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GOVERNMENT EXPENDITURES AND REGIONAL DEVELOPMENT (WEST KALIMANTAN BEFORE AND AFTER THE COVID-19 PANDEMIC)

Fitri Wahyuni[1]; Windhu Putra[2]; Erni Panca Kurniasih[3]
Faculty of Economics and Business, Universitas Tanjungpura, Pontianak, Indonesia[1,2,3,4,5]
Email : wahyunifitri782@gmail.com[1]

ABSTRACT

The relationship between government expenditures and economic growth is an important topic to analyze. Disagreements among economists and the results of previous studies show inconsistent findings across regions. This study aims to examine whether there is a two-way causal relationship between government expenditures and economic growth (growth rate of GRDP at Constant Prices, Poverty Depth Index, Poverty Severity Index, Human Development Index, and Gini index). This study used annual panel data from 14 regencies/cities in West Kalimantan province with a Vector Error Correction Model (VECM) analysis, using E-views 10 as the analytical tool. The results of this study have not proven a two-way causal relationship for any variable. There was no two-way or one-way causal relationship (in the period before and after the pandemic) for the variables Growth Rate, P2, and GINI (neutrality relationship). In the period before the Covid-19 pandemic, there was a one-way causal relationship between P1 and LOGGE (government expenditure) under Wagner's Law, and between LOGGE (government expenditure) and HDI under Keynesian theory. Meanwhile, in the post-pandemic period, there is a causal relationship between HDI and LOGGE (Wagner's Law). The primary driver of regional economic growth cannot yet be attributed to government expenditure. Given the pooled time-series approach applied to a panel-structured dataset, these findings should be regarded as preliminary and exploratory, warranting confirmation through a dynamic panel (PVECM/PVAR) approach.

Keywords : Government Expenditures and Welfare Programs; Economic Growth and Aggregate Productivity; Poverty

ABSTRAK

Hubungan antara belanja pemerintah dan pertumbuhan ekonomi merupakan topik yang relevan untuk dikaji secara mendalam. Ketidaksepakatan di antara para ekonom serta hasil-hasil studi terdahulu menunjukkan temuan yang tidak konsisten di berbagai wilayah. Penelitian ini bertujuan untuk menguji ada tidaknya hubungan kausalitas dua arah antara belanja pemerintah dan pertumbuhan ekonomi, yang diukur melalui laju pertumbuhan PDRB atas dasar harga konstan, Indeks Kedalaman Kemiskinan, Indeks Keparahan Kemiskinan, Indeks Pembangunan Manusia, dan Indeks Gini. Penelitian ini menggunakan data panel tahunan dari 14 kabupaten/kota di Provinsi Kalimantan Barat dengan metode analisis Vector Error Correction Model (VECM), menggunakan E-Views 10 sebagai perangkat analisis. Hasil penelitian ini tidak membuktikan adanya hubungan kausalitas dua arah pada variabel mana pun. Tidak ditemukan hubungan kausalitas dua arah maupun satu arah, baik pada periode sebelum maupun sesudah pandemi untuk variabel Laju Pertumbuhan, P2, dan GINI, sehingga ketiga variabel tersebut menunjukkan hubungan netralitas. Pada periode sebelum pandemi Covid-19, ditemukan hubungan kausalitas satu arah antara P1 dan LOGGE (belanja pemerintah) yang sesuai dengan Hukum Wagner, serta antara LOGGE (belanja pemerintah) dan IPM yang sesuai dengan teori Keynesian. Sementara itu, pada periode pascapandemi, ditemukan hubungan kausalitas antara IPM dan LOGGE yang mengindikasikan berlakunya Hukum Wagner. Dengan demikian, belanja pemerintah belum dapat diidentifikasi sebagai faktor pendorong utama pertumbuhan ekonomi regional. Mengingat pendekatan pooled time-

series yang diterapkan pada struktur data panel, temuan ini bersifat awal (eksploratif) dan memerlukan konfirmasi lebih lanjut melalui pendekatan panel dinamis (PVECM/PVAR).

Kata Kunci : Government Expenditures And Welfare Programs; Economic Growth And Aggregate Productivity; Poverty

INTRODUCTION

Government expenditure is a fiscal policy instrument that plays a role in driving and maintaining stability as well as improving public welfare. The relationship between government expenditure and economic growth is an important topic to analyze (Kurniawati, 2018). There are differing views among economists regarding the relationship between government expenditure and economic growth. Keynes stated that government expenditure can drive economic growth (Y=C+I+G) Nur et al, 2024). Conversely, Wagner's Law, *The Law of Expanding Expenditure*, holds that a growing economy will drive higher government expenditure in order to provide public services and improve social welfare

Economic growth cannot be measured solely by the increase in regional value added; it must also reflect the quality of more inclusive economic development, such as poverty reduction, improvements in the quality of human resources, and equitable income distribution. The occurrence of the Covid-19 pandemic was a major shock that significantly affected economic performance and the structure of government expenditure at both the national and regional levels, including in West Kalimantan province. Economic growth underwent significant changes in the period before and after the Covid-19 pandemic. (Normasyhuri et al., 2021). This is due to several factors such as Large-Scale Social Restrictions, weakening consumer purchasing power, and massive layoffs because companies experienced losses during the pandemic. (Akhmad, 2022).

