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Regional Investment, Leverage, and Financial Independence in Central Sulawesi

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ABSTRACT

Purpose - This study examines the association between regional investment, leverage, and regional financial independence within the fiscal decentralization framework.
Design/methodology/approach - A quantitative associative approach is employed using pooled panel data from 13 regency and municipal governments in Central Sulawesi Province during 2018–2024. The relationships among variables are analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with WarpPLS. The analysis is grounded in fiscal decentralization theory and agency theory to explain local government financial management behavior.
Finding/Results – The results indicate that regional investment and leverage are positively and significantly associated with regional financial independence in the pooled PLS-SEM model. Long-term investment is related to stronger fiscal capacity, while leverage may serve as a supportive financing instrument when managed prudently. Together, both variables explain a moderate proportion of the variation in regional financial independence.
Originality/Value - This study contributes empirical evidence on how regional investment and leverage are linked to local fiscal autonomy in Central Sulawesi, an underrepresented provincial context in Indonesian local government finance studies. The findings provide practical insights for local governments to improve productive long-term investment and maintain prudent liability management. This study is limited to one province and two explanatory variables; therefore, future research may expand regional coverage and include governance quality, revenue effectiveness, transfer dependence, and expenditure efficiency.

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1. Introduction

Fiscal decentralization is intended to strengthen local autonomy by giving regional governments broader authority to manage public finance and determine development priorities. However, the transfer of fiscal authority does not automatically create such independence. Many local governments still rely heavily on central government transfers, which may limit their flexibility in allocating their budgets and responding to regional development needs. This dynamic underscores the core challenge of subnational governance, where vertical fiscal imbalance necessitates a strategic approach to local revenue mobilization (Bahl & Bird, 2018).

Regional financial independence reflects local governments' ability to finance public expenditure through their own revenue capacity. Higher financial independence allows regions to design development programs more freely, while lower independence indicates weak fiscal capacity and strong dependence on external funding. Therefore, financial independence is an important issue for evaluating the effectiveness of regional autonomy and fiscal decentralization.

Regional investment and leverage are relevant factors in explaining this. Investment can support economic growth, strengthen public assets, and increase future local revenue when directed toward productive sectors. Meanwhile, leverage can provide additional financing for development when managed prudently. Nevertheless, ineffective investment and excessive liabilities may reduce fiscal flexibility and weaken the long-term financial sustainability.

The main problem in this study lies in the unequal fiscal capacity among local governments. Some regions can strengthen their revenue base through investment and sound financial management, while others remain highly dependent on external funding. This raises an important question: Are regional investment and leverage positively associated with regional financial independence? Addressing this question is essential because financial independence is determined not only by revenue collection but also by how local governments manage investment and financing structures.

Central Sulawesi Province provides a relevant context for this study because its regencies and municipalities show different levels of investment capacity, leverage, and financial independence. Preliminary assessments of the region's fiscal condition in 2019 indicated that, while several local governments began demonstrating improved budget efficiency, the overall independence ratio remained a significant challenge for sustainable development (Salmita, 2023). Although previous studies have examined regional financial independence, many have focused separately on locally generated revenue, fiscal transfers, capital expenditure, or government financial performance. Limited attention has been paid to the combined role of regional investment and leverage as fiscal management instruments that may explain differences in local financial independence. This gap is important because regional investment reflects long-term efforts to expand local economic and revenue capacity, whereas leverage reflects the financing structure used by local governments to support fiscal activities. In addition, empirical evidence from underrepresented provincial contexts, such as Central Sulawesi, remains limited in local public finance studies. Therefore, examining regional investment and leverage together provides a more focused understanding of how fiscal management decisions are associated with regional financial independence. Based on this background, this study aims to examine the association between regional investment, leverage, and regional financial independence among regency and municipal governments in Central Sulawesi during 2018–2024.

The findings are expected to contribute to the literature on local public finance and provide practical insights into improving sustainable fiscal management at the regional level.

2. Literature Review and Hypothesis Development

Fiscal decentralization gives local governments broader authority to manage public resources, determine expenditure priorities, and design policies that reflect regional needs. Within this framework, regional financial independence is an important indicator of fiscal autonomy because it shows the extent to which local governments can finance public activities through their own revenue sources rather than relying excessively on central government transfers. Regional financial independence is generally measured by comparing locally generated revenue, or PAD, with total regional revenue. A higher PAD contribution indicates stronger fiscal capacity, while a lower ratio reflects greater dependence on intergovernmental transfers (Fitriyani, Sumbawati, & Puspita, 2019; Imawan & Wahyudin, 2014).

Furthermore, the institutional design of intergovernmental fiscal relations plays a decisive role in determining whether local authorities can achieve meaningful financial autonomy without compromising macroeconomic stability (Bird & Smart, 2002).

The concept of regional financial independence is also closely related to the agency theory. In a decentralized fiscal system, the central government acts as the principal that delegates authority and resources to local governments as agents. This relationship requires local governments to manage public funds effectively, transparently, and in accordance with local priorities. When local governments can strengthen their own-source revenue, they have a greater ability to reduce fiscal dependence, improve accountability, and respond more directly to public needs (Susanto & Murtini, 2015). Tiebout (1956) further emphasizes that decentralized governance allows a "voting with their feet" mechanism, through which local governments compete to provide better public services, investment conditions, and fiscal environments.

A high dependence on central government transfers may limit the flexibility of local governments in setting development priorities. Regions that rely heavily on transfer funds often face restricted fiscal space because part of the funding is tied to central policy direction. Consequently, local governments may have limited scope to innovate, adjust spending priorities, and respond quickly to regional development challenges. Martinez-Vazquez and McNab (2003) and Shah (2007) explain that fiscal decentralization can support development when local governments have sufficient authority and capacity to manage their fiscal resources effectively.

The theoretical foundation of this study is based on the principle of fiscal decentralization. As argued by Oates (1972), decentralization enhances economic efficiency because local jurisdictions have superior information regarding the specific needs and preferences of their constituents than the central government.

In the context of public sector management, agency theory suggests that information asymmetry between the central and local governments can influence decision-making regarding regional debt and investments (Jensen & Meckling, 1976).

