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Youth Engagement and Leadership in Decentralized Indonesia: Evidence from Indonesian Youth Development Index 2015–2023

Abstract

This study aims to assess whether within-provincial variations in youth development are related to provincial variations in youth engagement and leadership across Indonesian provinces from 2015 to 2023, and if the relationships may vary across the conditional distribution of the outcome under decentralized governance. A quantitative longitudinal panel design is used to investigate this question utilizing an annual province-level dataset from the Indonesian Youth Development Index for the years 2015-2023, based on a balanced panel of 306 province-year observations. The empirical strategy includes descriptive statistics, trend analysis, principal components analysis (PCA), two-way fixed effects, and panel quantile regression. The results indicate that after controlling for province and year fixed effects, there were no statistically significant associations between the four youth development dimensions and engagement and leadership at the time of measurement. The results indicate no systematic contemporaneous association between the improvement in short-term youth-development metrics at the provincial level and improved scores for the aggregate Engagement & Leadership metric. As decentralization and institutional processes were not directly examined, the outcomes are to be viewed as an indication of a decoupling of participation from development within provinces from 2015-2023; as opposed to testing decentralization or converting institutions. Since we have no data on how decentralization was implemented or what institutional changes occurred (i.e., we do not measure either), our finding should be viewed as evidence of development–participation decoupling in Indonesia's system of local government; should not be interpreted as a direct assessment of the impact of decentralization.

Keywords: youth engagement; decentralization; governance; Indonesia; panel data

Introduction

Engagement and leadership are central to decentralized governance because they shape the legitimacy, responsiveness, and effectiveness of

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subnational governments (Monkam & Saba, 2025). In systems of regional autonomy, citizen voices are mediated through provincial and local institutions that organize engagement and translate civic engagement into policy influence, including public engagement platforms and other locally designed participatory mechanisms (Cho et al., 2020). This issue is particularly important for youth, who are not only targets of development policy but also potential actors in local governance and democratic renewal in the region. Simultaneously, youth engagement is changing, as Generation Z increasingly engages through digital, networked, and issue-based forms that often extend beyond conventional bureaucratic channels (Li & Li, 2022; Mia & Hasan, 2025; Mulyono et al., 2022; Suhariyanto & Rozak, 2025; Wijaya & Amalia, 2024). For decentralized governments, the challenge is therefore twofold: improving youth development outcomes while also building institutional pathways through which those outcomes can be converted into meaningful engagement and leadership.

Indonesia provides an important setting for examining this issue. Under decentralization and regional autonomy, subnational governments play a major role in implementing development policy and facilitating participatory governance. However, provinces differ in administrative capacity, civic ecosystems, and the credibility of participatory institutions, and these territorial differences may shape local development outcomes (Fitriyanti & Pradana, 2022; Monkam & Saba, 2025). These differences matter because they shape whether youth are merely recipients of public programs or are able to participate in decision-making and assume leadership roles within their communities. In other words, decentralization creates both opportunities and variations: it brings governance closer to citizens, but it also means that the translation of youth development into civic engagement may differ across regions.

This research takes place in an already existing discussion about decentralization, citizen participation, and young people's civic engagement. The existing literature has shown that decentralization can have a wide range of different results depending on how institutions are configured (Richardson et al., 2019; Sellers & Lidström, 2007); that citizen participation depends on how public services are designed to be produced together with citizens (Osborne et al., 2016; Voorberg et al., 2015); and that having resources as a youth does not automatically mean you will participate as a member of society (Lopes et al., 2009; Banaji, 2008).

This issue can be examined through the Indonesian Youth Development Index, which tracks youth conditions across education, health and well-being, opportunity and employment, gender and discrimination, and engagement and leadership (Fitriyanti & Pradana, 2022). From a capability-oriented perspective, improvements in education, health, economic opportunity, and inclusion should expand the resources and freedoms that enable young people to engage in public life. Better education may strengthen civic skills and efficacy, while stronger health and well-being may support sustained engagement and more positive civic trajectories (Bukhari et al., 2025; Wiium et al., 2023). Improved employment opportunities may reduce precarity and widen access to leadership pathways, especially in the context of youth unemployment and socioeconomic inequality (Safitri et al., 2025; Subanti & Amanda, 2024). Likewise, lower discrimination and stronger gender inclusion

may expand access to public spaces, representation, and leadership (Juniarti & Jie, 2024). For this reason, policy discourse often assumes a relatively direct relationship between youth development gains and higher engagement and leadership.

However, such a relationship may be less automatic in decentralized settings than policy narratives often suggest. Engagement and leadership are not simply individual attributes; they are governance outcomes shaped by institutional opportunity structures. Youth capabilities must be converted into action through credible participatory forums, responsive local administrations, inclusive leadership pipelines, and governance arrangements that recognize how young people actually engage (Bussu et al., 2024; Cho et al., 2020; Dobbs, 2025; Williams et al., 2020). Where participatory institutions are symbolic, weakly connected to decision-making, inaccessible to marginalized groups, or poorly aligned with Gen Z's digital forms of engagement, improvements in youth development may not be followed by measurable gains in engagement and leadership (Bussu et al., 2024; Dobbs, 2025; Jalloh & Jackson, 2023). The theoretical bases of these arguments explain how developmental outcomes can occur without participatory outcomes; however, the organizational mechanisms that would facilitate such developmental outcomes and/or the potential to have some influence on those organizations are not assessed here. Therefore, it is assumed here that this research will provide a basis to test these theoretical propositions as well as serve as possible directions for future research (i.e., testing whether there are specific mediating/moderating influences from the mechanisms).

