

Dynamic interactions of local tax revenues in Cirebon Regency: A vector autoregression approach

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Abstract

This research analyzes the dynamic interaction of local tax revenue sources in Cirebon Regency to understand how these components are interdependent within the context of fiscal decentralization. The study used a quantitative approach and monthly time-series data from January 2021 to December 2024. The variables analyzed included hotel tax, advertisement tax, street lighting tax, and land and building transfer tax. The research employed a vector autoregression model to analyze the relationships without imposing prior structural restrictions. Pre-estimation tests confirmed that all variables were stationary in levels and that the estimated system was stable. The Granger causality test results indicated no statistically significant causal relationships among the tax variables. Furthermore, the forecast error variance decomposition revealed a strong degree of exogeneity, where variations in each tax component were driven primarily by its own innovations rather than exogenous shocks from other taxes. The study concluded that these local revenue sources operated independently in the short run, meaning the collection and performance of one tax did not significantly influence the others.

Keywords: Local Tax, Vector Autoregression, Fiscal Decentralization, Local Revenue.

Abstrak

Penelitian ini menganalisis interaksi dinamis dari sumber penerimaan pajak daerah di Kabupaten Cirebon untuk memahami saling ketergantungan komponen tersebut dalam konteks desentralisasi fiskal. Pendekatan kuantitatif telah memanfaatkan data deret waktu bulanan dari bulan Januari 2021 hingga Desember 2024. Variabel yang dianalisis mencakup pajak hotel, pajak reklame, pajak penerangan jalan, serta bea perolehan hak atas tanah dan bangunan. Penelitian ini telah menggunakan model vektor autoregresi untuk menganalisis hubungan tanpa memaksakan batasan struktural sebelumnya. Pengujian awal memastikan bahwa semua variabel stasioner pada tingkat dasar dan sistem yang diestimasi stabil. Hasil uji kausalitas Granger menunjukkan tidak ada hubungan sebab akibat yang signifikan secara statistik di antara variabel pajak tersebut. Selanjutnya, dekomposisi varians kesalahan peramalan mengungkapkan tingkat eksogenitas yang kuat, di mana variasi pada masing-masing komponen pajak terutama didorong oleh inovasinya sendiri daripada guncangan eksogen dari pajak lain. Penelitian ini menyimpulkan bahwa sumber-sumber penerimaan daerah tersebut beroperasi secara independen dalam jangka pendek.

Kata kunci: Pajak Daerah, Vektor Autoregresi, Desentralisasi Fiskal, Penerimaan Daerah.

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1. Introduction

The implementation of administrative-territorial reforms and specific laws on fiscal decentralization has dynamically evolved to boost local own-source revenues, granting local governments greater financial discretion to meet community needs (Brahimi et al., 2025). While fiscal decentralization provides the framework for regional autonomy, the actual enhancement of local own-source revenue is heavily contingent upon improved regional capacity and administrative competence (Yimenu, 2023). Within Indonesia's decentralized framework, the capacity of local governments to generate own-source revenue exhibits strong dynamic persistence and is heavily dictated by broader macroeconomic conditions, particularly regional economic growth and poverty levels (Priambodo, 2025).

Conversely, a contrasting body of literature posits that local revenue components often operate in silos, face high volatility, or even negatively impact one another through structural inefficiencies. Fiscal decentralization heavily dependent on unconditional transfers can create a 'crowding-out' effect that significantly reduces the incentives for local own-source revenue generation (Panao, 2021). For instance, empirical evidence from OECD regions demonstrates that greater autonomy in local tax collection can inadvertently weaken effective intra-regional income redistribution (Pietrovito et al., 2023). This global phenomenon mirrors the practical challenges in Cirebon Regency; during the 2021-2024 period, despite having the autonomy to manage local revenues, Cirebon's tax collections experienced high volatility and remained heavily reliant on isolated sectors rather than forming a cohesive, redistributed financial safety net. Furthermore, local governments treating temporary revenue windfalls as permanent budget boosts set themselves up for financial stress, while excessive fiscal autonomy can inadvertently worsen overall welfare and environmental quality (Guo et al., 2020).

