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The impact of democracy, unemployment, and corruption control on human development in 10 asean countries: panel evidence and interaction analysis, 2010–2023

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ABSTRACT

This study examines the relationship between liberal democracy, unemployment, corruption control, and human development in 10 Southeast Asian countries over the period 2010–2023, using 140 country-year observations. HDI data were obtained from the Asian Development Bank, LDI from Our World in Data/V-Dem, and other variables from the World Bank. The analysis employs panel data regression through three specifications: a baseline model, a democracy–unemployment interaction model, and a democracy–corruption control interaction model. Model selection tests indicate that Random Effects Models (REM) are preferred for the baseline and unemployment interaction specifications, while a Fixed Effects Model (FEM) with country-clustered robust standard errors is selected for the corruption-control interaction model. The findings reveal that liberal democracy has a negative and significant association with HDI in the first two models but becomes insignificant in the third. Unemployment shows a positive and significant association in the first two models but loses significance in the third. In contrast, corruption control and foreign direct investment (FDI) exhibit positive and significant associations with HDI across all specifications, while economic growth and both interaction terms are statistically insignificant. These findings highlight the importance of institutional quality and productive foreign investment in supporting human development in Southeast Asia.

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Introduction

Human development is a multidimensional process that encompasses improvements in health, education, and living standards. Beyond economic growth, the achievement of human development may depend on institutional quality, political conditions, and labour-market performance. In Southeast Asia, substantial differences in governance structures, democratic institutions, and employment conditions provide an important context for examining the factors associated with human development. Recent research on selected Asian countries also highlights the relevance of governance quality in promoting inclusive human development (Stylianou et al., 2025). Therefore, examining the relationships between democracy, unemployment, corruption control, and human development is particularly relevant to understanding development disparities across the region.

Democracy may be associated with human development through political accountability, public participation, protection of civil liberties, and incentives for governments to provide public services. Nevertheless, the relationship between democracy and human development is not necessarily uniform across countries. (Gerring et al., 2021) demonstrate that empirical findings depend partly on how democracy is conceptualised and measured, while (Soretz et al., 2025) report a positive relationship between democracy and human development using a spatial econometric approach. (Gerring et al., 2024) further highlight the varied effects of democracy on development outcomes. Similarly, (Choudhary et al., 2026), using data from 133 countries, find a positive relationship between liberal democracy and sustainable development, although its magnitude varies across income groups. These findings indicate that the relationship between democratic institutions and development outcomes remains context-dependent, particularly in Southeast Asia.

Unemployment is another factor that may influence human development because it can reduce household income and limit access to education, healthcare, and adequate living standards. Nevertheless, the relationship between unemployment and HDI may differ across economic and institutional contexts. (Nazarko & Hoxha, 2025) identify variations in the relationships among economic growth, employment, unemployment, and HDI across Western Balkan countries. Similarly, (Celik & Kostekci, 2025) report a negative relationship between unemployment and human development in Central and West Asian countries. Evidence from Vietnam also indicates that unemployment negatively affects HDI in both the short and long run (Hechmi, 2025). Furthermore, cross-country evidence from 129 countries highlights the interconnected relationship between unemployment and human welfare measured by HDI (Naz, 2023). Meanwhile, (Yıldırım et al., 2026) highlight the long-run relationship between unemployment, human development, innovation capacity, and industrialisation in China. These findings suggest that the relationship between unemployment and human development may vary according to economic structures, informal employment, and labour-market institutions.

Governance quality, particularly the capacity to control corruption, may also be relevant to human development. Corruption can divert public resources, weaken accountability, and reduce the effectiveness of expenditure intended for education, healthcare, and social protection. (Neme et al., 2024), using data from 135 developed and developing countries, find that corruption constrains human development across income groups. Similarly, (Celik & Kostekci, 2025) highlight the importance of corruption control, political stability, and the rule of law in explaining human development. Evidence from SAARC countries also indicates a positive relationship between stronger corruption control and HDI (Vinayagathasan, 2022). These findings underline the importance of institutional accountability in translating public resources into improved human development outcomes.