Province-year analysis is selected primarily because the official Indonesian youth development index provides comparable annual domain measures for each province throughout 2015–2023. Longitudinal comparability of provinces has an analytical advantage over the claim that provinces are superior to districts, organizations, or individuals (Fitriyanti & Pradana, 2022). This study asks a deliberately bounded question: do changes in officially measured youth development conditions within the same province correspond with changes in aggregate engagement and leadership outcomes for that province?

This study was guided by two research questions.

RQ1: To what extent are within-province changes in youth development dimensions associated with within-province changes in youth engagement and leadership across Indonesian provinces from 2015 to 2023?

RQ2: Do these associations vary across the conditional distribution of engagement and leadership after controlling for province and year's fixed effects?

This study contributes to existing research concerning youth development and participation in Indonesia's decentralized governance system through three delimited avenues. First, the study uses provincial-level longitudinal data from 2015 to 2023, which shifts the focal point of empirical research from static cross-provincial comparative analysis to analysis of changes that occur over time in the same province. Second, through the application of province and year-fixed effects as well as PCA and panel quantile robustness tests, the study isolates within-province temporal relationships from those that persist at the cross-provincial level. The study further evaluates whether the main patterns established are consistent across different specification forms and the conditional distributions of the dependent variable (Maani & Wen, 2021; Safaei & Saliminezhad, 2023; F. Tian et al., 2018). The results indicate that none of the contemporaneous improvements in dimensions of Education, Health and Wellbeing, Opportunity and Employment, and Gender and Discrimination have been consistently associated with improvements in the overall aggregate dimension of Engagement and Leadership once both province and year effects are accounted for.

Additionally, the continued lack of systematic association identified in this study provides an empirically precise platform for challenging expectations about a straightforward contemporaneous link between developmental investments in youth and their subsequent involvement as participants in local governance. Research on participatory governance has suggested that the relationship between developmental resources invested in youth and levels of youth engagement and/or participation

may be shaped by both institutional opportunities, responsiveness to citizens' concerns, and identified pathways for citizens to express their views (Williams et al., 2020; Cho et al., 2020; Monkam & Saba, 2025). However, since these mechanisms were not directly measured in the dataset collected for the current study, they cannot account for the observed null association. Therefore, the study identifies a theoretically relevant question to be addressed by subsequent studies: Under what conditions relative to institutional, temporal, political, and measures will improvements in youth development lead to corresponding increases in youth engagement and/or leadership? As such, the governance implications of this study are interpretative and agenda-setting rather than testing of an institutional conversion or decentralization effect.

Methods

This study used the quantitative longitudinal panel research methodology to utilize secondary data from the National Socioeconomic Survey and the National Labour Force Survey during the time frame of 2015–2023. The focus of the research was placed on the population of youth aged 16–30 years across all regions of Indonesia. The National Socioeconomic Survey is a comprehensive source that covers many aspects of youth development, such as educational level, health & wellbeing, social engagement, etc., and gender-related issues. On the other hand, the National Labour Force Survey provides details about youth employment conditions, whether unemployed or employed, and youth labor market participation. In addition to this, both surveys employ a multi-stage probability sample design at provincial/regency/municipality/census block/household levels and gather their data by using face-to-face standard interview methods (Central Bureau of Statistics (Indonesia), 2023, 2024).

The survey coverage of the National Socioeconomic Survey is roughly 300,000 households per year, and the National Labour Force Survey is roughly 200,000 households per year. Since the population of interest in the current study is Indonesian youth aged 16–30 years observed during the time span of 2015–2023, therefore after compiling the data, youth variables from both surveys were systematically defined into 15 indicators, and these indicators were categorized into five analytical domains (i.e. Education; Health and Well-being; Opportunity and Employment; Engagement and Leadership; and Gender and Discrimination). These indicators were primarily the analytical variables used to assess youth development trends during the entire duration of the study (Ministry of Youth and Sports of the Republic of Indonesia, 2024).

Engagement and Leadership were designated as the dependent variable in this study, and Education, Health and Well-being, Opportunity and Employment, and Gender and Discrimination were designated as the primary independent variables. These dimensions were selected because they represent conditions that may expand the resources and opportunities needed for youth engagement in public life. Education is expected to strengthen civic skills and efficacy (Suhariyanto & Rozak, 2025; Wijaya & Amalia, 2024), health and well-being may support sustained engagement (Habib et al., 2023), opportunity and employment may shape access to leadership pathways (Cornejo-Paredes, 2024; Jaramillo et al., 2022), and gender equality and non-discrimination may broaden access to engagement (Juniarti & Jie, 2024; Sukim et al., 2019). It is expected that each of the four dimensions will be positively associated with youth engagement and leadership. The level of inference is strictly provincial: the analysis concerns relationships among aggregate IPP domains and does not permit individual-level behavioral inference.

Additional considerations when measuring include the fact that each of the five variables was developed based on the same architecture as the Indonesia Youth Development Index. Although we have analytically designated Engagement and Leadership as the outcome variable and the other four dimensions—Education, Health and Well-being, Opportunity and Employment, and Gender and Discrimination—as predictor variables, this analytical designation does not imply conceptual independence or a causal ordering among these domains. Each dimension is unique in its own way to represent different areas for youth development in Indonesia; however, all the dimensions will have a similar structure of measurement, how they are combined

(aggregation), what sources of data can be used (data environment), and where each dimension fits into the larger socioeconomic picture. Therefore, when using the youth development dimensions as predictors with Engagement and Leadership as the outcome, one should think of this as a methodological/theoretical specification, instead of a causal sequencing of these dimensions.

