and compliance evaluation. For the Surabaya City Government, technology-based supervision requires institutional support, including infrastructure maintenance, system integration, data governance, and capacity building for local tax officers. For hotel taxpayers, tax surveillance should be viewed as a transparency mechanism that supports accurate and accountable tax reporting. Future research may extend this study by using monthly data, adding variables such as monitoring intensity, audit frequency, occupancy rate, hotel class, number of rooms, and turnover, or comparing hotel tax with restaurant, entertainment, and parking taxes.

LIMITATION

This study has several limitations that should be considered when interpreting the findings. First, the analytical technique used in this study still relies on a two-way fixed effect approach for panel data. However, the research data indicate that tax surveillance was installed gradually across hotel tax objects in different years, reflecting a staggered treatment setting. Given this characteristic, future studies may employ a staggered Difference-in-Differences (staggered DID) approach so that the estimated effect of tax surveillance can more accurately capture variation in treatment timing. Second, this study does not include hotel-level operational control variables, such as occupancy rate, hotel class, number of rooms, average daily rate, actual turnover, or tourism activity indicators. These variables may affect hotel tax revenue and provide a more comprehensive explanation of revenue variation across tax objects. Third, the post-installation period is relatively short for some tax objects because most installations occurred in 2023, while the available research data only extend to 2024. This condition limits the post-installation observation window, so the medium-term effects of tax surveillance or effects that require an adaptation period may not be fully captured in this study.

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