Economic growth and foreign direct investment (FDI) are included as control variables because they may contribute to human development. However, economic growth does not automatically improve health, education, and living standards. FDI may support human development through employment creation, technology transfer, and skills development. (Ha et al., 2024) find that institutional quality strengthens the positive relationship between FDI and human development, while (Djokoto & Abawiera, 2023) show that this relationship varies across development levels. Evidence from ASEAN-9 also highlights the contribution of FDI to human development (Thi & Ha, 2024). These findings suggest that the benefits of investment depend partly on institutional and socioeconomic conditions.

Although previous studies have examined democracy, unemployment, corruption, and FDI in relation to human development, their findings often vary across countries and research contexts. Studies on democracy emphasize the importance of measurement and institutional context (Gerring et al., 2021, 2024; Soretz et al., 2025), while research on unemployment and corruption reports differing relationships with HDI (Celik & Kostekci, 2025; Nazarko & Hoxha, 2025; Neme et al., 2024). However, limited evidence examines these factors within a common Southeast Asian panel, particularly the moderating roles of unemployment and corruption control in the relationship between liberal democracy and human development.

Accordingly, this study examines the relationships between liberal democracy, unemployment, corruption control, and human development in ten selected Southeast Asian countries during 2010–2023, comprising 140 country-year observations. HDI is the dependent variable, while LDI, unemployment (UE), and Control of Corruption (COR) are the main explanatory variables. Economic growth (EG) and FDI are included as controls. Using panel regression, the study estimates a baseline model and two interaction models to investigate whether unemployment (LDI × UE) and corruption control (LDI × COR) moderate the relationship between liberal democracy and HDI.

Method

Research design and sample

This study employs a quantitative observational panel-data design to examine the relationships between liberal democracy, unemployment, corruption control, and human development in ten selected Southeast Asian countries: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste, and Viet Nam. The analysis covers 2010–2023, comprising 140 balanced country-year observations. The period captures pre-pandemic, pandemic, and post-pandemic conditions without separately estimating the causal effect of COVID-19. Brunei Darussalam was excluded due to unavailable LDI observations. The panel structure captures cross-country and temporal variations; however, given its observational nature, the estimated coefficients are interpreted as conditional associations rather than causal effects.

Data sources and operationalisation

Table 1. Operationalization of variables

Variable	Operational measure	Source	Role
HDI	Human Development Index; composite of health, education, and living standard	ADB/UNDP data cited in thesis	Dependent
LDI	Liberal Democracy Index, scale 0–1	Our World in Data / V-Dem	Focus
UE	Unemployment rate (% of labour force)	World Bank	Focus
COR	Control of Corruption, 0–100; higher = better control	World Bank	Focus
EG	Annual economic growth rate (%)	World Bank	Control
FDI	Foreign direct investment, current US dollars	World Bank	Control
LDI × UE	Product of centred LDI and centred UE	Author's calculation	Interaction term
LDI × COR	Product of centred LDI and centred COR	Author's calculation	Interaction term

Source: Author's synthesis from the thesis research design and data appendix.

Econometric specification

The empirical analysis consists of three panel-regression specifications: a baseline model and two models incorporating interaction terms. The three main explanatory variables are LDI, UE, and COR. EG and FDI are included as control variables.

The baseline model is specified as follows:

$$HDI_{it} = \alpha + \beta_1 LDI_{it} + \beta_2 UE_{it} + \beta_3 COR_{it} + \beta_4 EG_{it} + \beta_5 FDI_{it} + \mu_i + \varepsilon_{it}$$

where HDI_{it} denotes the Human Development Index of country i in year t; LDI denotes liberal democracy; UE denotes unemployment; COR denotes control of corruption; EG denotes economic growth; FDI denotes foreign direct investment; μ_i captures the country-specific component; and ε_{it} is the idiosyncratic error term.