The PCA robustness exercise addresses the shared variance among the four explanatory dimensions but does not eliminate potential conceptual dependence between those dimensions and the Engagement and Leadership domains. For this reason, all regression coefficients are interpreted as conditional within-province associations rather than causal effects.

The analytical bounds of the study should be clearly distinguished from its theoretical bounds. The available Indonesian Youth Development Index data do not have direct measures for institutional responsiveness, participatory infrastructure, local administrative capacity, political competitiveness, fiscal autonomy, or the level of access to and perceived credibility of youth participation mechanisms. Therefore, the models assess whether there is a relationship between changes in the different dimensions of development and changes in both engagement and leadership; the models do not assess how institutions mediate, moderate, or explain causation. Thus, institutional frameworks are used to explain the various possible mechanisms that future studies can potentially investigate.

To establish the association between youth developmental dimensions and engagement and leadership using a longitudinal approach, this study employed a panel data approach. The analysis included descriptive statistics, a bivariate correlation matrix, and a correlation heatmap that displayed pair-wise association and potential multicollinearity (J. Tian et al., 2025), as well as national, provincial, and demeaned within-province trend plots that depicted the temporal dynamics of each dimension of youth development. To account for overlapping dimensions of youth development, we conducted a principal component analysis (PCA) that served as both a diagnostic and robustness check, and used the first principal component (PC1) as an alternative composite measure (Jolliffe & Cadima, 2016). The main inferential model was a two-way fixed-effects (TWFE) regression estimated as follows:

$$Y_{it} = \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

where Y_{it} denote the Engagement and Leadership score for province i in year t; *X1–X4* denote the four youth development dimensions; α_i captures province fixed effects; γ_t captures year fixed effects; and ε_{it} is the error term. To assess model suitability, poolability tests, a random-effects, a Hausman test were examined. A robustness model replaced the four separate dimensions with the PCA-derived composite:

$$Y_{it} = \theta\, PC1_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

The use of this alternative model could provide a means of reducing the potential instability that may arise due to the overlap in the four youth development dimensions. A secondary distributional check and robustness analysis, using a secondary method to test for differences in fixed effects results throughout the conditional distribution of engagement and leadership by point of quantile fixed effect models, was used to see if the main findings were similar or different across selected levels of the conditional distributions of engagement and leadership, as stated by Galvão Jr. (2011) and Gu Volgushev (2019), because this analysis is not intended as an additional substantive test of the role of institutional mechanisms; it will be interpreted primarily as a determination of whether the overall null result hides disparate associations at lower or higher outcome levels.

Results and Discussion

Descriptive Patterns and Bivariate Associations

This study examined whether within-province changes in youth development conditions were associated with within-province changes in youth engagement and leadership across Indonesian provinces during 2015–2023. There is large variability in youth engagement and leadership, as well as in all the different aspects of youth development, as shown in the provincial-year panel (Table 1). These distributions show that there are very large differences across provinces and years, which provides empirical support for the use of a panel data structure that can capture both spatial and time-based variations.

The next step in the analysis was to examine the bivariate relationships or co-movements of Y and the four predictor variables using a correlation heatmap (Figure 1). The purpose of this diagnostic is to provide an empirical justification for supplementing the disaggregated model specification with a composite measure of youth development conditions.

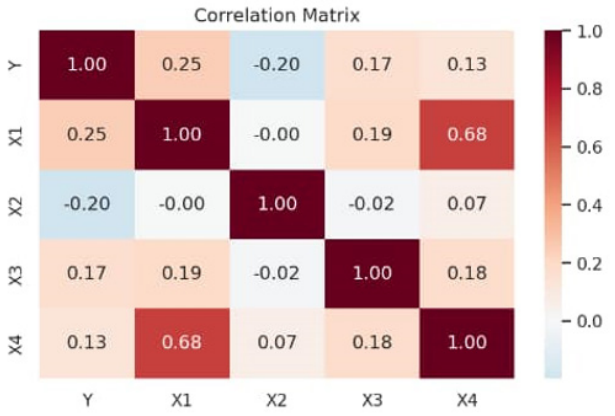


Figure 1. Correlation Heatmap Matrix
Source: obtained from data analysis (2026)

Temporal Trends

This study uses a variety of trend visuals to portray the pre-estimation panel relationship dynamics. The study presents the average annual levels of engagement and leadership, along with 95% CI to provide an overview of the Y trend from 2015 to 2023 and the variability associated with year-to-year averages (Figure 2a). The study also shows parallel national trend lines for the youth development domain (X1–X4), to allow for visual inspection of movement or correlation among domains over time (Figure 2b).