Previous studies have shown inconsistent results in explaining the relationship between government expenditure and economic growth. Studies by Suriadi et al (2023) in Indonesia, Bazán et al (2022) in Peru, Rahman et al (2023) in SAARC countries (Bangladesh, India, Pakistan, Sri Lanka and Buthan), as well as Ekpo et al (2022) in Nigeria state that there is a two-way causal relationship between government expenditure and economic growth, with both Keynesian theory and Wagner's Law applying in those studies. Other studies showing a one-way relationship (supporting Keynesian theory) include Sijabat (2017) in Indonesia, Selvanathan et al (2021) in Sri Lanka and Elish et al (2023) in Egypt, Mama et al (2022) in Cameroon, Alam et al (2022) in Saudi Arabia, Paudel & Khanal (2024) in Nepal, Nguyen (2022) in 9 ASEAN countries (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam). On the other hand, studies by Akay & Oskonbaeva (2024) in 22 transition countries, Nur et al (2024) in Malaysia and Pasaribu & Sepriani (2020) in

Indonesia, Szarowska (2022) in the Visegrad group, Dada et al (2021) in the ECOWAS and Inchauspe et al (2022) in Indonesia indicate a one-way relationship (supporting Wagner's Law).

Meanwhile, studies by Afxentiou & Serletis (1991) in Canada (Hanifah et al., 2017) and in eight provinces in Sumatra show a neutrality relationship (not supporting Keynesian and Wagner's theories).

The existence of differing views among economists regarding the relationship between government expenditure and economic growth, empirical evidence showing inconsistent results, and the limited number of studies that examine the causal relationship using welfare indicators while distinguishing between the period before and after the Covid-19 pandemic all highlight the need for further statistical analysis. Such analysis can provide a deeper understanding of the two-way causal relationship between government expenditure and economic growth in the periods before and after the Covid-19 pandemic.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Keynesian Theory

Keynes positions government expenditure as an exogenous variable operating through the aggregate demand mechanism. Within the national income identity $Y = C + I + G$, the *G* component serves as a fiscal policy instrument capable of directly expanding economic output when the private sector experiences coordination failures (Keynes, 1937). This view was further reinforced by endogenous growth theorists such as Romer (1986), Barro (1990), and Rebelo (1991), who assert that government expenditure directed toward infrastructure, education, and research contributes directly to long-run economic growth. Within this Keynesian framework, increases in regional government spending should be capable of stimulating GRDP growth, alleviating poverty, improving the quality of human resources, and narrowing income distribution inequality.

Wagner's Law

Wagner's perspective differs fundamentally from Keynes in that government expenditure is treated as endogenous to economic growth. Wagner's Law, The Law of Expanding State Expenditure posits that as an economy advances, public demand for government services intensifies, causing government expenditure to grow proportionally alongside national income expansion (Wagner, 1958). Peacock (1961) supplemented this argument by demonstrating that societies can tolerate increased tax burdens provided that expenditure is directed toward meeting increasingly complex public needs, particularly during periods of socioeconomic crisis. Wagner identified three primary drivers of public expenditure expansion: first, the broadening of administrative functions accompanying urbanization and population density growth; second, rising demand for higher-quality public services as household incomes grow, with an income elasticity exceeding unity; and third, large-scale infrastructure requirements in the industrial era that exceed the capacity of the private sector (Wagner, 1958; Bazán et al., 2022). Within Wagner's logic, improvements in welfare indicators such as advances in HDI, reductions in poverty depth, or improvements in income distribution should responsively drive the expansion of government spending.

The Covid-19 Pandemic as a Fiscal Policy Structural Break

The Covid-19 pandemic, declared a global health emergency by the WHO on 11 March 2020, constituted a structural shock that significantly affected economic performance and the fiscal policy architecture at both the national and regional levels. Governments responded with massive fiscal expansion through direct social assistance programs, business sector subsidies, and health sector support, which had substantial implications for the composition of regional government expenditure (DJPK, 2026). Such a shock carries the potential to alter the transmission mechanism of fiscal policy, such that the direction and intensity of causality between government expenditure and economic growth indicators observed in the pre-pandemic period may not necessarily persist in the post-pandemic period (Normasyhuri et al., 2021; Akhmad, 2022). This constitutes the theoretical justification for distinguishing between two analytical periods in this study the pre-pandemic period (2015–2019) and the post-pandemic period (2020–2024).

Empirical Review

Prior studies reveal considerable heterogeneity in findings, reflecting the sensitivity of the government expenditure–economic growth relationship to institutional context, economic structure, and analytical methods employed. The first group of studies supports bidirectional causality, confirming the simultaneous validity of both Keynesian theory and Wagner's Law, including Suriadi et al. (2023) in Indonesia, Bazán et al. (2022) in Peru, Rahman et al. (2023) in SAARC countries, and Ekpo et al. (2022) in Nigeria, employing VAR, ECM-ARDL, and VECM approaches. A second group supports only unidirectional causality running from government expenditure to economic growth (Keynesian theory), as found by Sijabat (2017) in Indonesia, Selvanathan et al. (2021) in Sri Lanka, Elish et al. (2023) in Egypt, Nguyen (2022) across nine ASEAN countries, and Nabillia et al. (2023) in West Kalimantan Province. A third group, conversely, supports causality running from economic growth to government expenditure (Wagner's Law), as demonstrated by Çağlayan Akay & Oskonbaeva (2024) across 22 transition economies, Nur et al. (2024) in Malaysia, Pasaribu & Sepriani (2020) in Indonesia, Szarowska (2022) in the Visegrad group, and Dada et al. (2021) in the ECOWAS region. Meanwhile, Afxentiou & Serletis (1991) in Canada and Hanifah et al. (2017) across eight provinces in Sumatra found no causal relationship in either direction, supporting the neutrality hypothesis.

The cross-study inconsistency indicates that the relationship between government expenditure and economic growth is inherently contextual, rendering region-specific analyses with explicit temporal distinctions both relevant and necessary.