Regional financial independence is associated with various fiscal and economic factors. In this study, regional investment and leverage are positioned as two important variables that may explain the differences in the level of financial independence across local governments. Regional investment reflects the commitment of local governments to build long-term economic capacity through capital allocation, whereas leverage represents the use of liabilities

as part of the financing structure. Previous studies have shown different findings regarding these variables. Afiah, Mulyani, and Ulfi (2021) find that regional investment can improve financial independence through the growth of locally generated revenues. However, Abdulfatah and Mulyani (2024) show that investment may have a negative effect when it is not managed effectively. Similarly, leverage can support fiscal capacity when used prudently, but it may also reduce budget flexibility when debt obligations are not aligned with repayment capacity (Hadi, 2010; Rofiq & Arza, 2021). These mixed findings indicate the need to examine regional investment and leverage within a more integrated framework.

The integrated examination of regional investment and leverage is important because both variables represent different but related fiscal decisions. Regional investment reflects the allocation of public resources to build long-term economic capacity, whereas leverage reflects the extent to which local governments use obligations as part of their financing structure. When managed prudently, investment and leverage may complement each other in strengthening the local fiscal capacity. However, when investment is not productive or liabilities are not linked to revenue-generating outcomes, both may reduce fiscal flexibility. Therefore, this study does not treat regional investment and leverage as automatic determinants of financial independence but as fiscal management variables whose associations with regional financial independence require empirical testing.

2.1. Regional Investment and Regional Financial Independence

Regional investment refers to the long-term capital allocation undertaken by local governments to support development, expand productive capacity, and strengthen regional economic growth. In local government financial reports, investment may include permanent and non-permanent long-term investments recorded in the regional balance sheet. From a public finance perspective, investment is not only a budget allocation but also a strategic instrument that may generate future fiscal benefits. Mirsan, Hamzah, and Sjufri (2019) state that investment is one of the main drivers of regional economic growth because it can expand productive activities and improve regional economic performance.

The importance of regional investment in fostering financial autonomy is supported by the productivity of public capital. Aschauer (1989) argues that public investment in infrastructure and non-military capital significantly enhances private sector productivity, which eventually broadens the local tax base and strengthens the regional fiscal capacity.

Strategic capital expenditure builds physical infrastructure and signals a region's economic viability to external investors, creating a multiplier effect on local economic growth (Easterly & Rebelo, 1993).

Theoretically, regional investment can strengthen financial independence through several mechanisms. First, investing in productive assets can expand the regional economic base, increasing the potential for PAD collection. Second, investing in infrastructure can improve accessibility, reduce transaction costs, and encourage private economic activities. Third, investment connected to local economic potential may create long-term fiscal benefits through higher output, broader tax bases, and stronger local revenue capacity. Therefore, regional investment can be understood as a long-term fiscal strategy for reducing dependence on central government transfers. However, the effect of regional investment on financial independence does not occur automatically. Investments that are not based on clear regional priorities may fail to generate meaningful fiscal returns. Satibi (2020) argues that regional investment policy requires real bureaucratic and institutional improvement, not merely formal

policy planning. This argument is consistent with Abdulfatah and Mulyani (2024), who found that investment can negatively affect financial independence when not managed effectively. Thus, the contribution of regional investment depends not only on the amount of investment but also on planning quality, implementation capacity, supervision, and alignment with regional revenue potential.

Consistent with Musgrave's (1959) fiscal functions, local governments must maintain a balance among allocation, distribution, and stabilization functions. Achieving financial independence signifies the success of the allocation function, where the region can independently fund public services tailored to its unique economic structure.

Afiah et al. (2021) report that regional investment has a positive relationship with regional financial independence because investment can support the increase of locally generated revenue. In Central Sulawesi, differences in economic structure, fiscal capacity, and investment intensity across regencies and municipalities may lead to different levels of financial independence. Regions with stronger and more productive investments are more likely to expand their economic base, improve PAD, and reduce dependence on transfers from the central government. Based on this reasoning, the first hypothesis is formulated as follows:

H1: Regional investment is positively associated with regional financial independence.

2.2. Leverage and Regional Financial Independence

Leverage reflects the extent to which local governments use liabilities in their financing structure. In regional finance, leverage is commonly measured by comparing liabilities with equity, which indicates the degree of reliance on external financing sources. Hadi (2010) explains that leverage shows the capacity of local governments to meet their long-term obligations. Therefore, leverage is not only a financial risk indicator but also a representation of how local governments structure their development financing.

In the public sector, the use of debt instruments is fundamentally tied to the pay as you use principle, ensuring that the costs of long-lived assets are distributed across the generations that benefit from them (Stiglitz, 2000).

In the context of Local Government Financial Statements, or LKPD, leverage should be interpreted carefully because total liabilities may include different types of obligations, such as short-term payables, accrued obligations, and long-term liabilities when these components are recorded in the regional balance sheet. Therefore, the liabilities-to-equity ratio does not necessarily represent formal borrowing for investment projects only. Instead, it reflects the broader financing structure of local governments and shows the extent to which regional fiscal activities are supported by obligations relative to the accumulated equity. This distinction is important because liabilities may have different fiscal implications depending on whether they are related to productive development programs, temporary administrative obligations or fiscal pressure.

The relationship between leverage and regional financial independence can be viewed from two perspectives. On the one hand, leverage may support fiscal independence when debt is used for productive development activities. Borrowing can provide additional fiscal space for local governments, especially when internally generated revenue is not sufficient to finance infrastructure, public facilities, or strategic regional assets. Adinata and Efendi (2022) argue that debt can support government operations and contribute to asset accumulation when managed appropriately.

However, leverage may weaken fiscal independence when debt obligations exceed the repayment capacity of local governments. High liabilities can reduce future budget flexibility because a portion of the revenue must be allocated to debt repayment rather than productive expenditure. This condition may limit the ability of local governments to independently finance development programs and increase their dependence on external support. Therefore, leverage can contribute positively to regional financial independence only when borrowing is selective, controlled, and aligned with a realistic fiscal capacity.

This means that the positive role of leverage depends on the fiscal purpose and management quality of liabilities. If liabilities are used to support productive assets, infrastructure, or programs that improve future revenue capacity, leverage may contribute to greater fiscal independence. Conversely, if liabilities mainly reflect accumulated obligations or short-term fiscal pressure, leverage may not improve financial independence and may reduce budget flexibility. Thus, leverage should be understood as a conditional financing instrument, rather than a direct source of fiscal autonomy.