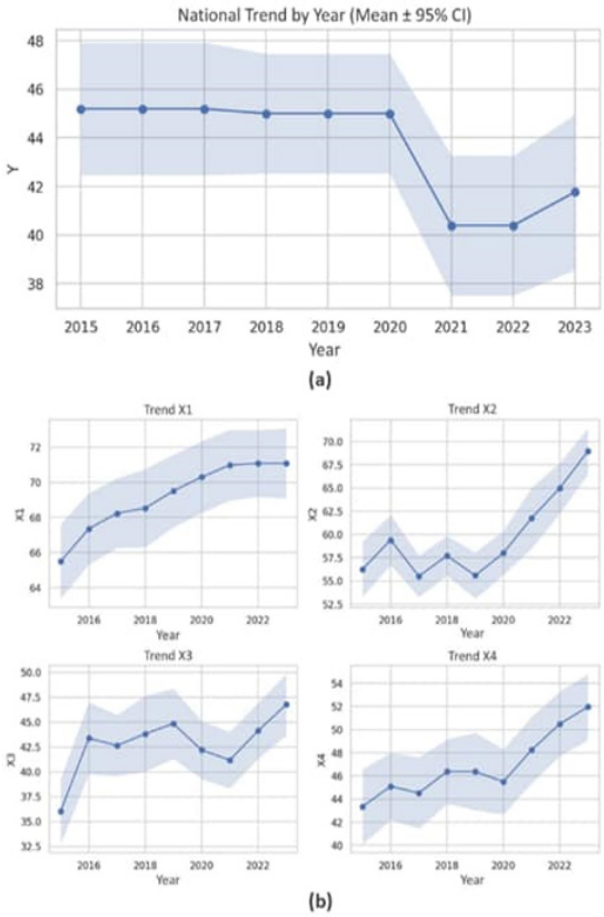


Figure 2. National Trend by Year: (a) Youth Engagement and Leadership (Y) and (b) Youth Development Dimensions (X1 - X4)
Source: obtained from data analysis (2026)

Table 1. Descriptive Statistics

Variable	Mean	Std	Min	Max
X1 (Education)	69.172	6.288	50.0	90.00
X2 (Health & Well-being)	59.804	8.850	32.5	82.50
X3 (Opportunity & Employment)	42.778	9.932	15.0	85.00
X4 (Gender & Discrimination)	46.873	9.134	30.0	76.67
Y (Engagement & Leadership)	43.682	8.308	20.0	70.00

Source: obtained from data analysis (2026)

Table 2. PCA Loadings and Explained Variance of X1 – X4

Variable	PC1	PC2	PC3	PC4
		Loadings		
X1	0.668	-0.014	-0.242	-0.704
X2	0.052	0.946	0.310	-0.076
X3	0.323	-0.310	0.894	0.006
X4	0.669	0.091	-0.215	0.706
		Explained Variance		
EVR	0.443	0.253	0.224	0.079
Cumulative	0.443	0.696	0.921	1.000

Source: obtained from data analysis (2026)

Principal Component Analysis (PCA)

The study applied principal component analysis (PCA) to X1 – X4 to describe the commonalities among them and to create a more compact (parsimonious) index of youth development for robustness analysis. The PCA of X1–X4 shows that PC1 explains 44.3% of the total variance and loads primarily on education and gender and discrimination (Table 2). Therefore, PC1 is used as a parsimonious composite in the robustness models. These patterns suggest retaining PC1 as a composite "youth development signal" for purposes of robustness analysis, while retaining the fully disaggregated model as the primary substantive specification. Overall, the results from these analyses demonstrate that the majority of shared variance among the predictors exists within the education and gender & discrimination dimensions and not as an even distribution among all four dimensions (Figure 3).

Two-Way Fixed-Effects Estimates, Model Selection, and Robustness

The main statistical results from this study, which provides two-way fixed-effects estimates (effects for both province and year) for model 1, that used X1–X4, model 2 that used PC1 as a single, combined index, a random-effects comparator to model 1, and a fixed-effects robustness version (Table 3). In the preferred model 1, using all four development indices, the fixed-effects specification indicates that none of the predictor variables was statistically significant at a conventional level of significance. The fixed-effects robustness specification provided the same basic result; all four predictor variables were statistically nonsignificant. To determine if the null findings could be due to the study's modeling of youth development in separate domains (disaggregated), we estimated Model 2 using the first principal component (PC1). The PC1 coefficient was approximately equal to zero and not significantly different from zero based upon its standard error, which corresponds to the low within province correlations observed in the disaggregated fixed-effects model. The random-effects version of the model differs from the fixed effects version, particularly in terms of having a positive coefficient for education and a negative coefficient for gender and discrimination. The Hausman test supports the fixed effects model, which means that the random-effects estimates are inconsistent because of the correlation between unit-specific effects and the included regressors. Therefore, substantively, the fixed effects versions of H1-H4 do not provide evidence of positive within province relationships between X1-X4 and Y during 2015-2023. Coefficient plots for model 1 and model 2 allowing for a visual inspection of the magnitude and uncertainty of each effect (Figure 5).

Table 3. Panel regression estimates for youth engagement and leadership

Variable	FE Model 1		FE Model 2		RE		FE Robustness	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
X1	-0.014	0.954	—	—	0.789	0.000	-0.014	0.951
X2	-0.019	0.799	—	—	-0.071	0.327	-0.019	0.811
X3	0.050	0.217	—	—	0.070	0.143	0.050	0.189
X4	-0.078	0.490	—	—	-0.243	0.015	-0.078	0.563
PC1	—	—	0.069	0.938	—	—	—	—
Statistics								
R^2 (within)	0.046		-0.005		-0.198		0.046	
R^2 (overall)	-0.166		0.000		0.965		-0.166	
F-Test	16.39		18.134		—		16.393	
Included effects	Province & Year				(RE)		Province & Year	
Poolabi-lity F-test p-value	0.000		0.000		—		0.000	
Hausman test	—		—		$\chi^2(4) = 17.267$; $p = 0.002$		—	

Source: obtained from data analysis (2026)



Figure 3. PCA loadings heatmap for X1–X4 across PC1–PC4

Source: obtained from data analysis (2026)