Hypothesis Development

Drawing on the theoretical foundations and empirical evidence reviewed above, this study formulates the following hypotheses:

H1: There is a significant positive bidirectional causal relationship between government expenditure and the growth rate of GRDP at constant prices in the regencies/cities of West Kalimantan Province in the period before and after the Covid-19 pandemic.

H2: There is a significant negative bidirectional causal relationship between government expenditure and the Poverty Depth Index (P1) in the regencies/cities of West Kalimantan Province in the period before and after the Covid-19 pandemic.

H3: There is a significant negative bidirectional causal relationship between government expenditure and the Poverty Severity Index (P2) in the regencies/cities of West Kalimantan Province in the period before and after the Covid-19 pandemic.

H4: There is a significant positive bidirectional causal relationship between government expenditure and the Human Development Index (HDI) in the regencies/cities of West Kalimantan Province in the period before and after the Covid-19 pandemic.

H5: There is a significant negative bidirectional causal relationship between government expenditure and the Gini Index in the regencies/cities of West Kalimantan Province in the period before and after the Covid-19 pandemic.

RESEARCH METHODS

Method is a method of work that can be used to obtain something. While the research method can be interpreted as a work procedure in the research process, both in searching for data or disclosing existing phenomena (Zulkarnaen, W., et al., 2020). This research is a causality study that explains the relationship between government expenditure and economic growth in the period before (2015-2019) and after the pandemic (2020-2024). It used annual panel data from 14 regencies/cities in West Kalimantan Province over 10 years. The type of data used was secondary data from the Directorate General of Fiscal Balance (government expenditure) and the Central Bureau of Statistics (growth rate of GRDP at constant prices, poverty depth index, poverty severity index, HDI, and Gini index).

This research employed the Vector Error Correction Model (VECM) method. This method was used because it is appropriate for the type of data and the research objectives. In this method, all variables are considered endogenous, making it suitable for testing and analyzing two-way causal relationships. This study uses Eviews 10 as the analytical tool.

Research Design and Data Structure

The EViews workfile for this study was structured as a panel, with cross-section identifiers for the N = 14 regencies/cities of West Kalimantan Province, estimated separately for two sub-periods: pre-pandemic (2015–2019, T = 5) and post-pandemic (2020–2024, T = 5). Within each sub-period, however, the unit root, cointegration, Granger causality, and VECM estimation procedures were the conventional single-equation tests appropriate to an ordinary time series the Augmented Dickey-Fuller unit root test, the Johansen trace test (Johansen, 1988; Johansen & Juselius, 1990), and pairwise Granger causality applied to the cross-sectionally pooled observations, rather than panel-specific unit root tests (e.g., Levin, Lin, & Chu, 2002; Im, Pesaran, & Shin, 2003), panel cointegration tests (e.g., Pedroni, 1999, 2004; Westerlund, 2007), or a dynamic panel VECM (PVECM)/PVAR estimator. Consequently, although the workfile carries a panel structure, the estimated model does not exploit panel-specific properties such as cross-sectional dependence or individual (regency/city) fixed effects; it reduces to a conventional VECM applied to cross-sectionally pooled observations (14 × 5 = 70 raw annual observations per sub-period, yielding 42 usable observations after adjusting for two lags).

This mismatch between the panel data structure and the conventional (non-panel) time-series estimation procedure means the study assumes homogeneity in the long-run cointegrating relationship across regencies/cities; unobserved time-invariant heterogeneity between, for example, Kota Pontianak and Kayong Utara is not separately netted out, and cross-sectional dependence across regencies/cities is not modeled (Baltagi, 2013). This is acknowledged as a limitation of the present analysis (see Conclusion).

The VECM model used is as follows:

GEit = a + bit1 EG + Ɛ it ……………………………………………………….……(i)

EGit = a + bit1 GE + Ɛ it …………………………………….………………..… (ii)

Where:

GE : Government Expenditure

EG : Economic Growth, which includes:

- Growth Rate of GRDP at Constant Prices (GR)
- Poverty Depth Index (P1)
- Poverty Severity Index (P2)
- Human Development Index (HDI)
- Gini Index (GINI)

Model Specification

Because government expenditure is hypothesized to interact separately with five distinct dimensions of regional welfare and growth (GR, P1, P2, HDI, and the Gini Index), the model above was estimated as five separate bivariate VECM systems one for each government expenditure–indicator pair rather than as a single six-variable multivariate VECM. This specification keeps each cointegrating relationship and its associated short- and long-run dynamics interpretable in isolation, and avoids the loss of degrees of freedom that a jointly estimated six-variable system would entail given the limited number of annual observations.

Variable Operationalization

Table 8 summarizes the operational definition, unit, transformation, and data source for each variable used in this study.

Sample Period Justification

The sample was divided into pre-pandemic (2015–2019) and post-pandemic (2020–2024) sub-periods rather than estimated as a single pooled model with a pandemic dummy. This split-sample design reflects the treatment of the Covid-19 shock as a potential structural break in the transmission mechanism between government expenditure and economic growth/welfare indicators — that is, the direction and significance of Granger causality, not only the intercept, may differ across the two periods (Normasyhuri et al., 2021; Akhmad, 2022). Estimating two separate VECM systems allows the direction of causality to vary freely between sub-periods, which a single dummy-variable specification would not capture. The demarcation point follows the WHO's declaration of Covid-19 as a global health emergency on 11 March 2020.