Previous research has drawn different conclusions regarding the role of leverage. Rofiq and Arza (2021) find that leverage has a positive effect on regional financial independence, indicating that liabilities may function as a supportive financing instrument when managed prudently. In contrast, Hadi (2010) suggests that leverage's influence on regional financial independence may be relatively limited, particularly when debt does not directly support productive activities. These findings imply that leverage is not the main driver of financial independence. However it may complement investment when used within a prudent fiscal management framework.

For local governments, leverage management should be linked to repayment ability, development priorities, and expected economic benefits. Debt should not be used merely to cover budget shortages, but to finance programs that can strengthen regional assets and increase future revenue capacity. If leverage is managed carefully, it can help local governments accelerate development without undermining long-term fiscal autonomy. Based on this explanation, the second hypothesis is formulated as follows:

H2: Leverage is positively associated with regional financial independence.

Overall, the literature suggests that regional financial independence is related to the ability of local governments to strengthen productive investment and manage financing structures responsibly. Regional investment is expected to serve as the main instrument for expanding economic and fiscal capacity, while leverage functions as a complementary financing mechanism when liabilities are managed prudently and connected to productive outcomes. Therefore, this study positions regional investment and leverage as explanatory variables that are expected to be positively associated with regional financial independence. This wording is consistent with the pooled PLS-SEM design used in this study, which estimates predictive associations among regency-year observations rather than strict causal effects.

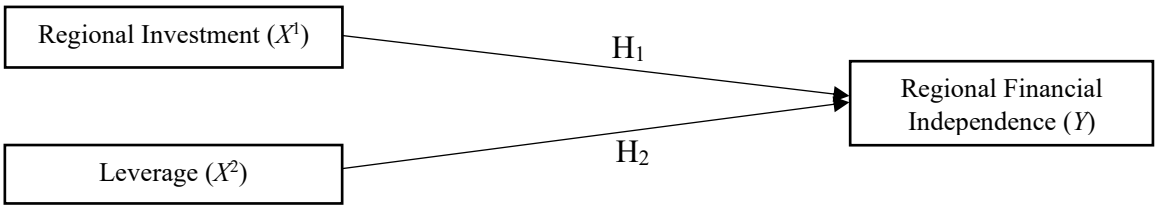
3. Methodology

This study applies a quantitative associative design to test how regional investment and leverage are associated with regional financial independence in Central Sulawesi. This design is appropriate because the study examines directional relationships among measurable fiscal variables obtained from local government financial statements. Rather than merely describing regional fiscal conditions, the study evaluates whether investment allocation and financing

structure help explain differences in local fiscal autonomy within the fiscal decentralization framework (J. F. Hair, Hult, Ringle, & Sarstedt, 2021; Kock, 2021; Martono, 2016).

The research framework specifies regional financial independence as the endogenous variable, while regional investment and leverage are treated as exogenous variables. Regional investment represents long-term capital allocation recorded in the local government balance sheet and reflects the fiscal commitment of local governments to strengthen future economic and revenue capacity. Leverage represents the proportion of liabilities in the regional financing structure and indicates the extent to which local governments rely on obligations to support fiscal activities. Therefore, the model examines whether investment capacity and financing structure contribute to differences in local fiscal independence.

Figure 1. Research model



The population of this study consists of all regency and municipal governments in Central Sulawesi Province. The study covers 13 local governments observed over seven fiscal years, from 2018 to 2024, resulting in an initial balanced panel of 91 regency-year observations. After data screening, 84 observations were retained for the final PLS-SEM analysis. Seven observations were excluded because they were marked as outliers in the data-screening process: Banggai Laut 2020, Banggai Laut 2021, Banggai Laut 2022, Morowali 2018, Morowali 2024, Morowali Utara 2022, and Morowali Utara 2023. The exclusion was applied using a formal univariate outlier-screening procedure. For leverage, the interquartile range rule was used because the distribution showed several unusually high liability-to-equity values. Based on the full 91-observation dataset, the upper fence for leverage was 5.31%. Therefore, leverage observations above this threshold were classified as outliers. This criterion identified six leverage outliers: Banggai Laut 2020, Banggai Laut 2021, Banggai Laut 2022, Morowali 2018, North Morowali 2022, and North Morowali 2023. For regional financial independence, standardized score inspection was used to identify an extreme value. Morowali 2024 was classified as an outlier because its financial independence ratio reached 35.09%, representing an extreme value compared with the overall distribution. The exclusion was not caused by missing data, but by extreme financial values that could disproportionately influence the pooled PLS-SEM estimates. Therefore, 84 observations were retained as the main screened dataset for predictive model evaluation (Kock, 2021; Sarstedt, M., Hair, J. F., Nitzl, C., Ringle, C. M., & Howard, 2020).

Table 1. Excluded Outlier Observations

Local Government	Year	Screening Note
Banggai Laut	2020	Leverage = 11.31%, above the IQR upper fence of 5.31%
Banggai Laut	2021	Leverage = 8.96%, above the IQR upper fence of 5.31%
Banggai Laut	2022	Leverage = 7.10%, above the IQR upper fence of 5.31%

Morowali	2018	Leverage = 10.53%, above the IQR upper fence of 5.31%
Morowali	2024	Financial Independence = 35.09%, identified as an extreme standardized value
North Morowali	2022	Leverage = 9.73%, above the IQR upper fence of 5.31%
North Morowali	2023	Leverage = 7.41%, above the IQR upper fence of 5.31%

Source: data processed by the author

To assess the sensitivity of the findings to outlier treatment, a robustness comparison was conducted using the full 91-observation dataset and the screened 84-observation dataset. The comparison shows that the direction and statistical significance of the two structural paths remain stable across both models. In the full-sample model, regional investment remains positively and significantly associated with regional financial independence, and leverage also remains positively and significantly associated with regional financial independence. Therefore, the screened 84-observation dataset is retained as the main estimation model because it reduces the influence of extreme financial values, while the full 91-observation model provides supporting evidence that the main findings are robust. The robustness comparison between the full sample and the screened sample is presented in Table 2. This comparison was conducted to examine whether the direction and statistical significance of the structural relationships remained stable after the exclusion of extreme financial observations.