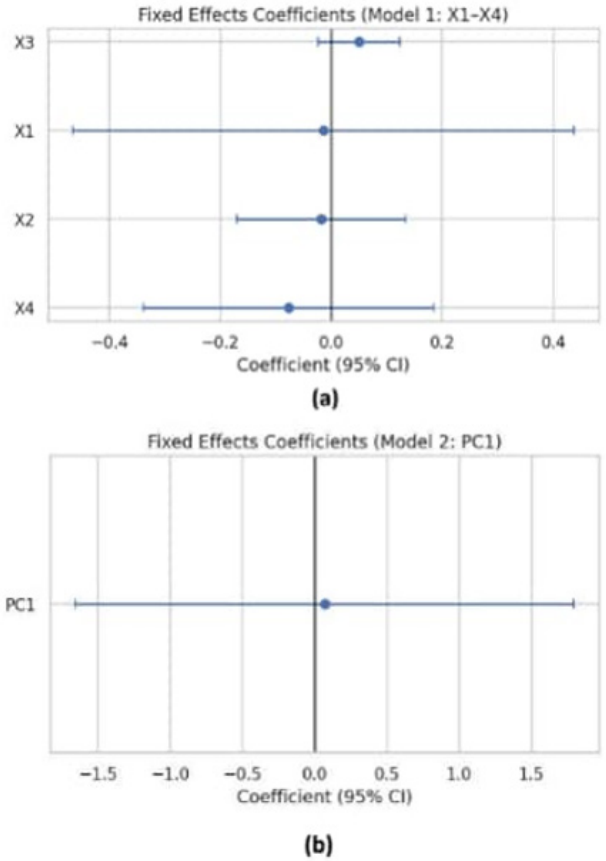


Figure 4. Fixed-Effects Coefficient Plot for (a) Model 1 and (b) Model 2
Source: obtained from data analysis (2026)

Panel Quantile Fixed Effects

Secondary robustness was achieved using panel quantile regression. The results of this method were used to test whether there was an association between Engagement and Leadership at various levels in the conditional distribution of those variables. The fixed effects estimates showed no evidence of a consistent set of statistical significance that could have changed our conclusions based on the mean fixed effect estimate (See Figure 5) of the provincial year effect. Therefore, it can be concluded from these quantile analyses that neither extreme levels of engagement and leadership nor their combinations explain the primary findings of this study.

Youth Engagement, and Leadership under Decentralized Governance

The main theoretical importance of this study is in what the models do not confirm. In all three models — namely, the preferred fixed effects specification, the robustness model based on PCA, and the conditional quantile analyses — there is no statistical evidence supporting the view that provincial-level improvement in all four (development) dimensions will lead to improved levels of engagement/leadership at the same time as these improvements occur. Hence, these findings represent an empirical challenge to the basic additive assumption underlying much research, that is, that better developmental conditions for participation should immediately result in greater citizen participation.

Null estimates provide no insight into the nature of this relationship. Therefore, several theoretical explanations for the absence of this relationship could be hypothesized, including: institutional opportunity structure, lag in temporal space, data collection limits, limited variability on the dependent variable across provinces, political dynamics, or some other omitted variable that changes over time. Therefore, we use the descriptive term "decoupling" (i.e., development-participation) to describe the observed disconnection of the two variables, rather than to establish whether an institutionally based link has developed.

However, the data do not support the conclusion that youth development has no role to play in increasing participation. Rather, the data suggest that there was little association between short-run changes in developmental environments and changes in levels of participation and leadership during the period studied and at the provincial level, when province and year fixed effects have been controlled for. A potential reason for this finding is that the opportunity to participate depends on how institutional arrangements

convert individual and collective capability into voice, representation, and leadership (Rodriguez-Pose & Mustra, 2022; Monkam & Saba, 2025; Mushtag & Zaman, 2022). Nevertheless, the current models cannot distinguish between this reason and many alternative explanations.