When local tax revenues are highly volatile, the share of taxes kept by local governments must be lowered to protect them from financial risk, even if it means reducing their incentive to drive economic growth (Lyu et al., 2022). Local governments treat a temporary, volatile revenue windfall as a permanent budget boost, they set themselves up for severe financial stress, forcing sudden tax hikes and deep spending cuts the moment the market crashes (Solé-Ollé & Viladecans-Marsal, 2019). Since current tax policies do very little to smooth out revenue swings, communities hosting these mines are left vulnerable to unpredictable boom-and-bust financial cycles (Beach & Raimi, 2026).

Regional discount and local tax policies designed to mitigate cross-border economic leakages can significantly alter market dynamics, often resulting in higher net costs within environments characterized by high volatility (Bergantino et al., 2025). Switching to a property tax based on physical size rather than market value was a deliberate move to guarantee local governments a stable income during periods of extreme price volatility (Mintz & Portnov, 2023). By capping state and local tax deductions, recent reforms have essentially cushioned the blow, significantly reducing how much income

and property price volatility impacts a homeowner's expected mortgage tax savings (Ghoddusi & Afkhami, 2019).

In the Indonesian context, the advancement of ICT infrastructure and the adoption of digital fiscal transactions act as critical catalysts for enhancing local tax revenues by significantly improving collection efficiency and transparency (Priambodo et al., 2024). Furthermore, the expansion of the digital economy creates a financial ripple effect, boosting not only local tax collections but also organically lifting the tax revenues of neighboring regions (Liu & Lian, 2025). When regional spillovers increase, giving local governments more power to collect taxes becomes less desirable because it can actually worsen overall welfare and income equality (Aslim & Neyapti, 2017). Ecological externalities easily cross administrative borders, giving local governments too much fiscal autonomy often fails to contain regional spillovers and can actually worsen the damage (Que et al., 2018).

Hotel tax provides a realistic mechanism for cities to recover the heavy public safety costs associated with massive events, but only if the vast majority of attendees are out-of-town tourists (Hall & Parker, 2020). Even as short-term rental platforms generate tens of millions in host revenue, the vast majority of small cities are missing out on a massive opportunity to collect local lodging taxes (DiNatale et al., 2018). Varying local hotel taxes can create a spillover effect, prompting tourists to book rooms just outside the taxed county's borders to avoid the extra costs while still enjoying the same local attractions (Mills et al., 2019).

Advertisement tax serves as a far more effective and measurable policy tool to drive actual behavioral change compared to relying solely on cultural campaigns (Mashhadi et al., 2025). Taxing advertising serves as an ideal policy tool to contain wasteful corporate spending and boost innovation while preserving the ability of marketing to allocate resources efficiently (Cavenaile et al., 2025). Implementing an advertising tax can actually improve public welfare by hitting the brakes on the exhausting work-and-spend cycle, where constant marketing pushes people to overwork just so they can consume more (Delpeuch & Turino, 2026). Faced with higher corporate taxes, multinational digital platforms shift the financial burden directly onto local advertisers by restricting ad supply and driving up prices (Lassmann et al., 2025).

Street lighting serves as a crucial yet highly energy-intensive public service that places significant financial pressure on local governments, making the optimization of the street lighting tax essential to sustain daily operations and finance future technological transitions (Boulmrharj et al., 2023). Street lighting, acting as a major source of urban light pollution that significantly impacts ecosystems and public health (Ling et al., 2025), necessitates local governments to leverage the street lighting tax as a strategic regulatory tool for managing artificial nighttime lighting and promoting sustainable environmental planning.

Theoretical debates regarding local tax interactions present conflicting views. On one hand, existing theories argue that local economic sectors and their tax bases are interconnected, where local decisions regarding land use and development are

strategically intertwined with other municipal fiscal expectations to boost overall revenues (Getzner et al., 2025). On the other hand, contrasting evidence suggests that local revenues often operate in strict isolation; for instance, land tax adjustments are heavily dictated by the localized availability of zoned land reserves rather than broader fiscal spillovers (Mauri, 2024). Synthesizing these opposing views, the interdependency of local taxes is not automatically synergistic but depends heavily on structural regional capacities.