Table 2. Robustness Comparison Between Full and Screened Samples

Model	N	Path	Coefficient	p-value	R-square	Q-square	Interpretation
Full sample	91	INV → KEM	0.432	< 0.001	0.313	0.320	Supported
Full sample	91	LEV → KEM	0.273	0.003	0.313	0.320	Supported
Screened sample	84	INV → KEM	0.496	< 0.001	0.384	0.380	Supported
Screened sample	84	LEV → KEM	0.268	0.005	0.384	0.380	Supported

Source: WarpPLS output, data processed by the author

The robustness comparison indicates that the main findings remain stable across the full and screened samples. In the full 91-observation model, regional investment remains positively and significantly associated with regional financial independence ($\beta = 0.432$, $p < 0.001$), and leverage also remains positively and significantly associated with regional financial independence ($\beta = 0.273$, $p = 0.003$). The screened 84-observation model produces a higher R-square value, increasing from 0.313 to 0.384, and a higher Q-square value, increasing from 0.320 to 0.380. This pattern suggests that excluding extreme observations improves model stability without changing the direction or statistical significance of the main relationships. Therefore, the screened model is retained as the primary estimation model, while the full-sample model is reported as robustness evidence.

The dataset combines cross-sectional units and annual observations; therefore, it is treated as pooled panel data in WarpPLS. Each regency-year is analyzed as one observation in the structural model. This study does not estimate fixed-effects or random-effects panel regression and does not directly model unobserved local-government heterogeneity or temporal dependence. Consequently, the path coefficients are interpreted as pooled predictive associations rather than strict causal effects. The estimated relationships may reflect both

differences across local governments and changes across fiscal years, but the model cannot fully separate within-region fiscal dynamics from between-region heterogeneity (Sarstedt, M., Hair, J. F., Nitzl, C., Ringle, C. M., & Howard, 2020).

This study uses secondary data collected through documentation. The main data source is the Local Government Financial Statements, or LKPD, for each regency and municipality in Central Sulawesi during the 2018–2024 fiscal years. LKPD is used because it provides official and comparable information on locally generated revenue, total regional revenue, long-term investment, total liabilities, and total equity. Because these reports are prepared under government accounting standards and are subject to audit procedures, they provide a consistent basis for measuring regional fiscal performance. The variables are operationalized using single observed financial indicators. Regional investment is measured by the value of long-term investment reported in the local government balance sheet. This measure reflects the fiscal commitment of local governments to strengthen future economic capacity and potential revenue sources. Leverage is measured as total liabilities divided by total equity. In this study, total liabilities refer to obligations reported in the LKPD balance sheet, including short-term liabilities and long-term liabilities when these components are recorded in the audited financial statements. Although public finance studies often use debt-to-revenue or debt-service indicators, the liabilities-to-equity ratio is used because LKPD balance sheets consistently report liabilities and equity across all observed local governments. This ratio is treated as a financing-structure indicator rather than as a corporate solvency measure. It captures the extent to which regional fiscal activities are supported by obligations relative to accumulated equity. In the local government context, this measure is relevant because liabilities may support development financing, but they can also create future budget pressure if they are not connected to productive assets, repayment capacity, and revenue-generating outcomes. Regional financial independence is measured as locally generated revenue, or PAD, divided by total regional revenue. A higher ratio indicates stronger fiscal autonomy, while a lower ratio indicates greater dependence on transfers and other external revenue sources (Fitriyani et al., 2019; Hadi, 2010; Rofiq & Arza, 2021).

Table 3. Operational Definition of Variables

Variable	Symbol	Indicator	Formula / Measurement	Data Source
Regional Investment	X1	Long-term investment	Value of long-term investment reported in LKPD	LKPD 2018–2024
Leverage	X2	Total liabilities-to-equity ratio based on obligations reported in the LKPD balance sheet	Total liabilities/total equity × 100%	LKPD 2018–2024
Regional Financial Independence	Y	PAD contribution to total revenue	Locally generated revenue/ total regional revenue × 100%	LKPD 2018–2024

Source: data processed by the author

Because each construct is represented by one observed financial indicator, this study specifies a single-indicator PLS-SEM model. Regional investment, leverage, and regional financial independence are not measured using multiple questionnaire items or latent dimensions; instead, they are measured using accounting-based indicators obtained directly from LKPD. Therefore, conventional outer-model assessments such as Cronbach's alpha, composite reliability, and average variance extracted are not interpreted in the same way as in multi-item latent constructs. The use of single indicators is appropriate for concrete financial variables when the indicator directly represents the construct being analyzed. Consequently, the analysis emphasizes the structural model, including path coefficients, statistical significance, explanatory power, predictive relevance, effect size, and collinearity diagnostics (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012; Petrescu, 2013; Sarstedt, M., Hair, J. F., Nitzl, C., Ringle, C. M., & Howard, 2020).

The data are analyzed using Partial Least Squares–Structural Equation Modeling, or PLS-SEM, with WarpPLS software. PLS-SEM is selected because it is suitable for predictive modeling, allows simultaneous estimation of relationships among variables, and can be applied to relatively small samples when the research objective is prediction and theory development. The structural model tests two direct predictive associations: the association between regional investment and regional financial independence, and the association between leverage and regional financial independence. This wording is used because the pooled PLS-SEM model estimates predictive relationships among regency-year observations and does not fully separate within-region changes from between-region differences. The hypothesis-testing results should be reported using path coefficients, standard errors, t-statistics, exact p-values, and hypothesis decisions for each path (J. Hair & Alamer, 2022; Kock, 2021; Sarstedt, M., Hair, J. F., Nitzl, C., Ringle, C. M., & Howard, 2020).

Model evaluation focuses on the structural model because the constructs are measured using single observed indicators. The evaluation includes path coefficients, p-values, coefficient of determination, predictive relevance, effect size, and collinearity diagnostics. The coefficient of determination is used to assess the explanatory power of regional investment and leverage in predicting regional financial independence. Predictive relevance is used to evaluate the model's predictive capability, while effect size indicates the relative contribution of each exogenous variable. Full collinearity variance inflation factors are also examined to detect potential multicollinearity problems in the model (J. Hair & Alamer, 2022; Kock, 2021).