Analytical Procedure

The analysis proceeded through the following stages. First, the stationarity of each series was examined using the Augmented Dickey-Fuller (ADF) test at level and, where necessary, at first difference, with the null hypothesis of a unit root tested against the alternative of stationarity at the 5 percent significance level (Gujarati & Porter, 2009). Second, the optimal lag length for each bivariate system was selected using the Akaike Information Criterion (AIC). Third, model stability was verified by confirming that all inverse roots of the characteristic AR polynomial lie within the unit circle. Fourth, the Johansen trace test (Johansen, 1988; Johansen & Juselius, 1990) was applied to determine the presence of cointegration; the existence of at least one cointegrating vector justified the use of the VECM rather than an unrestricted VAR in levels. Fifth, Granger causality was tested via the VECM's short-run coefficients and Wald tests, with the null hypothesis of no Granger causality rejected when the probability value was below 0.05 (Widarjono, 2018). Sixth, the long- and short-run coefficients of the VECM were estimated and evaluated against the critical t-table value. Finally, the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) were generated to trace the dynamic response of each variable to a shock in the other and to decompose forecast error variance accordingly (Enders, 2015).

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Software Utilization

All estimations were conducted in EViews 10. The pooled annual series for each sub-period were organized as a single time-ordered workfile. Stationarity was assessed via View → Unit Root Test (ADF, with intercept). Optimal lag length was determined via View → Lag Structure → Lag Length Criteria on an unrestricted VAR in levels. Model stability was checked via View → Lag Structure → AR Roots Table. The Johansen cointegration test was run via Quick → Estimate VAR → View → Cointegration Test (trace statistic, intercept, no trend). Upon confirming cointegration, the model was re-estimated as a VECM (Quick → Estimate VAR → VEC), from which long-run/short-run coefficients, Granger/Wald causality statistics, IRF, and FEVD were generated via the corresponding View menus.

RESULT AND DISCUSSION

Stationarity Test

Based on the table 1 above, it is known that only three variables are stationary at the level: the Poverty Depth Index (P1) with a probability value of 0.0010 < 0.05, the Poverty Severity Index (P2) with a probability value of 0.0021 < 0.05, and the Gini Index with a probability value of 0.0017 < 0.05, while the other variables are non-stationary at the level. Therefore, each variable was tested at the first difference level, and it was found that the results of the first difference test for each variable have probability values < 0.05. It can be concluded that all variables are stationary at the first difference level.

Determination of the Optimum Lag Length

Based on the test results in the table 2 above, lag 2 has the most asterisks (*), therefore the lag used is lag 2.

Model Stability Test

Based on the output results in the table 3, all moduli have absolute values < 1, so the model is declared stable. Once the model is stable, we can proceed to perform Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis.

Cointegration Test

Based on the test results in table 4 above, it is known that, based on the statistic being greater than the critical value, all variables are cointegrated. From the cointegration test results, it can be determined that there is both a long-run and short-run relationship among the variables. Furthermore, because cointegration exists among the variables, the estimation model used is the Vector Error Correction Model (VECM).

Granger Causality Test

Based on Granger Causality Test in table 5 the causal relationships between variables are as follows:

1. There is no two-way or one-way causal relationship between LOGGE and GR (before and after the pandemic), as evidenced by probability values > 0.05.
2. There is no two-way causal relationship between LOGGE and P1 (before and after the pandemic), but there is a one-way causal relationship from P1 to LOGGE in the pre-pandemic period (probability value 0.0429 < 0.05).
3. There is no two-way or one-way causal relationship between LOGGE and P2 (before and after the pandemic), as evidenced by probability values > 0.05.
4. There is no two-way causal relationship between LOGGE and HDI (before and after the pandemic), but there is a one-way causal relationship from LOGGE to HDI in the pre-pandemic period (probability value 0.0375 < 0.05) and a one-way causal relationship from HDI to LOGGE in the post-pandemic period (probability value 0.0474 < 0.05).
5. There is no two-way or one-way causal relationship between LOGGE and GINI (before and after the pandemic), as evidenced by probability values > 0.05.

VECM Model Estimation

Long-Run Analysis of the VECM Model

Long-Run Analysis of the VECM Model in table 6 reveals:

1. The GE variable has no significant effect on GR, and vice versa (t-statistic < t-table).
2. The GE variable has no significant effect on P1, and vice versa (t-statistic < t-table).
3. The GE variable has no significant effect on P2 (t-statistic < t-table). However, the P2 variable has a significant effect on GE, with a t-statistic (4.31454) > t-table (1.66462).
4. The GE variable has no significant effect on HDI (t-statistic < t-table). However, the HDI variable has a significant effect on GE, with a t-statistic (-3.70957) > t-table (1.66462).
5. The GE variable has a significant effect on the Gini index, with a t-statistic (5.30391) > t-table (1.66462). However, the Gini Index variable has no significant effect on GE (t-statistic < t-table).

Short-Run Analysis of the VECM Model

Short-run analysis of the VECM model in table 7 reveals:

1. The effect of LOGGE on GR is not significant at lag 1 and lag 2. Meanwhile, the effect of GR on LOGGE is significant at lag 1 and lag 2.
2. The effect of LOGGE on P1 is not significant at lag 1 and lag 2. The effect of P1 on LOGGE is not significant at lag 1 and lag 2.
3. The effect of LOGGE on P2 is not significant at lag 1 and lag 2. The effect of P2 on LOGGE is not significant at lag 1 and lag 2.
4. The effect of LOGGE on HDI is not significant at lag 1 and lag 2. Meanwhile, the effect of HDI on LOGGE is significant at lag 1, but not significant at lag 2.