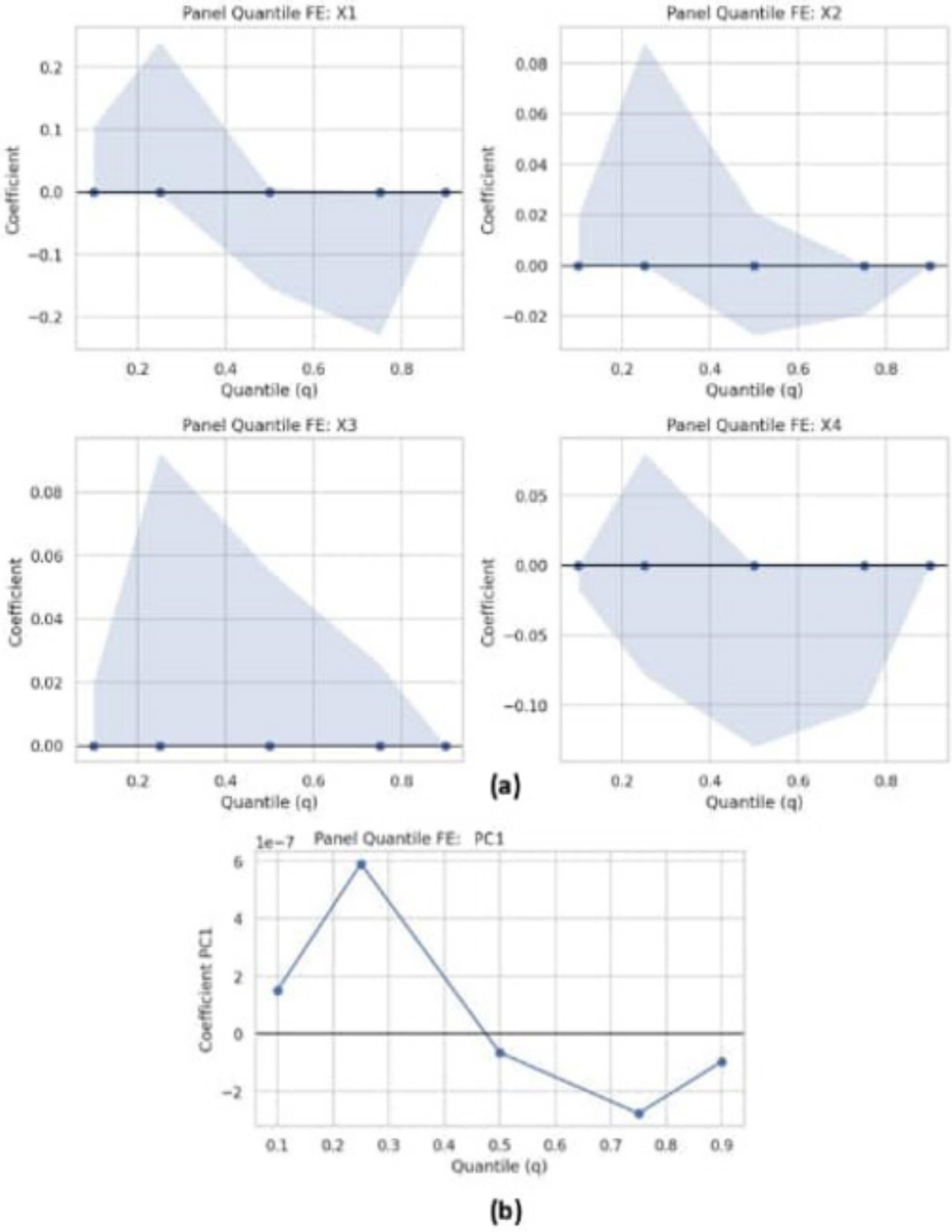


Figure 5. Panel Quantile Fixed-Effects Estimates for Y Using (a) X1-X4 and (b) PC1
Source: obtained from data analysis (2026)

Theoretical relevance to Indonesia's decentralized system arises because, although each province operates under the same national legal structure, provinces will likely vary substantially in their ability to implement policies effectively, as well as in their political incentive structures, civic ecosystems, and local implementation practices (Sijabat, 2017; Kiswanto et al., 2023; Sevindik et al., 2021). As such, differences in institutional contexts may influence the relationship between youth development and participation. However, since the current findings do not include measures of institutional characteristics directly related to institutions, they can only be seen as motivation for — not confirmation of — an institutional conversion hypothesis.

Such an understanding is particularly pertinent to the Indonesian case. At the national level, all municipalities and provinces operate within a similar national decentralization framework. However, the different provincial or municipal governments operating within this framework may also differ significantly in terms of bureaucratic capacity, political incentives, civic ecosystems, and quality of implementation (Sevindik et al., 2021; Sijabat, 2017; Kiswanto et al., 2023). This type of institutional variation is consistent with some of the possible reasons why otherwise identical changes in developmental capacities may result in different corresponding increases in engagement and leadership across provinces. In contrast to institutional variations, however, the current analysis does not provide evidence regarding whether these institutional variations explain the observed patterns.

In light of the above discussion, then, while the results are generally consistent with an institutional conversion hypothesis, they cannot be taken to confirm it. Institutional factors may potentially determine whether youth capabilities are ultimately translated into increased civic engagement (Stein et al., 2023; Cho et al., 2020; Silveira et al., 2024; Rioseco & Alberti, 2022), including credible participatory forums, clearly defined pathways to influence policy, inclusionary opportunities for leadership positions, and administrative responsiveness to the voices of youth. Therefore, while institutional factors may be plausible mechanisms to examine empirically in further research rather than being established by the present analyses, they remain mechanisms to explore further.

Another possible explanation relates to temporal dynamics. The relationship between youth development and engagement may occur over a longer time frame than that captured in annual, contemporaneous models. Improvements in education, health, employment prospects, or gender inclusion may shape civic efficacy, trust, organizational capacity, and leadership trajectories gradually rather than immediately (Wiium et al., 2023; Williams et al., 2020; Zhang & Yang, 2022). From the standpoint of decentralized governance, this matters because the effects of regional development investments may only become visible after they are mediated by local institutional learning, repeated interaction between youth and government, and the consolidation of participatory routines (Rodríguez-Pose & Muštra, 2022; Zhang & Yang, 2022). Accordingly, the fixed-effects estimates should be interpreted as evidence that short-term within-province changes in the four Indonesian Youth Development Index dimensions are not tightly coupled with short-term changes in engagement and leadership, not as evidence that longer-run relationships are absent.

A third interpretation concerns measurement alignment. Both predictors and outcomes are composite indices. While such indices are valuable for monitoring, they may be less sensitive to specific governance mechanisms that are decisive in decentralized settings. Engagement and leadership may depend on institutional variables such as the authority of youth councils, the design quality of consultative forums, participatory budgeting access, school-to-community leadership pathways, and the responsiveness of local officials. These are the types of institutional factors that provincial composite measures may not adequately capture. Therefore, the null results are informative of substance. They demonstrate that broader improvements in development conditions cannot serve as adequate proxy measures for the subnational governance structures through which engagement and leadership are generated (Giraudy & Pribble, 2020; Septiono et al., 2025).

The distinction between cross-sectional and within-unit reasoning is central to this regard. The fixed effects approach provides a measure of change

over time within each province, whereas cross-provincial comparisons are affected by permanent structural differences. In decentralized Indonesia, provinces with greater long-term institutional capacity, more developed civic networks, or more inclusive bureaucratic traditions may score higher on development dimensions and engagement outcomes. However, such differences between provinces do not imply that year-to-year improvements in a given province will necessarily translate into increased levels of engagement and leadership. For research on regional autonomy, this is an essential consideration: policy implications derived solely from provincial ranking may overestimate the likelihood of achieving participatory outcomes through development gains without considering institutional design (Adhikari & Dhital, 2021; Rodríguez-Pose & Muštra, 2022).