Classical assumption tests commonly used in ordinary least squares regression are not presented as the main diagnostic procedure because this study applies a variance-based SEM approach. Instead, the analysis evaluates model quality through PLS-SEM criteria, including explanatory power, predictive relevance, effect size, and collinearity diagnostics. However, because the observation period covers 2018–2024, the 2020–2021 COVID-19 period is acknowledged as a possible temporal disruption that may have affected local revenue, investment realization, liabilities, and fiscal independence. Therefore, the findings should be interpreted as pooled predictive associations rather than strict causal effects, and part of the observed fiscal variation may reflect extraordinary pandemic-period conditions.

A separate sensitivity model excluding the 2020–2021 pandemic years was conducted to assess whether the main findings remained stable after removing the fiscal period most directly affected by COVID-19. This model is not used as the main specification because excluding two fiscal years reduces the number of regency-year observations and limits comparability across the full 2018–2024 fiscal period. Therefore, the screened 84-observation dataset remains the

primary estimation model, while the model excluding 2020–2021 is reported as an additional robustness check in the results section. This approach allows the study to acknowledge the possible fiscal disruption caused by the pandemic without replacing the main pooled predictive model.

Accordingly, the methodological design is intended to provide a cautious predictive explanation of regional financial independence rather than a definitive causal panel-data estimation.

4. Result and Discussion

4.1. Overview of Research Data

The descriptive results provide an initial overview of the fiscal structure of regency and municipal governments in Central Sulawesi during the 2018–2024 period. As shown in Table 4, the final dataset consists of 84 regency-year observations after the exclusion of seven outlier observations described in the methodology section. The financial independence ratio ranges from 2.92% to 30.52%, with a mean value of 9.25%. This average indicates that locally generated revenue still contributes a relatively small share to total regional revenue. In practical terms, most local governments in Central Sulawesi have not yet achieved a strong level of fiscal autonomy and remain closely connected to intergovernmental transfer mechanisms. This condition supports the argument that low own-source revenue reflects limited local fiscal capacity to finance development independently (Halim, 2014; Mahmudi, 2016).

Table 4. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Financial Independence	84	2.92	30.52	9.25	5.84
Regional Investment	84	6.70	155.67	40.24	29.94
Leverage	84	0.02	5.20	1.51	1.16

Source: data processed by the author

The mean value of regional investment is IDR 40.24 billion, while the standard deviation is 29.94. This relatively high dispersion indicates that long-term investment capacity differs substantially across local governments. Some regions are able to allocate larger investment resources, whereas others operate with narrower fiscal space. This variation is important because regional investment can strengthen the local fiscal base only when it is directed toward productive assets, infrastructure, and economic activities that are capable of expanding locally generated revenue over time (Afiah et al., 2021; Mirsan et al., 2019).

Leverage has an average value of 1.51%, with a minimum of 0.02% and a maximum of 5.20%. This result shows that the use of liabilities as a financing instrument remains relatively limited among local governments in Central Sulawesi. Such a pattern reflects a cautious financing structure, which is important because debt can support development needs only when it is managed within the repayment capacity of the region. If liabilities are not followed by productive outcomes, they may reduce fiscal flexibility in subsequent budget periods and weaken the ability of local governments to finance development independently (Bahl & Bird, 2008; Rofiq & Arza, 2021).

A more detailed comparison across regencies and municipalities is presented in Table 5. Morowali Regency records the highest average financial independence ratio, at 23.69%, followed by Palu Municipality at 20.76%. These two regions appear to have stronger fiscal foundations than other local governments in Central Sulawesi. Morowali benefits from economic activities related to industrial and natural-resource-based sectors, while Palu has advantages as the provincial administrative and service center. These economic characteristics provide broader opportunities for local revenue mobilization and help explain why both regions show higher financial independence than most other local governments in the province.

Table 5. Average Research Variables per Regency/Municipality, 2018–2024

Regency/Municipality	Financial Independence (%)	Investment (IDR billion)	Leverage (%)
Banggai	8.49	34.76	2.62
Banggai Islands	4.13	37.38	0.50
Banggai Laut	4.40	19.38	2.84
Buol	7.27	36.25	0.59
Donggala	6.72	38.30	0.79
Palu Municipality	20.76	126.03	2.45
Morowali	23.69	25.68	2.02
North Morowali	6.95	18.15	1.69
Parigi Moutong	9.40	28.67	2.49
Poso	8.55	36.82	0.93
Sigi	5.69	8.41	1.19
Tojo Una Una	6.68	41.61	0.97
Toli Toli	8.93	52.29	1.31

Source: data processed by the author (LHP 2018–2024)

In contrast, Banggai Islands and Banggai Laut show the lowest financial independence ratios, at 4.13% and 4.40%, respectively. This pattern reflects the fiscal challenges faced by archipelagic areas, particularly those with a limited economic base and relatively smaller local revenue potential. A narrow tax and retribution base makes it more difficult for these regions to reduce dependence on central government transfers.

Palu Municipality records the highest average investment value, reaching IDR 126.03 billion. This reflects the concentration of public assets, infrastructure activities, and economic services in the provincial capital. Meanwhile, Sigi Regency has the lowest average investment value, at IDR 8.41 billion. The difference shows that local investment capacity is shaped not only by

development needs but also by fiscal strength, administrative readiness, and regional economic prospects.

The leverage pattern also differs across regions. Banggai Laut records the highest average leverage value at 2.84%, followed by Banggai at 2.62%. However, a higher leverage ratio does not automatically lead to stronger fiscal independence. Banggai Laut, for example, has relatively high leverage but remains among the regions with the lowest own-revenue capacity. This comparison implies that liabilities become useful only when they are connected to productive programs, asset optimization, or revenue-generating activities.

Overall, the descriptive evidence suggests that financial independence is not determined solely by the size of investment or the level of liabilities. Instead, it depends on how local governments transform investment and financing decisions into productive economic outcomes. Therefore, the descriptive results provide an important basis for interpreting the structural model, particularly in assessing whether investment and leverage significantly explain differences in regional financial independence.