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5. The effect of LOGGE on GINI is not significant at lag 1, but significant at lag 2. Meanwhile, the effect of GINI on LOGGE is not significant at lag 1 and lag 2.

Impluse Response Function (IRF) Test

IRF Graph of LOGGE and GR

The response of D(LOGGE) to D(GR) fluctuates between positive and negative over the ten periods. Meanwhile, the response of D(GR) to D(LOGGE) tends to be consistently positive, except in the second period which shows a decline to -0.129158 (Figure1).

IRF Graph of LOGGE and P1

The response of D(LOGGE) to D(P1) is consistently positive over the period. Meanwhile, the response of D(P1) to D(LOGGE) fluctuates between positive and negative values. Declines into negative values occur in the second, fourth, sixth, eighth, and tenth periods (Figure 2).

IRF Graph of LOGGE and P2

The response of D(LOGGE) to D(P2) is consistently positive, although there is a decline to -0.006885 in the third period. Meanwhile, the response of D(P2) to D(LOGGE) fluctuates, with five periods showing positive values and five periods showing negative values alternately (Figure 3).

IRF Graph of LOGGE and HDI

The response of D(LOGGE) to D(HDI) tends to be positive, although it declines into negative values in the third, fifth, eighth, and tenth periods. Meanwhile, the response of D(HDI) to D(LOGGE) is consistently positive in every period (Figure 4).

IRF Graph of LOGGE and GINI

The response of D(LOGGE) to D(GINI) tends to be negative, with only the first, fourth, and ninth periods showing positive values. Conversely, the response of D(GINI) to D(LOGGE) is consistently positive (Figure 5).

Variance Decomposition (DVC) Test

DVC Graph of LOGGE and GR

The variable D(LOGGE) influences D(GR) from the first period with a contribution of 5.585567, and a declining trend occurs until the sixth period, while from the seventh to the tenth period it experiences fluctuations. The variable D(GR) influences D(LOGGE) with a contribution of 0% in the first period; this contribution continues to increase until the seventh period (17.13475), but then experiences a consistent decline thereafter until the tenth period (Figure 6).

DVC Graph of LOGGE and P1

The variable D(LOGGE) influences D(P1) in the first period (0.961850) and continues to increase until the seventh period, after which it experiences fluctuations. Conversely, the variable D(P1) influences D(LOGGE) with a contribution of 0% in the first period, and this contribution fluctuates until the tenth period (Figure 7).

DVC Graph of LOGGE and P2

The variable D(LOGGE) influences D(P2) in the first period (0.561058) and continues to increase until the seventh period, after which it experiences fluctuations. Conversely, the variable D(P2) influences D(LOGGE) with a contribution of 0% in the first period, and this contribution fluctuates in every period (Figure 8).

DVC Graph of LOGGE and HDI

The variable D(LOGGE) influences D(HDI) in the first period (3.157232) and experiences fluctuations in subsequent periods. Conversely, the variable D(HDI) influences D(LOGGE) with a contribution of 0% in the first period, and this contribution fluctuates in every period (Figure 9).

DVC Graph of LOGGE and GINI

The variable D(LOGGE) influences D(GINI) in the first period (8.037279); this value continues to decline until the third period (6.122170), but then increases in the fourth period (6.870573), and the subsequent periods show a consistent declining trend until the tenth period. Conversely, the variable D(GINI) influences D(LOGGE) with a contribution of 0% in the first period, and this contribution fluctuates in every period (Figure 10).

CONCLUSION

The findings below should be interpreted as preliminary and exploratory, given that the estimation applied conventional single-equation time-series tests to a panel-structured dataset rather than a dedicated dynamic panel procedure (see the methodological limitation discussed at the end of this section). This study did not succeed in proving a two-way causal relationship for any variable, either in the period before or after the Covid-19 pandemic. In fact, the GR, P2, and GINI variables showed neither two-way nor one-way causal relationships (before and after the Covid-19 pandemic). These results indicate a neutrality relationship, in line with the studies of Afxentiou & Serletis (1991) and Hanifah et al (2017). This relationship shows that government expenditure does not significantly influence economic growth indicators, and vice versa. One of the causes of this condition is the structure of government expenditure, which tends to be dominated by routine expenditures, such as personnel expenditure and government operations. As a result, its economic impact is relatively limited. Furthermore, the economy of West Kalimantan is relatively more dependent on natural resource-based sectors such as agriculture and plantations. Economic activity in these sectors is heavily influenced by external factors such as commodity prices, market demand, and private investment. Therefore, local government expenditure is not always the main factor determining regional value added, poverty levels, or income inequality.

In the period before the Covid-19 pandemic, the research results showed a one-way causal relationship from P1 to LOGGE (Wagner's Law). These results are consistent with the studies of Akay & Oskonbaeva (2024), Nur et al (2024), and Pasaribu & Sepriani (2020). This means that increasing social and economic needs of the community will encourage the government to increase its expenditure, particularly on social protection programs, social assistance, and poverty alleviation programs. Thus, changes in poverty conditions become one of the factors influencing the fiscal policy of local governments. Additionally, there was a one-way causal relationship between LOGGE and HDI (Keynesian theory), consistent with the studies of Suriadi et al (2023), Bazán et al (2022) and Rahman et al (2023). This result shows that when the government has greater fiscal capacity to finance education, health, and public welfare, the quality of life of the people will improve, as reflected by an increase in HDI.

In the period after the Covid-19 pandemic, there was a one-way causal relationship between HDI and LOGGE. This means that a high level of HDI indicates that economic activity is developing, so state revenues also increase. This condition encourages the government to increase its expenditure to promote public welfare. This research findings are in line with studies conducted by Akay & Oskonbaeva (2024), Nur et al (2024) and Pasaribu & Sepriani (2020).