In Cirebon Regency, this theoretical tension reflects a practical problem. Preliminary financial data from 2021 to 2024 reveals highly volatile local tax collections, raising the empirical question of whether taxes like hotel, advertisement, street lighting, and land transfer actually support one another during economic shocks or operate in fragile isolation. While previous studies predominantly treat local tax revenues in isolation or rely on static models that ignore endogenous shock transmissions, this research addresses this gap by employing a dynamic Vector Autoregression (VAR) approach. This method provides a novel empirical perspective by capturing multi-directional fiscal interdependencies without imposing prior structural restrictions.

Based on the theoretical synthesis and empirical gaps, this study proposes two hypotheses. The first hypothesis (H1) states that there are significant dynamic interdependencies and causal relationships among hotel, advertisement, street lighting, and land and building transfer taxes in Cirebon Regency. The second hypothesis (H2) states that exogenous shocks in one specific local tax component significantly contribute to the forecast error variance of the other tax components over time. Consequently, the main objective of this study is to analyze the dynamic interactions and spillover effects among hotel, advertisement, street lighting, and land and building transfer taxes in Cirebon Regency. By determining whether these revenue sources operate independently or influence one another over time, this paper provides novel empirical insights to help local policymakers design more integrated and resilient fiscal strategies.

2. Research Method

This study employs a quantitative approach using time-series data to analyze the dynamic interactions among various sources of local tax revenue in Cirebon Regency. The secondary data utilized in this research was officially sourced from the Central Bureau of Statistics (Badan Pusat Statistik) of Cirebon Regency. To provide a clear overview of the dataset, the details regarding the variables, sample size, time period, and data sources are summarized in Table 1.

The variables analyzed include Hotel Tax (HOT), Advertisement Tax (ADV), Street Lighting Tax (SLT), and Land and Building Transfer Tax (LBTT). Prior to the Vector Autoregression (VAR) econometric modeling, descriptive statistics—including mean, standard deviation, skewness, and kurtosis—are calculated to understand the baseline distribution of the data.

Table 1. Descriptive Variables and Data Sources

Variable Name	Abbreviation	Data Type	Time Period	Sample Size (N)
Hotel Tax	HOT	Monthly Time-Series	Jan 2021 – Dec 2024	48 observations
Advertisement Tax	ADV	Monthly Time-Series	Jan 2021 – Dec 2024	48 observations
Street Lighting Tax	SLT	Monthly Time-Series	Jan 2021 – Dec 2024	48 observations
Land and Building Transfer Tax	LBTT	Monthly Time-Series	Jan 2021 – Dec 2024	48 observations

Source: Badan Pusat Statistik (BPS) Cirebon Regency

To examine the interdependencies between tax components without imposing a priori structural restrictions, this study utilizes the Vector Autoregression (VAR) model. In this system, all variables are treated as endogenous, allowing the model to capture the linear interdependencies among multiple time series. The general mathematical formulation of the VAR(p) model with variables is expressed as follows:

$$Y_t = c + \sum_{i=1}^p A_i Y_{t-i} + \epsilon_t$$

Where Y_t is a ($k \times 1$) vector vector of endogenous variables (HOT, ADV, SLT, LBTT), c is the intercept vector, A_i represents the matrix of autoregressive coefficients for lag i , and ϵ_t is the vector of white noise error terms.

The analysis begins with the Augmented Dickey-Fuller (ADF) unit root test to determine the stationarity of the time series data. Stationarity is a prerequisite for VAR modeling to avoid spurious regression results. The test is conducted at the level form, with the null hypothesis stating that the series contains a unit root. Following this, the optimal lag length is determined to ensure the model captures the dynamic structure of the data without losing degrees of freedom. Selection criteria include the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn (HQ) criterion. Furthermore, the stability of the VAR system is verified by examining the Inverse Roots of the AR Characteristic Polynomial. The model is considered stable if all roots lie within the unit circle, which is a necessary condition for the validity of subsequent innovation accounting analyses.