4.2. Inner Model Evaluation

The inner model evaluation was conducted to assess the explanatory power, predictive relevance, effect size, model fit, and collinearity condition of the structural model. As shown in Table 6, the R-square value is 0.384, indicating that regional investment and leverage jointly explain 38.4% of the variance in regional financial independence. Based on PLS-SEM interpretation, this value indicates a moderate level of explanatory power. This means that investment and leverage are relevant predictors of financial independence, although other fiscal and institutional factors may also influence local fiscal autonomy, such as revenue effectiveness, transfer dependence, expenditure quality, governance capacity, and public asset management (J. F. Hair et al., 2021; Kock, 2021).

Table 6. Inner Model Estimation Assessment Results

Criteria	Value	Benchmark	Remark
Coefficient of Determination (R-Square)	0.384	0.75 (substantial), 0.50 (moderate), 0.25 (weak)	Moderate
Predictive Relevance (Q^2)	0.380	$Q^2 > 0$	Good
Effect Size	INV = 0.279	(0.02) small, (0.15) medium, (0.35) large	Medium
	LEV = 0.105		Small
Average Path Coefficient (APC)	0.382;p<0.001	$p < 0.05$	Model fit
Average R-Squared (ARS)	0.384;p<0.001	$p < 0.05$	Model fit
Average Adjusted R-Squared (AARS)	0.369;p<0.001	$p < 0.05$	Model fit
Average block VIF (AVIF)	1.066	< 5 (ideally ≤ 3.3)	Model fit
Average Full Collinearity VIF (AFVIF)	1.353	< 5 (ideally ≤ 3.3)	Model fit
Tenenhaus GoF	0.620	small ≥ 0.10, medium ≥ 0.25, large ≥ 0.36,	Large

Simpson's Paradox Ratio (SPR)	1.000	Acceptable if ≥ 0.70, ideally = 1	Good
R-squared Contribution Ratio (RSCR)	1.000	Acceptable if ≥ 0.90, ideally = 1	Good
Statistical Suppression Ratio (SSR)	1.000	Acceptable if ≥ 0.70	Good
Nonlinear Bivariate Causality Direction Ratio (NLBCDR)	1.000	Acceptable if ≥ 0.70	Good

Source: Data processed by the author

The Q-square value of 0.380 is greater than zero, confirming that the model has predictive relevance. This means that the structural model is not limited to explaining the observed data but also has acceptable predictive ability for the endogenous variable. The effect size values provide further information on the relative contribution of each predictor. Regional investment shows a medium contribution, with an effect size of 0.279, whereas leverage shows a small contribution, with an effect size of 0.105. This comparison indicates that regional investment is a stronger predictor of regional financial independence than leverage. Therefore, the model supports the view that investment is the main explanatory predictor in this pooled PLS-SEM model, while leverage functions as a complementary financing-structure predictor.

The model fit indices also support the adequacy of the estimated model. The APC, ARS, and AARS values are statistically significant at $p < 0.001$, showing that the structural model meets the required fit criteria. In addition, the AVIF value of 1.066 and AFVIF value of 1.353 are below the threshold of 5 and also below the ideal limit of 3.3. Thus, multicollinearity is not a serious issue in the model. The Tenenhaus GoF value of 0.620 is categorized as large, indicating that the overall model fit is strong (Kock, 2021).

Additional quality indices also support the adequacy of the model. The Simpson's paradox ratio, R-squared contribution ratio, statistical suppression ratio, and nonlinear bivariate causality direction ratio all show values of 1.000. These results indicate that the model does not suffer from serious suppression or directionality problems and that the contribution of the predictor variables to the endogenous construct is consistent with the expected structural relationships.

4.3. Structural Model Results

Table 7. Structural Path Results in the Pooled Predictive Model

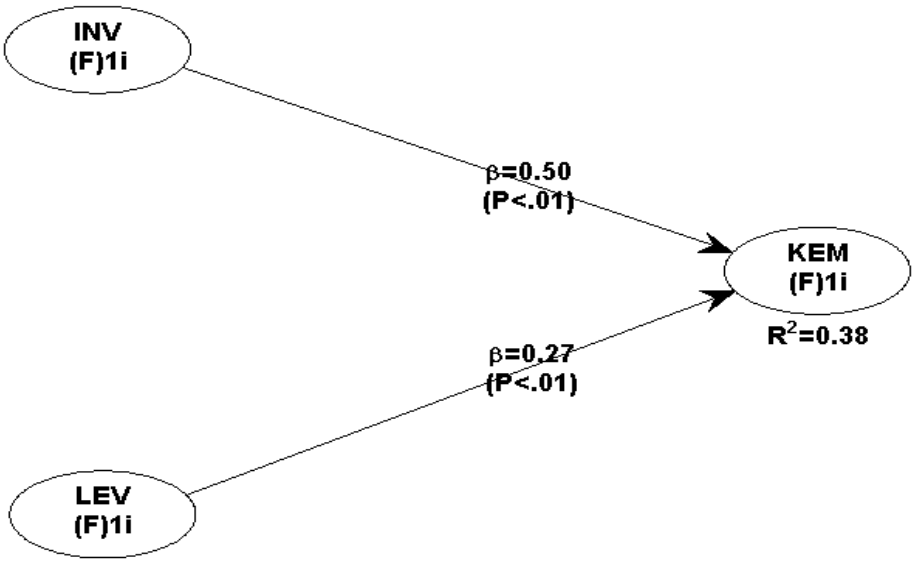
Hypothesis	Path	Coefficient	Std. Error	t-statistic	p-value	Decision
H1	INV → KEM	0.496	0.094	5.277	< 0.001	Supported
H2	LEV → KEM	0.268	0.101	2.653	0.005	Supported

Source: WarpPLS output, data processed by the author.

The structural model results show that both hypothesized paths are positive and statistically significant within the pooled PLS-SEM model. Regional investment is positively and significantly associated with regional financial independence, with a path coefficient of 0.496, a standard error of 0.094, a t-statistic of 5.277, and $p < 0.001$. Thus, H1 is supported. This result indicates that higher regional investment predicts stronger fiscal independence in the pooled regency-year observations. In practical terms, long-term investment may support local fiscal capacity when it is directed toward productive assets, infrastructure, and economic activities

that can expand locally generated revenue. Therefore, this relationship should be interpreted as a predictive association rather than as a strict causal effect.