A methodological limitation of this study is that although the data were organized as a panel of 14 regencies/cities, the unit root, cointegration, causality, and VECM estimation procedures applied within each sub-period were conventional single-equation time-series tests rather than panel-specific procedures. This means the study assumes homogeneity in the long-run cointegrating relationship across regencies/cities and does not separately net out unobserved, time-invariant heterogeneity between them, nor does it account for possible cross-sectional dependence (Baltagi, 2013). Future research is encouraged to re-estimate these relationships using panel unit root tests (e.g., Levin, Lin, & Chu, 2002; Im, Pesaran, & Shin, 2003) and panel cointegration tests (e.g., Pedroni, 1999, 2004; Westerlund, 2007), together with a dynamic panel VECM (PVECM)/PVAR estimator that explicitly models individual regency/city fixed effects alongside the short- and long-run causal dynamics examined here.

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TABLE AND FIGURE

Table 1. Stationarity Test

Variable	Unit Root Test					
	Level			1st Difference		
	ADV	Prob	Remarks	ADV	Prob	Remarks
GE	40.7769	0.0563	Non-Stationary	72.8854	0.0000	Stationary
GR	32.9330	0.2382	Non-Stationary	52.5626	0.0033	Stationary
P1	56.9027	0.0010	Stationary	76.1221	0.0000	Stationary
P2	54.1572	0.0021	Stationary	74.5198	0.0000	Stationary
HDI	1.79411	1.0000	Non-Stationary	51.6812	0.0042	Stationary
Gini	55.0659	0.0017	Stationary	72.1893	0.0000	Stationary

Table 2. Determination of the Optimum Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	195.3288	NA	8.45e-10	-3.863853	-3.705590	-3.799839
1	313.7826	219.9856	1.57e-10	-5.546583	-4.438740*	-5.098484
2	371.7681	100.5870*	1.01e-10*	-5.995266*	-3.937843	-5.163081*

Table 3. Model Stability Test

Root	Modulus
0.201838 - 0.685554i	0.714649
0.201838 + 0.685554i	0.714649
-0.431480 - 0.514795i	0.671705
-0.431480 + 0.514795i	0.671705
-0.576440 - 0.278644i	0.640255
-0.576440 + 0.278644i	0.640255
-0.267746 - 0.538749i	0.601613
-0.267746 - 0.538749i	0.601613
-0.177368 - 0.338004i	0.381714
-0.177368 + 0.338004i	0.381714
-0.362113	0.362113
0.228023	0.228023

Table 4. Cointegration Test

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.674698	333.8236	95.75366	0.0000
At most 1 *	0.640640	239.4914	69.81889	0.0000
At most 2 *	0.478715	153.5233	47.85613	0.0000
At most 3 *	0.460519	98.80085	29.79707	0.0000
At most 4 *	0.293231	46.96036	15.49471	0.0000
At most 5 *	0.191035	17.80799	3.841466	0.0000

Table 5. Granger Causality Test

Null Hypothesis:	Obs	Pre-Pandemic Period		Post-Pandemic Period	
		F-Statistic	Prob.	F.Statistic	Prob.
LOGGE does not Granger Cause GR	42	0.98992	0.3812	2.33359	0.1111
GR does not Granger Cause LOGGE		0.99349	0.3799	2.03266	0.1454
LOGGE does not Granger Cause P1	42	0.67243	0.5166	0.03327	0.9673
P1 does not Granger Cause LOGGE		3.43217	0.0429	0.28190	0.7560
LOGGE does not Granger Cause P2	42	0.58628	0.5615	0.02085	0.9794
P2 does not Granger Cause LOGGE		3.22053	0.0514	0.45422	0.6384
LOGGE does not Granger Cause HDI	42	3.59439	0.0375	0.29010	0.7499
HDI does not Granger Cause LOGGE		1.57647	0.2203	3.31496	0.0474
LOGGE does not Granger Cause GINI	42	1.09148	0.3463	0.20631	0.8145
GINI does not Granger Cause LOG		0.13590	0.8734	2.75433	0.0767

Table 6. Long-Run Analysis of the VECM Model

Variable	Coefficient	T-Statistic	T-Table	Remarks
D(LOGGE(-1)) to D(GR(-1))	-0.467362	-0.11911	1,66462	Not Significant
D(GR(-1)) to D(LOGGE(-1))	0.021317	0.26341	1,66462	Not Significant
D(LOGGE(-1)) to D(P1(-1))	0.127161	0.45702	1,66462	Not Significant
D(P1(-1)) to D(LOGGE(-1))	-0.910490	-0.60967	1,66462	Not Significant
D(LOGGE(-1)) to D(P2(-1))	0.093136	0.90404	1,66462	Not Significant
D(P2(-1)) to D(LOGGE(-1))	17.08955	4.31454	1,66462	Significant
D(LOGGE(-1)) to D(HDI(-1))	-0.484606	-0.99092	1,66462	Not Significant
D(HDI(-1)) to D(LOGGE(-1))	-1.560979	-3.70957	1,66462	Significant
D(LOGGE(-1)) to GINI(-1)	1.216316	5.30391	1,66462	Significant
D(GINI(-1)) to D(LOGGE(-1))	-2.511726	-0.54920	1,66462	Not Significant