Furthermore, to fulfill complete diagnostic requirements, the estimated VAR(1) model is subjected to advanced post-estimation residual tests. These include advanced residual normality tests alongside checks for serial correlation (such as the Lagrange Multiplier test) and heteroskedasticity. Conducting these complete diagnostic checks ensures that the residuals are well-behaved and that the system generates robust, unbiased empirical estimations for policy interpretation.

To investigate the directional relationships between variables without assuming strict exogeneity, this study employs the Granger Causality Test (Granger, 1969). This method is highly justified for fiscal data as it evaluates whether past values of one tax variable contain statistically significant information to predict the current values of another, thereby providing robust empirical evidence of short-run lead-lag relationships.

Furthermore, because individual autoregressive coefficients in a VAR system are often difficult to interpret directly, the study utilizes Innovation Accounting tools, a methodological framework pioneered by Sims (Sims, 1980), consisting of the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) (Lütkepohl, 2005). The IRF is justified to trace the dynamic, time-path response of each endogenous variable to a one-standard-deviation Cholesky shock in itself and other variables over a ten-month horizon. Meanwhile, the FEVD quantifies the percentage of the forecast error variance of each variable attributable to exogenous shocks from others. Together, these primary econometric methods provide a comprehensive justification for evaluating how structural shocks are transmitted across different tax components.

3. Results and Discussion

3.1. Results

Table 2 provides a statistical overview of the four local tax variables after logarithmic transformation. The results indicate that the data for Street Lighting Tax (lnSLT) and Transfer Tax (lnLBTT) have higher mean values compared to Hotel Tax (lnHOT) and Advertisement Tax (lnADV). The standard deviation values suggest that Street Lighting Tax exhibits the highest volatility among the observed variables. Furthermore, the Jarque-Bera test results show that, with the exception of the Advertisement Tax, the null hypothesis of normal distribution is rejected. This rejection is primarily driven by high kurtosis values, most notably in the Street Lighting Tax (43.64). While these data abnormalities indicate a non-normal distribution, it should be noted that this is a very common characteristic in regional financial time series data. Importantly, regarding the implications for the validity of the VAR model, the estimation remains robust. The VAR framework is widely recognized to be quite resilient to non-normality, provided that the variables satisfy the stationarity requirements and the estimated system is stable.

Table 2. Descriptive Analysis

	lnHOT	lnADV	lnSLT	lnLBTT
Mean	20.39187	20.03887	22.62372	22.64464
Median	20.47229	20.05864	22.77883	22.63781
Maximum	20.88512	20.76195	23.48877	23.86772
Minumum	19.18577	19.39444	15.81188	21.60897
Std. Dev.	0.295042	0.253065	1.017588	0.428978
Skewness	-1.607779	0.021490	-6.430118	0.617256
Kurtosis	7.481128	3.862035	43.64624	4.160081
Jarque-Bera	60.84064	1.489901	3635.004	5.739615
Probability	0.000000	0.474758	0.000000	0.056710
Sum	978.8098	961.8656	1085.939	1086.943
Sum Sq. Dev.	4.091337	3.009967	48.66783	8.649058
Observations	48	48	48	48

The results of the stationarity test using the Augmented Dickey-Fuller (ADF) method are presented in Table 3. The probabilistic values for all variables—Hotel Tax, Advertisement Tax, Street Lighting Tax, and Land and Building Transfer Tax—are statistically significant at the 1% and 5% levels ($p < 0.05$). Consequently, the null hypothesis of a unit root is rejected. This confirms that all variables are stationary at

the level form, allowing for the estimation of the VAR model without the need for first-difference referencing

Table 3. Augmented Dickey-Fuller test

	t-Statistic	Prob.
lnHOT	-3.960080	0.0035
lnADV	-6.349943	0.0000
lnSLT	-7.386522	0.0000
lnLBTT	-7.323848	0.0000