The first interaction specification introduces the interaction between liberal democracy and unemployment:

$$HDI_{it} = \alpha + \beta_1 cLDI_{it} + \beta_2 cUE_{it} + \beta_3 COR_{it} + \beta_4 EG_{it} + \beta_5 FDI_{it} + \beta_6 (cLDI \times cUE)_{it} + \mu_i + \varepsilon_{it}$$

The second interaction specification introduces the interaction between liberal democracy and corruption control:

$$HDI_{it} = \alpha + \beta_1 cLDI_{it} + \beta_2 UE_{it} + \beta_3 cCOR_{it} + \beta_4 EG_{it} + \beta_5 FDI_{it} + \beta_6 (cLDI \times cCOR)_{it} + \mu_i + \varepsilon_{it}$$

The prefix c denotes a mean-centred variable, calculated by subtracting the sample mean from the original variable. In the first interaction specification, LDI and UE are centred before their product term is constructed. In the second interaction specification, LDI and COR are centred before their product term is constructed.

In the interaction models, UE and COR retain their respective main effects and are also examined as moderators through the interaction terms. Specifically, LDI × UE tests whether unemployment moderates the relationship between liberal democracy and HDI, while LDI × COR examines the moderating role of corruption control. Mean-centering helps reduce non-essential multicollinearity between the constituent

variables and their interaction terms. It also allows the main-effect coefficients to be interpreted at the sample mean of the corresponding centred variables. However, centering does not eliminate all multicollinearity or address violations of regression assumptions.

Estimation Strategy and Model Selection

The Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) are considered for each specification. Model selection uses the Chow test to compare CEM and FEM, the Breusch–Pagan Lagrange Multiplier (LM) test to assess CEM against REM, and the Hausman test to compare FEM and REM.

The selection process is conducted separately for each specification. Initial Hausman results favour REM for the baseline and unemployment-interaction models, while FEM is favoured for the corruption-control-interaction model. However, warnings regarding the variance-difference matrix in the Stata outputs require further assessment before these selections can be considered conclusive. A correlated random-effects specification is therefore considered as a robustness check. The specification tests and selected estimators are presented in the model-selection table, while coefficient estimates are reported separately.

Panel Diagnostics and Robust Inference

The analysis examines multicollinearity using variance inflation factors (VIF), groupwise heteroskedasticity using the Modified Wald test, and first-order serial correlation using the Wooldridge test.

For the liberal-democracy–corruption-control interaction model, the Modified Wald test indicates groupwise heteroskedasticity, $\chi^2(10) = 513.22$, $p < 0.001$, while the Wooldridge test confirms first-order serial correlation, $F(1, 9) = 63.733$, $p < 0.001$. Accordingly, the fixed-effects estimates use country-clustered standard errors to account for heteroskedasticity and within-country error dependence.

However, with only 10 country clusters, conventional cluster-robust inference may be unreliable. Wild cluster bootstrap inference is therefore recommended as an additional robustness check. Diagnostic results for the baseline and unemployment-interaction models should also be reported where available.

Statistical Power and Sample Adequacy

The sample consists of 140 country-year observations from 10 countries over 14 years. Since the study examines interaction effects, sample adequacy should be assessed based on the minimum detectable interaction effect rather than the observation count alone.

A preliminary sensitivity calculation assuming independent observations is insufficient because the panel contains repeated observations within countries. A more appropriate assessment would use simulations that account for the panel structure, observed predictor distributions, and within-country dependence. Until such an assessment is conducted, the ability to detect small moderation effects should be interpreted cautiously, and insignificant interaction estimates should not be taken as definitive evidence of no moderation.

Results and Discussions

Descriptive profile of the ASEAN panel

The ten selected Southeast Asian countries exhibit considerable differences in human development and institutional quality. In 2023, Singapore recorded the highest HDI (0.946), while Cambodia recorded the lowest (0.606). Timor-Leste had the highest LDI (0.525), whereas Myanmar had the lowest (0.015). Singapore also recorded the highest control-of-corruption score (86.8), compared with Cambodia (25.2). These differences indicate substantial variation in development and governance across the sample.