Table 7. Short-Run Analysis of the VECM Model

Lag	Variable	Coefficient	T-Statistic	T-Table	Remarks
Lag 1	D(LOGGE(-1),2) to D(GR,2)	2.018770	0.51053	1,66462	Not Significant
	D(GR(-1),2) to D(LOGGE,2)	-0.006730	-2.32808	1,66462	Significant
	D(LOGGE(-1),2) to D(P1,2)	0.040342	0.13271	1,66462	Not Significant
	D(P1(-1),2) to D(LOGGE,2)	-0.121000	-1.47974	1,66462	Not Significant
	D(LOGGE(-1),2) to D(P2,2)	0.005802	0.04790	1,66462	Not Significant
	D(P2(-1),2) to D(LOGGE,2)	-0.100283	-0.35173	1,66462	Not Significant
	D(LOGGE(-1),2) to D(HDI,2)	-0.410161	-1.15588	1,66462	Not Significant
	D(HDI(-1),2) to D(LOGGE,2)	0.125680	3.81574	1,66462	Significant
	D(LOGGE(-1),2) to D(GINI,2)	-0.030320	-0.77657	1,66462	Not Significant
	D(GINI(-1),2) to D(LOGGE,2)	-0.070641	-0.26033	1,66462	Not Significant
Lag 2	D(LOGGE(-2),2) to D(GR,2)	4.501891	1.12000	1,66462	Not Significant
	D(GR(-2),2) to D(LOGGE,2)	-0.015137	-5.10351	1,66462	Significant
	D(LOGGE(-2),2) to D(P1,2)	0.422368	1.36690	1,66462	Not Significant
	D(P1(-2),2) to D(LOGGE,2)	-0.011612	-0.14023	1,66462	Not Significant
	D(LOGGE(-2),2) to D(P2,2)	0.160209	1.30125	1,66462	Not Significant
	D(P2(-2),2) to D(LOGGE,2)	-0.143250	-0.61097	1,66462	Not Significant
	D(LOGGE(-2),2) to D(HDI,2)	0.062837	0.17421	1,66462	Not Significant
	D(HDI(-2),2) to D(LOGGE,2)	0.025375	0.85967	1,66462	Not Significant
	D(LOGGE(-2),2) to D(GINI,2)	-0.069506	-1.75134	1,66462	Significant
	D(GINI(-2),2) to D(LOGGE,2)	-0.315374	-1.59743	1,66462	Not Significant

Tabel 8. Operational Variable

Variable	Operational Definition	Unit	Transformation Used	Source
Government Expenditure (GE)	Realized regional government expenditure recorded in the regional budget (APBD), used to finance the implementation of regional governmental affairs within a fiscal year	Billion Rupiah (IDR bn)	Natural log (LOGGE); first-differenced (non-stationary at level)	DJPK, 2026
Growth Rate of GRDP at Constant Prices (GR)	Annual growth rate of Gross Regional Domestic Product valued at 2010 constant prices	Percent (%)	First-differenced (non-stationary at level)	BPS, 2026
Poverty Depth Index (P1)	Average expenditure gap of the poor population relative to the poverty line	Index	Level (stationary); first-differenced for VECM estimation	BPS, 2026
Poverty Severity Index (P2)	Measure of expenditure inequality among the poor population	Index	Level (stationary); first-differenced for VECM estimation	BPS, 2026
Human Development Index (HDI)	Composite index of a long and healthy life, knowledge, and a decent standard of living	Index (0–100)	First-differenced (non-stationary at level)	BPS, 2026
Gini Index	Measure of income/expenditure inequality across the population	Index (0–1)	Level (stationary); first-differenced for VECM estimation	BPS, 2026