Table 4. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-101.47	NA*	0.0010*	4.49*	4.65*	4.55*
1	-87.35	25.22	0.0011	4.57	5.36	4.86

Determining the optimal lag length is critical to capturing the dynamic interactions within the model while preserving degrees of freedom. Table 3 displays the values for various information criteria, including the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn (HQ). While the formal statistical criteria point to an optimal lag of 0, adopting a lag of 0 would technically reduce the VAR system to a regular static correlation model, eliminating any intertemporal dynamic interactions from previous periods. Therefore, to fulfill the study's core objective of analyzing dynamic short-run fiscal spillovers, this study deliberately imposes a lag of 1. Estimating the model with a lag of 1 is theoretically and methodologically justified as it allows for the execution of Granger causality tests, Impulse Response Functions (IRF), and Variance Decomposition (FEVD), ensuring that economically relevant short-term shock transmissions can still be evaluated even if the raw statistical criteria default to a static baseline.

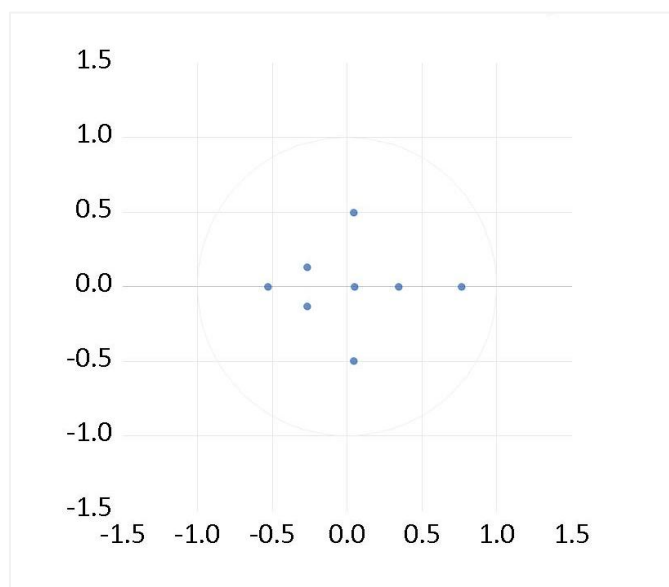


Figure 1. Inverse Roots of AR characteristic polynomial

The stability of the estimated VAR system is verified in Figure 1. The plot demonstrates that all inverse roots of the AR characteristic polynomial lie strictly within the unit circle. No root lies on or outside the circumference. This condition confirms

that the VAR model is stationary and stable, validating the subsequent interpretation of the Impulse Response Functions (IRF) and Variance Decomposition (FEVD).

Table 5. Granger causality test

Dependent Variable	Excluded Variable	Chi-sq	Prob.	Note
HOT	ADV	1.2123	0.5455	Not Significant
HOT	SLT	3.4296	0.1800	Not Significant
HOT	LBTT	5.3573	0.0687	Not Significant
ADV	HOT	0.4063	0.8162	Not Significant
ADV	SLT	0.1512	0.9272	Not Significant
ADV	LBTT	0.1239	0.9400	Not Significant
SLT	ADV	0.0725	0.0944	Not Significant
SLT	HOT	0.6182	0.7341	Not Significant
SLT	LBTT	0.9330	0.6272	Not Significant
LBTT	ADV	0.9126	0.6336	Not Significant
LBTT	HOT	0.4192	0.8109	Not Significant
LBTT	SLT	0.1981	0.9057	Not Significant

Table 5 summarizes the pairwise Granger Causality tests to detect directional relationships between the tax variables. The results indicate that there are no statistically significant causal relationships among the variables at the 5% significance level, as evidenced by probability values exceeding 0.05 for all pairs. This suggests that, in the short run, the sources of local tax revenue in Cirebon Regency operate independently, where the past values of one tax component do not significantly predict the future behavior of others

Table 6. Summary of Forecast Error Variance Decomposition (FEVD)