Table 2. Selected ASEAN indicators, 2023

Country	HDI 2023	LDI 2023	Unemployment 2023	Control of corruption 2023
Cambodia	0.606	0.054	0.225	25.2
Indonesia	0.728	0.054	3.308	38.9
Lao PDR	0.617	0.091	1.188	28.3
Malaysia	0.819	0.357	3.869	55.6
Myanmar	0.609	0.015	3.032	25.4
Philippines	0.720	0.299	2.222	36.3
Singapore	0.946	0.331	3.444	86.8
Thailand	0.798	0.240	0.733	39.0
Timor-Leste	0.634	0.525	1.521	39.2
Viet Nam	0.766	0.113	1.645	41.6

Source: Data appendix in the thesis; author's presentation.

During 2010–2023, average annual economic growth was 4.72%, with a standard deviation of 2.23%. FDI also varied considerably across countries, particularly due to Singapore's substantially larger investment flows. This variation is relevant when interpreting the FDI coefficient, which is measured in current US dollars.

Panel estimation results and Model Selection

Three specifications are estimated: a baseline model, an interaction model between liberal democracy and unemployment, and an interaction model between liberal democracy and control of corruption. The interaction variables are constructed using mean-centered explanatory variables.

The Chow tests favor FEM over pooled regression in all three specifications ($p < 0.001$). The Hausman tests favor REM for the baseline model ($\chi^2 = 2.43$; $p = 0.6573$) and Interaction I ($\chi^2 = 0.99$; $p = 0.9632$), while Interaction II favors FEM ($\chi^2 = 34.15$; $p < 0.001$). The Breusch–Pagan LM tests support REM over pooled regression for the baseline and Interaction I models.

Table 3. Panel Model Selection Results

Test	Baseline REM	Interaction I REM (LDI × UE)	Interaction II FEM-robust (LDI × COR)
Chow Test	$p < 0.001$	$p < 0.001$	$p < 0.001$
Hausman Test	$p > 0.6573$	$p > 0.9632$	$p < 0.001$
Breusch-Pagan LM test	$p < 0.001$	$p < 0.001$	—
Estimator Retained	REM	REM	FEM

Notes: The Chow test compares pooled and fixed-effects models, the Hausman test compares FEM and REM, and the LM test evaluates REM against pooled regression. The LM test is not required to distinguish between FEM and REM. Source: Author's calculations using Stata 14.

The REM specifications are estimated using generalized least squares (GLS), while FEM controls for time-invariant country-specific heterogeneity. However, the Stata outputs report warnings concerning the rank and positive definiteness of the Hausman variance-difference matrix. Therefore, the model-selection results should be interpreted cautiously, and further specification checks are warranted.

Table 4. Panel Regression Estimates for HDI

Variable	Baseline REM	p-value	Interaction I REM	p-value	Interaction II FEM-robust	p-value
LDI / cLDI	−0.0852 (0.0242)***	< 0.001	−0.0869***	< 0.001	−0.1057 (0.115)	0.115
UE / cUE	0.0060 (0.0023)***	< 0.009	0.0059***	0.011	0.0062 (0.188)	0.188
COR / cCOR	0.0043 (0.0005)***	< 0.001	0.0045***	< 0.001	0.0039***	0.003
EG	−0.00018 (0.00028)	0.526	−0.0002	0.378	−0.0022	0.415
FDI	2.88×10^{-13} (1.34×10^{-13})**	0.031	2.92e−13**	0.030	2.80e−13**	0.039
INT_cLDI_cUE	—	—	0.0146 (0.230)	0.230	—	—
INT_cLDI_cCOR	—	—	—	—	−0.0058 (0.0043)	0.214
C	0.5279 (0.0270)***	< 0.001	0.5136	< 0.001	0.6906	<0.001
R^2	0.8247	—	0.8239	—	0.3112	—
Overall model	Wald $\chi^2 = 80.79$; $p < 0.001$	$p < 0.001$	Wald $\chi^2 = 70.59$; $p < 0.001$	$p < 0.001$	$F = 5.72$; $p = 0.012$	p=0.012

*Notes: Standard errors are reported in parentheses. The standard errors in the Interaction II FEM specification are robust and clustered at the country level. The prefix "c" denotes a mean-centered variable. INT_cLDI_cUE is the interaction between centered liberal democracy and centered unemployment. INT_cLDI_cCOR is the interaction between centered liberal democracy and centered control of corruption. LDI is the Liberal Democracy Index; UE is the unemployment rate; COR is the Control of Corruption indicator; EG is the annual economic growth rate; and FDI is foreign direct investment in current US dollars. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The reported joint tests are post-estimation tests from the study's Stata output; the FEM statistic is based on testparm and should not be interpreted as identical to the REM statistics. Source: Author's calculations using Stata 14.*