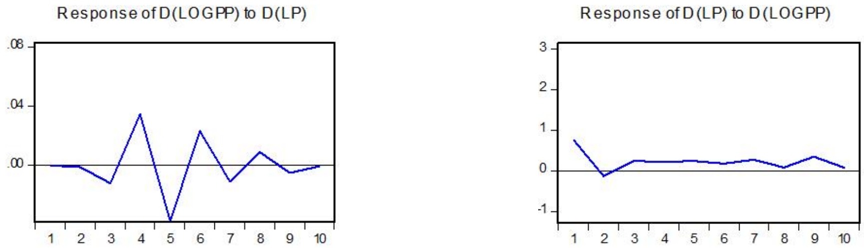

Figure 1. IRF Graph of LOGGE and GR

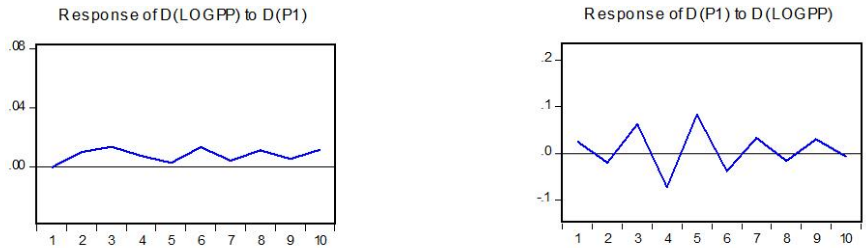

Figure 2. IRF Graph of LOGGE and P1

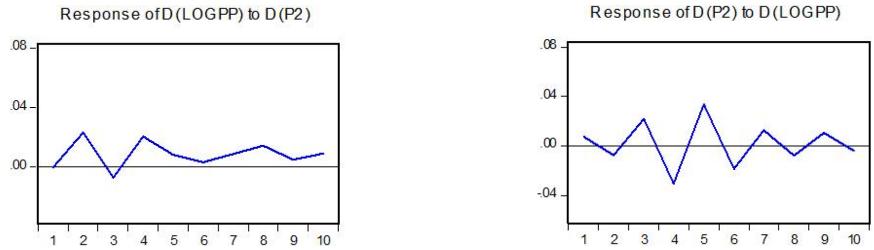

Figure 3. IRF Graph of LOGGE and P2

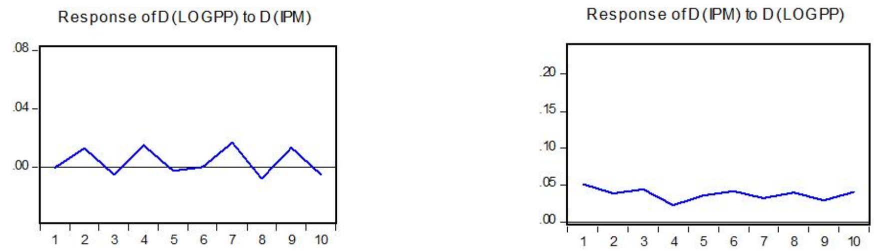

Figure 4. IRF Graph of LOGGE and HDI

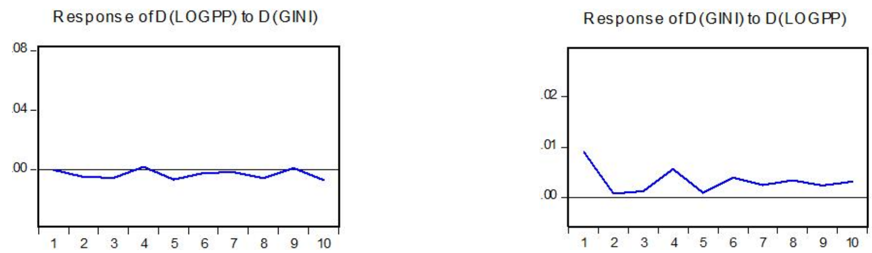

Figure 5. IRF Graph of LOGGE and GINI

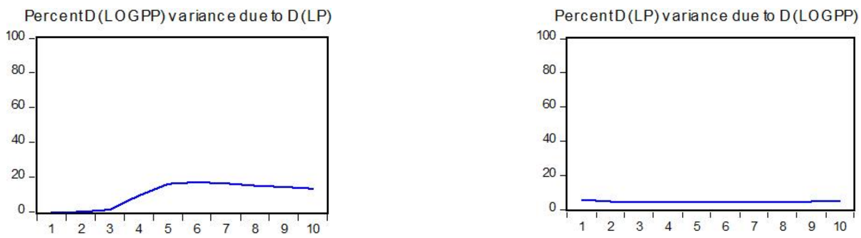

Figure 6. DVC Graph of LOGGE and GR

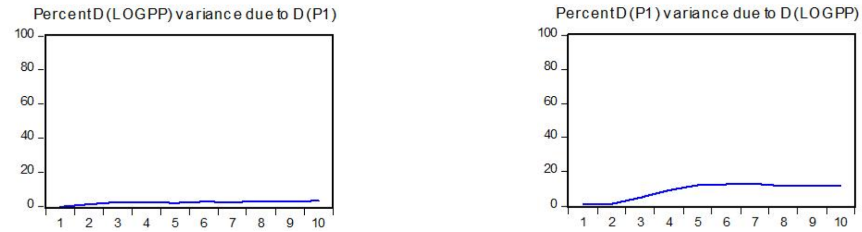

Figure 7. DVC Graph of LOGGE and P1

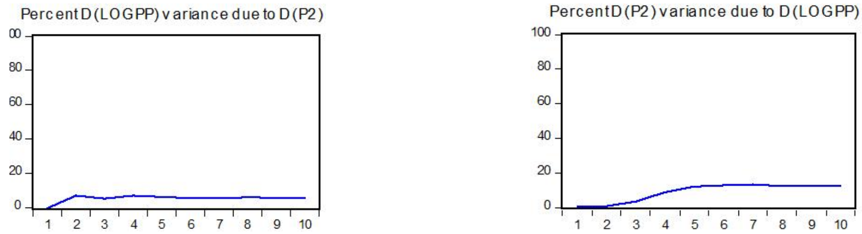

Figure 8. DVC Graph of LOGGE and P2

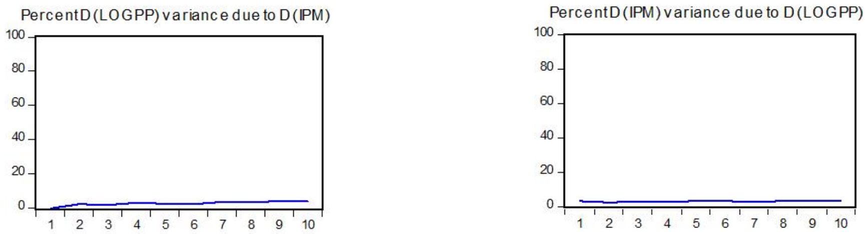

Figure 9. DVC Graph of LOGGE and HDI

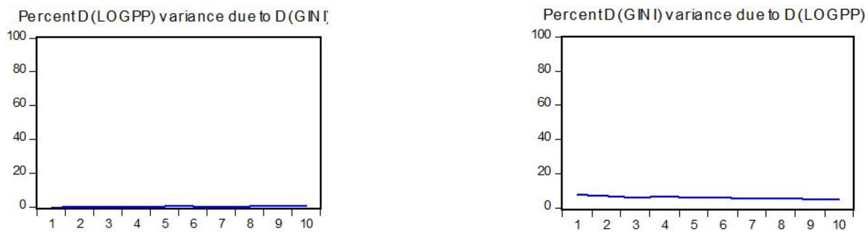

Figure 10. DVC Graph of LOGGE and GINI