Finally, the findings take on greater credibility when viewed through the lens of Generation Z. An increasing proportion of the 16–30 age cohort between 2015 and 2023 represents young people who engage in civic activities that are increasingly digital, networked, issue-based, and episodic (Kennedy et al., 2024; Schoon et al., 2024). In decentralized settings, engagement mechanisms that remain bureaucratically rigid, overly formal, or weakly connected to policy influence may fail to register or sustain these repertoires of engagement. Thus, the apparent disconnect between youth development and measured engagement may partly reflect a mismatch between contemporary youth civic practices and the institutional channels through which subnational governments recognize engagement.

Theoretical Implication

This study contributes to the literature on decentralization and regional autonomy by showing that youth engagement and leadership should be understood as co-produced governance outcomes rather than automatic results of sectoral development. Although education, health, opportunity, and non-discrimination may expand the potential for engagement. In decentralized contexts, this potential must be converted through institutional arrangements that are credible, inclusive, and responsive (Cho et al., 2020; Monkam & Saba, 2025).

The findings are consistent with but do not directly test institutionalist interpretations of regional autonomy. Province fixed effects absorb persistent province-level differences, including historical, institutional, socioeconomic, and civic characteristics, but the models cannot identify which specific factors account for the observed variation. This is consistent with the arguments that path dependence, long-term governance quality, and historical roots for civic-administrative relations affect the outcomes from engagement in decentralized systems (Adhikari & Dhital, 2021; Giraudy & Pribble, 2020; Rodríguez-Pose & Muštra, 2022). Regional autonomy should therefore not be understood simply as administrative devolution; it is also an institutional environment in which provinces and local governments differ in their capacity to transform development gains into voice, representation, and leadership opportunities.

In addition, the results highlight the relevance of multilevel governance. Youth engagement in decentralized Indonesia depends on interactions among governments, educational institutions, civil society, communities, and digital platforms. Engagement therefore emerges from interdependent governance networks rather than from a single sector or level of government (Bussu et al., 2024; Habib et al., 2023). This perspective is also consistent with the views of public value and street-level bureaucracy theory that argue that the design and effective implementation of engagement is required. At the same time, front-line discretion, facilitation practices, and implementation quality will influence the effectiveness of youth-focused engagement. As a result of regional autonomy, these variables will be affected differently by the different local administrative arrangements (Silveira et al., 2024; Williams et al., 2020; Zhang & Yang, 2022). Therefore, weak associations in the first year of the project between engagement and development indicators can indicate variations in institutional design and implementation quality at the local level that are not captured by the province-level composite measures.

Alternative Explanations for the Null Associations

Several alternative explanations may account for the absence of statistically significant associations

in the present study. One explanation could be the limited within-province temporal variation. The fixed effects estimate changes based solely on what happens within each province over time. If each province's developmental domain evolves very slowly, then there will likely be very little variability within the unit to measure associations — although the unit may have large variations in terms of cross-sectional differences.

Another possibility is temporal mismatch. The positive effects from better educational performance, improved public health, increased levels of employment, or greater levels of inclusion in society may take some time to develop into stronger civic efficacy, higher rates of organizational membership, higher levels of political trust, and/or higher rates of leadership trajectories. Therefore, yearly models for contemporaneously measured variables may not fully capture relationships that occur because they have been delayed or cumulatively developed over time.

A third potential explanation is related to the way that provincial composite measures are constructed. These constructs may mask diversity at the individual and community levels and make it difficult to measure changes in non-traditional forms of youth engagement — especially since most younger generations participate in non-traditional ways. This would be particularly true for younger generations that engage digitally and episodically — or through issues-based organizations.

Fourthly, omitted time-varying factors may independently impact both engagement and leadership. For example, fluctuations in competitive politics, elections, local leadership, administrative reforms, policy disruptions, fiscal priorities, changes in demographics, increases in connectivity via digital means, increases in civic mobilization, and significant national or regional events may all impact youth participation. However, none of these factors were accounted for by the four developmental domains.

Lastly, statistical power is an additional consideration. Although the dataset includes repeated measurements of the same province-year observation, fixed-effect estimation is largely dependent on the number of within-province temporal observations versus the overall number of observations. As such, lower amounts of effective variation may result in less statistical power to detect small but statistically significant correlations. Overall, collectively, these alternative explanations indicate that the null findings can be viewed as providing evidence against a direct and timely relationship between development and participation under this particular specification, but do not provide evidence for any one specific alternative causal mechanism.

Practical and Policy Implications

The results do not indicate that provincial or state-level government agencies need to reduce spending on developing youth. However, the results indicate that increases in education, health, employment, and gender inclusion will not automatically result in an increase in youth engagement and leadership. These findings suggest that improvements in youth capabilities alone may be insufficient to generate stronger engagement and leadership, and that supportive institutional mechanisms warrant further consideration (Samsidar, 2025; Syakir, 2025).

The specific institutional measures described in detail below cannot be considered empirically-tested interventions within the current model framework. Rather, they are literature-informed policy alternatives that have been proposed based on the lack of evidence for a consistent, short-term relationship between engagement and development processes, and also based on an extensive body of research supporting participatory governance; therefore, their effectiveness must be evaluated through empirical testing.