Figure 2. Structural Model Results



INV = regional investment; LEV = leverage; KEM = regional financial independence. The pooled predictive path from INV to KEM is 0.496 with $p < 0.001$, while the pooled predictive path from LEV to KEM is 0.268 with $p = 0.005$. The R-square value of KEM is 0.384, indicating that regional investment and leverage explain a moderate proportion of variation in regional financial independence.

Source: WarpPLS output, data processed by the author.

Leverage is also positively and significantly associated with regional financial independence, with a path coefficient of 0.268, a standard error of 0.101, a t-statistic of 2.653, and $p = 0.005$. Therefore, H2 is supported. This finding suggests that liabilities may serve as a supportive financing structure when they are connected to productive programs, asset development, and realistic repayment capacity. Because the coefficient and effect size of leverage are lower than those of regional investment, leverage should be interpreted as a complementary predictor rather than the main driver of regional financial independence.

The structural model further shows that regional financial independence is more strongly predicted by regional investment than by leverage. This pattern is consistent with the effect size results, where regional investment has a medium contribution and leverage has a small contribution. Therefore, strengthening fiscal autonomy should not rely mainly on liability-based financing. Local governments need to ensure that investment and financing decisions are linked to programs that expand economic activity, improve public assets, and increase the potential for locally generated revenue. Since the model is estimated using pooled regency-year observations, these results may reflect both differences across local governments and fiscal variation across years; therefore, they should be interpreted as predictive associations rather than causal panel effects.

Table 8. Sensitivity Test Excluding the 2020–2021 Pandemic Years

Model	N	Path	β	p-value	R^2	Q^2	Decision
Excluding 2020–2021	65	INV → KEM	0.409	< 0.001	0.305	0.343	Supported
Excluding 2020–2021	65	LEV → KEM	0.305	0.004	0.305	0.343	Supported

Source: WarpPLS output, data processed by the author

An additional sensitivity test was conducted by excluding the 2020–2021 pandemic years. The reduced model consists of 65 regency-year observations. As shown in Table 8, regional investment remains positively and significantly associated with regional financial independence, with a path coefficient of 0.409 and $p < 0.001$. Leverage also remains positively and significantly associated with regional financial independence, with a path coefficient of 0.305 and $p = 0.004$. Based on the standard errors from the WarpPLS output, the t-statistic is 3.787 for the INV → KEM path and 2.723 for the LEV → KEM path. The R-square value of 0.305 and Q-square value of 0.343 indicate that the model retains explanatory power and predictive relevance after the pandemic years are excluded. These results suggest that the main findings are relatively stable, although the full 2018–2024 model remains the primary specification because it provides broader fiscal-period coverage.

4.4. Discussion

The empirical results show that regional investment plays a stronger role than leverage in explaining financial independence among regency and municipal governments in Central Sulawesi. This finding is reasonable because investment is more directly connected to the creation of productive assets, infrastructure improvement, and local economic expansion. When investment is planned and implemented effectively, it can support business activity, improve public services, and broaden the potential base of locally generated revenue. This result is consistent with the public capital productivity argument proposed by Aschauer (1989), which explains that public capital can improve economic productivity when it supports core infrastructure and productive activities. In the context of Central Sulawesi, productive regional investment may strengthen PAD by expanding local economic activity and increasing the potential tax and retribution base. This interpretation is also in line with Afiah et al. (2021) and Mirsan et al. (2019), who emphasize the role of investment in supporting regional fiscal independence.

The regional comparison strengthens this interpretation. Palu Municipality has the highest average investment value and records one of the highest financial independence ratios. This condition reflects the advantage of Palu as a center of administration, services, infrastructure, and public asset concentration. However, Morowali's case shows that investment is not the only factor behind fiscal autonomy. Morowali records the highest financial independence, even though its average investment is lower than that of Palu. This indicates that the structure of the local economy, especially the presence of value-added and resource-based sectors, influences a region's ability to generate own-source revenue. Therefore, investment effectiveness depends not only on the nominal value of the investment but also on the economic environment in which the investment is implemented.

This finding also provides important caution for local governments. Investments do not automatically produce financial independence. If investment is not supported by clear planning, transparent implementation, asset maintenance, and revenue-oriented management, it may only increase asset value without improving fiscal capacity. Therefore,

the fiscal impact of investment depends not only on the amount of investment but also on the quality of governance and the ability of local governments to transform assets into economic and revenue-generating benefits. This interpretation supports Abdulfatah and Mulyani (2024), who showed that investment may produce unfavorable effects when it is not managed effectively.

The positive association between leverage and regional financial independence indicates that liabilities may support local fiscal capacity only under certain conditions. In the LKPD context, leverage reflects total liabilities relative to equity, including obligations recorded in the regional balance sheet, rather than only formal long-term debt. Therefore, the positive coefficient should not be interpreted as evidence that higher liability automatically improves fiscal autonomy. Instead, liabilities may become useful when linked to development financing, asset formation, infrastructure improvement, or programs that strengthen future revenue capacity. This interpretation is consistent with Rofiq and Arza (2021), who showed that leverage may be related to regional financial independence. Nevertheless, this relationship requires careful interpretation because liabilities can create fiscal pressure when they are not supported by repayment capacity or productive outcomes. The smaller coefficient and effect size of leverage compared with regional investment confirm that leverage plays a limited and complementary role in this model.

Descriptive evidence also supports this cautious interpretation. Banggai Laut records the highest average leverage among the observed local governments, but its financial independence ratio remains low. This contrast shows that leverage alone is not sufficient to strengthen fiscal autonomy. This also indicates that liabilities recorded in the regional balance sheet do not necessarily represent financing that has already produced revenue-generating assets. Some liabilities may reflect short-term obligations, accumulated payables, or financing needs related to administrative and public service functions, rather than activities that directly expand PAD. Therefore, liabilities become beneficial only when they are transformed into productive assets, public service improvements, or programs that increase future revenue capacity. Without such a connection, leverage may increase fiscal pressure rather than improve financial resilience.