Response Variable	Period	S.E.	ADV	HOT	LBTT	SLT
ADV	1	0.275	100.00	0.00	0.00	0.00
	5	0.281	98.32	0.66	0.50	0.52
	10	0.281	98.26	0.69	0.53	0.53
HOT	1	0.229	7.18	98.92	0.00	0.00
	5	0.300	7.92	70.40	17.38	4.30
	10	0.307	7.98	69.19	18.74	4.09
LBTT	1	0.456	0.41	0.25	99.34	0.00
	5	0.481	2.33	0.97	96.20	0.50
	10	0.481	2.37	1.11	96.02	0.50
SLT	1	1.119	13.74	0.06	0.89	85.31
	5	1.147	13.84	1.34	2.33	82.49
	10	1.147	13.84	1.34	2.33	82.49

The Variance Decomposition analysis, presented in Table 6, quantifies the contribution of each variable's own shocks versus shocks from other variables over a ten-period horizon. The results reveal a strong degree of exogeneity for all variables. For instance, Advertisement Tax (ADV) and Land and Building Transfer Tax (LBTT) are largely driven by their own innovations, explaining approximately 98% and 96% of their respective forecast error variances by the tenth period. While Hotel Tax (HOT) shows slight sensitivity to shocks from LBTT (18.74%), the general trend confirms that variations in these local taxes are primarily self-determined rather than interdependent.

Figure 2 illustrates the dynamic responses of each tax variable to a one-standard-deviation shock in the system over a ten-month period. The solid blue lines represent

the response coefficients, while the shaded regions indicate the standard error confidence intervals. Consistent with the variance decomposition results, the graphs show that the variables are highly responsive to their own shocks in the initial periods but show limited and rapidly decaying responses to shocks from other variables. Most cross-variable responses hover near zero, reinforcing the finding of independence among these revenue sources.