For Provincial and Local Governments, this translates to integrating youth engagement into their regional governance planning and design rather than adding youth engagement as a symbolic element to programmatic sectors. Participatory forums should have clear mandates, transparent procedures, feedback mechanisms, and visible links to policy-making. These mechanisms should also reflect Gen Z's modes of engagement, including digital, issue-based and hybrid engagement (Astawa, 2026; Mukhlis et al., 2025). In addition, participatory design should be supported by inclusive leadership practices and locally grounded approaches to equality and representation (Nurdin, 2025; Sallimi & Jatmika, 2025).

Regional autonomy should enable local adaptation but also maintain a relatively low level of disparity in terms of the "floor" of minimum participatory rights available to youth. Therefore, national frameworks can provide a floor on such items as youth engagement, youth leadership inclusion, and administrative responsiveness, and then allow for local implementation of these areas (Hariyanto et al., 2025; Samad, 2025; Saputra & Havlíček, 2025). The monitoring of these types of programs should shift from simply counting them to determining if youth input is received, recorded, and translated into action or decision-making processes.

The study also identified the potential roles of non-state actors, including civil society organizations, educational institutions, community-based organizations, and private sector entities. To enhance the linkages between youth development and public engagement, particularly in communities where formal public service delivery systems are either underdeveloped or unreliable. Nevertheless, collaborative governance arrangements have limitations when the engagement of young people is not supported by strong institutional commitment and/or consistent policy follow-through (Chilmy, 2026; Suherman, 2025). Overall, decentralization should be evaluated not only by the devolution of authority but also by whether subnational institutions create accessible, credible, and consequential opportunities for youth engagement and leadership (Samsidar, 2025; Syakir, 2025).

Limitations and Future Research

This study has a number of limitations. First, provincial average scores may conceal important sub-provincial variations in youth engagement. Because of decentralization in Indonesia, various factors that influence youth engagement, such as those found in districts or municipalities, schools, and communities, occur at the sub-provincial level. Provincial average scores could mask the different ways in which these various institutional forms, participatory options, and autonomy arrangements vary across provinces (Inayah, 2026; Srisaparmi et al., 2025; Syakir, 2025). Second, this study is limited to examining contemporaneous, within-provincial relationships. While this allows for the identification of the short-run relationship between youth development and engagement/leadership, it may overlook longer-term impacts of youth development on youth engagement and leadership. Under decentralization, institutional adaptation, civic learning, and participatory routines may evolve gradually rather than immediately (Fu et al., 2025; Zamzani, 2020). Third, although province and year-fixed effects account for time-invariant provincial characteristics and common yearly shocks, time-varying institutional and political factors remain unobserved. Under decentralization, these may include changes in political competition, administrative reform, fiscal priorities, civic mobilization, digital infrastructure, and regional collaboration. Under decentralization, these may include changes in policy capacity, leadership arrangements, special autonomy implementation, collaborative governance dynamics, and conflict-related governance challenges (Chilmy, 2026; Samad, 2025; Tambaip, 2025; Thaher, 2025).

Fourth, the five Analytical Variables are sub-domains in the same National Youth Development Measurement Architecture. While each domain represents a different theoretical construct, they all share a common Index Framework; this can result in shared measurement assumptions and common underlying factors. Thus, while it is theoretically useful to treat Engagement and Leadership as outcomes with respect to the other domains (i.e., does not imply temporal/causal ordering), future research should test whether these relationships exist independently through measures of youth capacities, civic participation, and institutional factors that come from separate data sources.

Future research should test lagged relationships, incorporate subnational governance variables, and use multilevel or quasi-experimental designs to better capture how decentralization shapes youth engagement. Greater attention should also be given to digital engagement, participatory village autonomy, and local policy responsiveness as possible mechanisms linking youth development to civic engagement (Astawa, 2026; Mukhlis et al., 2025). Overall, the findings motivate further investigation of whether subnational institutional conditions shape the relationship between youth development and engagement within Indonesia's

decentralized governance context. Thus, the challenge of regional autonomy lies not only in improving development outcomes but also in building credible channels for youth voice and leadership (Hariyanto et al., 2025; Samsidar, 2025).

Conclusion

The study found no statistically significant contemporaneous within-province associations between improvements in education, health and well-being, opportunity and employment, and gender and discrimination and changes in engagement and leadership across Indonesian provinces during 2015–2023. Consistency was demonstrated by the three methodologies employed: the preferred two-way fixed effects model; the robustness test based on principal component analysis (PCA); and the panel quantile analysis. These findings do not suggest that youth development does not have an effect on participation nor that institutional weaknesses or decentralization resulted in the lack of associations found. Instead, the findings indicate only that contemporaneous improvements in the measured provincial development dimensions were not systematically accompanied by changes in Engagement and Leadership during the study period. The data do not identify the conditions responsible for this pattern. Because all variables are measured at the provincial level, these findings should not be interpreted as evidence of individual-level behavioral relationships among young people. We describe this finding as a form of development-participation decoupling and contend that it identifies a fundamental theoretical question regarding the contextual circumstances that allow improvements in youth development conditions to become visible participation. Decentralized government is the context in which we examine this phenomenon; however, it is not considered a treatment or explanatory variable. Therefore, institutional responsiveness, participatory infrastructure, political competition, local administration capacity, civic networks, and temporal lags are possible explanations for why some forms of social capital are converted into participatory outcomes. To determine whether there are causal relationships between youth development and participation in civic activities, future studies need to include direct measurement of institutions, independent measures of participation, lagged variables, multi-level designs, and quasi-experimental methods to determine how youth development becomes civic engagement and/or leadership.

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