Agency theory also helps to explain the regional variations observed in the descriptive comparison. Palu Municipality's high investment and relatively high financial independence may reflect a stronger administrative capacity to convert delegated fiscal authority into productive assets and own-source revenue. In contrast, Banggai Laut's high leverage, combined with low financial independence, suggests that liabilities do not automatically reduce dependence on transfers when financing decisions are not sufficiently connected to revenue-generating outcomes. The Morowali case further indicates that the local economic structure can strengthen the fiscal benefit of delegated authority when public investment and financing decisions are supported by a stronger productive base. Thus, the usefulness of investment and leverage depends not only on the availability of fiscal resources but also on the ability of local governments as agents to manage delegated authority transparently, productively, and in line with long-term fiscal sustainability.

The positive associations found in this study complement earlier evidence from the 2019 fiscal year, which indicates that local governments in Central Sulawesi still face important challenges in strengthening financial performance (Salmita, 2023). Using observations from 2018 to 2024, this study provides a broader descriptive and predictive view of how investment and financing structures are related to regional financial independence. The findings suggest

that fiscal autonomy requires not only higher local revenue but also strategic investment management and prudent liability use.

The results further imply that local governments must combine productive investment with prudent liability management. Investment should be prioritized in sectors that have clear economic and fiscal returns, such as infrastructure, public service facilities, and assets that support local economic growth. At the same time, leverage should be used selectively based on repayment capacity, fiscal risk assessment, the type of liabilities recorded in LKPD, and medium-term budget planning. This balance is necessary to prevent liabilities from becoming a source of pressure in future fiscal periods and to ensure that financing decisions are directed toward long-term fiscal sustainability.

From a theoretical perspective, the results support the fiscal decentralization argument that local governments need sufficient own-source capacity to exercise autonomy effectively. Financial independence reflects not only the availability of local revenue but also the ability of local governments to manage delegated authority responsibly. In line with agency theory, stronger fiscal autonomy may reduce excessive dependence on the central government and increase accountability in regional financial management. However, autonomy requires disciplined planning, measurable investment outcomes, and responsible financing choices so that the delegated fiscal authority can be translated into sustainable local financial capacity.

Overall, the findings indicate that financial independence in Central Sulawesi is positively associated with development-oriented investment and financing structures. However, the model does not provide a complete explanation of local fiscal autonomy. Regional investment is a stronger explanatory predictor because it is more directly related to long-term economic capacity and local revenue expansion, whereas leverage remains relevant only when it is controlled and directed toward productive use. The sensitivity test, excluding the 2020–2021 pandemic years, further supports the stability of the main findings because both structural paths remained positive and statistically significant. However, the decrease in R-square from 0.384 in the main screened model to 0.305 in the reduced model suggests that the full 2018–2024 period still contains relevant fiscal variation for explaining regional financial independence. The moderate explanatory power also indicates that other factors outside the model may shape regional financial independence, including PAD effectiveness, transfer dependence, regional economic structure, expenditure quality, institutional capacity, governance quality, sectoral economic activity and public asset management. Therefore, the findings should be read as a focused predictive explanation of selected fiscal variables rather than a comprehensive causal model of regional financial independence.

5. Conclusion and Suggestion

This study concludes that regional investment and leverage are positively and significantly associated with regional financial independence among regency and municipal governments in Central Sulawesi during the 2018–2024 period. Regional investment appears to be a stronger predictor, as shown by its higher path coefficient and effect size in the pooled PLS-SEM model. This finding indicates that long-term investment is related to stronger local fiscal capacity when directed toward productive assets, infrastructure, and economic activities that can expand locally generated revenue. Leverage is also positively associated with financial independence, but its role is more limited and complementary. Therefore, liability-based financing should not be interpreted as an automatic source of fiscal autonomy. It should be

used prudently and linked to repayment capacity, productive asset formation, and long-term budget sustainability.

Theoretically, these findings contribute to the literature on fiscal decentralization by showing that regional financial independence is related to revenue collection and the way local governments manage investment and financing structures. In line with Oates's decentralization argument, local governments require sufficient fiscal capacity to respond effectively to local needs and development priorities (Oates, 1972). The positive association between regional investment and financial independence is also consistent with the public capital productivity perspective, which explains that productive public investment can support economic activity and broaden the fiscal base (Aschauer, 1989). Meanwhile, the positive but smaller association between leverage and financial independence can be interpreted through agency theory because local governments need to manage delegated fiscal authority responsibly and ensure that liabilities recorded in LKPD are connected to productive purposes rather than short-term fiscal pressure (Jensen & Meckling, 1976). Thus, this study supports the view that investment and leverage may complement each other in strengthening subnational fiscal resilience, but only when both instruments are managed prudently within a sustainable framework.

Practically, the findings suggest that local governments should improve the quality and productivity of investment rather than merely increasing its nominal value. Public investment should be directed toward sectors with clear economic and fiscal returns, such as infrastructure, public service facilities, productive regional assets, and activities that can expand the local tax and retribution bases. Investment planning should also be supported by feasibility analyses, transparent implementation, asset maintenance, and regular performance evaluations. At the same time, leverage should be used selectively and prudently. Borrowing should be connected to programs that generate long-term benefits, improve public assets, and increase future revenue. This strategy is important to prevent debt obligations from reducing fiscal flexibility in subsequent budget periods.

This study has several limitations that should be considered when interpreting the findings. First, the analysis is limited to regency and municipal governments in Central Sulawesi, so the results may not fully represent fiscal conditions in other provinces. Second, the model only includes regional investment and leverage, whereas regional financial independence may also be associated with PAD effectiveness, transfer dependence, regional economic structure, expenditure quality, governance capacity, institutional capacity, sectoral economic activity, and public asset management. Third, the model is estimated using pooled PLS-SEM; therefore, the path coefficients should be interpreted as pooled predictive associations rather than strict causal effects. This means that the results may reflect both differences across local governments and changes across fiscal years, while the model does not fully distinguish within-region fiscal dynamics from between-region heterogeneity. Fourth, although this study reports a robustness comparison using the full 91-observation dataset and the screened 84-observation dataset, as well as a sensitivity test excluding the 2020–2021 pandemic years, these additional tests remain limited because they do not replace a formal panel-data estimation strategy. Future research should expand the regional coverage, include broader fiscal and governance variables, test the model using fixed-effects or random-effects panel regression, compare full and screened samples, and examine more deeply how different types of liabilities recorded in LKPD are related to regional financial independence over time.

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