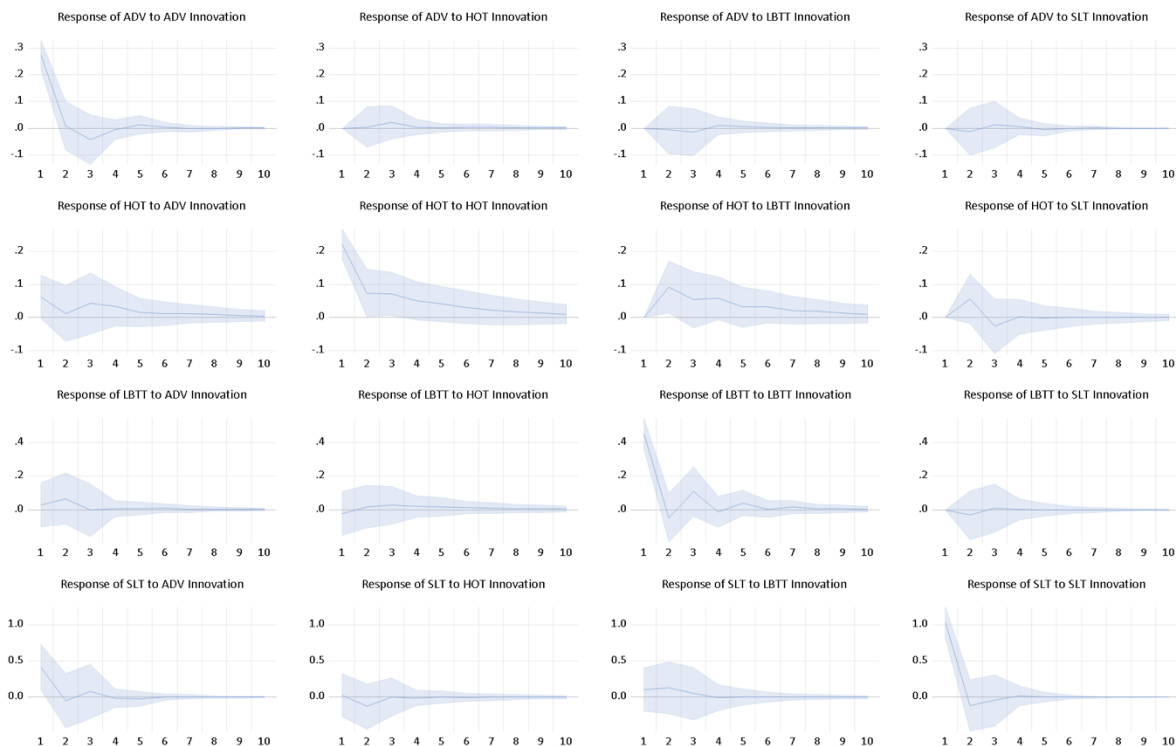


Figure 2. Impulse Response Functon to a One S.D. Cholesky Innovation

3.2. Discussion

The empirical findings of this study reveal a distinct pattern of fiscal behavior in Cirebon Regency, primarily characterized by the absence of short-term interdependence among the local tax components. The Granger causality tests confirmed no statistically significant causal relationships among hotel tax, advertisement tax, street lighting tax, and land and building transfer tax. Furthermore, the Forecast Error Variance Decomposition (FEVD) and Impulse Response Functions (IRF) demonstrated a strong degree of exogeneity, indicating that variations in these taxes are almost entirely driven by their own innovations rather than cross-variable shocks. Consequently, these findings reject both Hypothesis 1 (H1) and Hypothesis 2 (H2), clarifying that the relationship among these tax variables is strictly independent in the short run. From a theoretical standpoint, this outcome strongly aligns with the perspective that local revenue components often operate in structural silos, diverging from theories that assume natural economic spillovers will automatically interconnect different tax bases.

Fiscal Decentralization, Capacity, and Volatility

The core rationale behind fiscal decentralization is to grant local governments greater financial discretion to boost own-source revenues (Brahimi et al., 2025). However, the

isolated performance of Cirebon's tax bases suggests that structural synergies have not yet fully materialized. As noted by Yimenu (2023) and Priambodo (2025), the enhancement of local revenues exhibits strong dynamic persistence but remains heavily contingent upon regional capacity, administrative competence, and broader macroeconomic conditions such as poverty and economic growth. The lack of cross-tax interaction observed in this study may be symptomatic of structural vulnerabilities, such as a 'crowding-out' effect generated by a heavy reliance on unconditional transfers (Panao, 2021), or decentralization frameworks that inadvertently weaken intra-regional income redistribution (Pietrovito et al., 2023).

Moreover, the variance decomposition highlights the highly self-determined nature of these taxes, which poses a risk when dealing with economic volatility. Scholars warn that when tax policies fail to smooth out revenue swings, communities are left vulnerable to unpredictable boom-and-bust cycles (Beach & Raimi, 2026), particularly if local decision-makers mistake temporary revenue windfalls for permanent budget boosts (Solé-Ollé & Viladecans-Marsal, 2019). To mitigate the financial stress induced by such high volatility, authorities are often forced to lower the share of retained taxes (Lyu et al., 2022), utilize tax deductions to cushion market impacts (Ghoddusi & Afkhami, 2019), or shift specific tax bases, such as property taxes, to guarantee income stability (Mintz & Portnov, 2023). Additionally, the aggressive pursuit of isolated local revenue generation risks prioritizing short-term economic growth at the expense of environmental quality (Guo et al., 2020).

Translating these theoretical risks into operational policy, the Cirebon Regency Government should prioritize the establishment of proactive fiscal buffers. Instead of immediately absorbing sector-specific windfalls into routine expenditures, the regional treasury could designate a portion of these volatile revenues to a localized contingency reserve. Furthermore, the local revenue agency needs to transition toward active, cross-sectoral auditing mechanisms. This involves a systematic cross-check of taxpayer data—for instance, aligning hotel occupancy records with commercial billboard and street lighting usage. By implementing such integrated database management, local authorities can create the fiscal synergy that is currently absent, leading to a more resilient and integrated local tax ecosystem.

The Absence of Spillovers in the Digital Era

The finding that Cirebon's tax variables do not significantly influence one another is particularly intriguing given the modern context of digital and regional integration. The existing literature heavily emphasizes that the advancement of ICT infrastructure and the digital economy typically act as critical catalysts that create financial ripple effects, organically lifting collections across regions and improving overall transparency (Liu & Lian, 2025; Priambodo et al., 2024). Furthermore, regional policies designed to manage cross-border leakages often alter market dynamics significantly (Bergantino et al., 2025). The strictly independent behavior of Cirebon's taxes suggests that these theoretical spillovers have not endogenously connected the distinct tax sectors. However, this isolation might actually act as a localized buffer; as Aslim & Neyapti (2017) and Que et al. (2018) note, when ecological and regional spillovers easily cross

administrative borders, granting excessive fiscal autonomy can actually worsen overall welfare, income equality, and environmental damage.

Sector-Specific Tax Dynamics

A closer look at specific tax components further contextualizes their isolated behavior. The hotel and advertisement taxes show virtually no causal influence on other variables. While literature dictates that hotel taxes rely heavily on out-of-town tourists for major events (Hall & Parker, 2020) and are highly susceptible to cross-border spillovers (Mills et al., 2019) as well as leakages to short-term rental platforms (DiNatale et al., 2018), Cirebon's hotel tax variations remain strongly localized. Similarly, advertisement tax variations are predominantly driven by their own innovations. Although theoretically viewed as an ideal policy tool to contain wasteful corporate spending, drive behavioral change, and improve public welfare (Cavenaile et al., 2025; Delpeuch & Turino, 2026; Mashhadi et al., 2025), the lack of transmission from advertisement taxes to other sectors might be explained by the current digital landscape, where multinational platforms shift the financial burden directly onto local advertisers, restricting broader economic stimulation (Lassmann et al., 2025).

Finally, the street lighting tax (SLT) and land and building transfer tax (LBTT) exhibit high exogeneity, with SLT displaying the highest statistical volatility among all variables. The independence of SLT underscores a significant policy challenge; according to Boulmrharj et al. (2023) and Ling et al. (2025), this tax is not merely a revenue source but a crucial regulatory tool needed to sustain energy-intensive public operations and manage urban light pollution. Meanwhile, the highly self-driven nature of LBTT aligns with evidence that land use decisions and tax adjustments are deeply intertwined with municipal fiscal expectations and the perceived mobility of the tax base (Getzner et al., 2025; Mauri, 2024). Because local governments prioritize residential and commercial expansion to secure their fiscal position, property transaction revenues tend to respond strictly to zoned land availability and sector-specific shocks, rather than to short-term fluctuations in hospitality or advertising activities.

4. Conclusion

This study investigated the dynamic interactions among hotel, advertisement, street lighting, and land and building transfer taxes in Cirebon Regency. The empirical results demonstrate that these local revenue sources operate completely independently in the short run. Specifically, the Granger causality tests found no statistically significant multi-directional relationships among the variables. Furthermore, the variance decomposition and impulse response analyses confirmed that variations in each tax component are primarily driven by their own internal shocks rather than external spillovers from other tax sectors.

These findings offer a new perspective on regional fiscal dynamics. While theoretical frameworks often assume that economic expansions, such as a boom in property development or tourism, will create natural financial ripple effects across multiple tax bases, this synergy is currently absent in Cirebon Regency. The strict exogeneity of these taxes reveals a structural rigidity within the local economy. Consequently, local

policymakers cannot rely on automatic spillover effects to boost the overall municipal budget; a positive shock in the hospitality sector will not naturally increase advertisement or property tax collections. Therefore, rather than relying solely on general sector-specific administrative strategies, the Cirebon Regency Government must implement operational, cross-sectoral policies to actively construct revenue synergy. For example, the local revenue agency should integrate and cross-check taxpayer databases between the Hotel Tax and Advertisement Tax to ensure that commercial entities comply with both obligations simultaneously. By enforcing collaborative database management and proactively synchronizing land development (LBTT) with public utility monitoring (SLT), local authorities can artificially bridge these isolated sectors and build a more integrated, resilient local tax ecosystem.

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