The overall R^2 values are 0.8247 for the baseline model and 0.8239 for Interaction I. For Interaction II, the within, between, and overall R^2 values are 0.3112, 0.8778, and 0.8588, respectively. These measures represent different dimensions of model fit and should be interpreted according to the estimator used.

Diagnostic Results for the FEM Interaction Model

The diagnostics for the democracy–corruption interaction model indicate heteroskedasticity and first-order serial correlation. The Modified Wald test reports $\chi^2(10) = 513.22$ ($p < 0.001$), while the Wooldridge test reports $F(1, 9) = 63.733$ ($p < 0.001$). These results indicate that the conventional error-variance assumptions are not supported for this specification. Consequently, the final reported FEM estimates use country-clustered robust standard errors.

Table 5. Diagnostic Results for the Democracy–Corruption Interaction Model

Diagnostic test	Result	Interpretation
Modified Wald test	$\chi^2(10) = 513.22$; $p < 0.001$	Evidence of heteroskedasticity
Wooldridge test	$F(1, 9) = 63.733$; $p < 0.001$	Evidence of first-order serial correlation
VIF: cCOR	5.06	Below 10
VIF: FDI	4.31	Below 10
VIF: INT_cLDI_cCOR	2.65	Below 10
VIF: cLDI	1.77	Below 10
VIF: UE	1.42	Below 10
VIF: EG	1.01	Below 10
Mean VIF	2.70	No indication of severe multicollinearity under the VIF < 10 criterion
Estimation adjustment	Country-clustered robust SE	Used for reported FEM estimates

Notes: The Modified Wald test evaluates groupwise heteroskedasticity in the fixed-effects model, while the Wooldridge test evaluates serial correlation in panel-data errors. The VIF values are below the commonly used threshold of 10. The diagnostic findings motivate robust inference for the FEM interaction specification. Source: Author's calculations using Stata 14.

The diagnostic results support the use of robust standard errors for Interaction II. However, because the estimates are clustered across only ten countries, the statistical inference should be interpreted cautiously. The Hausman warning also indicates that additional specification checks would strengthen confidence in the selected estimators.

Democracy and human development

Baseline Model and Interaction Model I (INT_cLDI_cUE)

The estimation results indicate that liberal democracy has a negative and significant effect on the Human Development Index (HDI) in the Baseline Random Effects Model (REM) ($\beta = -0.0852$; $p < 0.001$) and the Interaction I REM ($\beta = -0.0869$; $p < 0.001$).

This finding is consistent with (Reilly et al., 2015), who suggest that democracy is not necessarily associated with improvements in education, health, and living standards. For example, Singapore has a lower democracy score than Timor-Leste but records the highest HDI in Southeast Asia. Nevertheless, this comparison does not establish a causal relationship between democracy and human development. The negative association found in this study differs from (Soretz et al., 2025), who identify a positive relationship between democracy and HDI through greater government accountability, public participation, and civil liberties. As (Gerring et al., 2012) suggest, the benefits of democracy may not be immediately reflected in human development. Thus, improvements in democratic quality do not necessarily lead to immediate increases in HDI, particularly across countries with diverse institutional and economic conditions.

Interaction Model II (cLDI × cCOR)

The results of Interaction Model II show that liberal democracy (cLDI) has a negative but statistically insignificant association with HDI ($\beta = -0.1057$, $p = 0.115$). Similarly, the interaction term between liberal democracy and control of corruption (INT_cLDI_cCOR) is negative and statistically insignificant ($\beta = -0.0058$, $p = 0.214$). Since higher COR scores indicate better control of corruption, the negative interaction coefficient suggests a tendency for stronger corruption control to make the association between democracy and HDI more negative. However, its statistical insignificance provides insufficient evidence that control of corruption moderates this relationship. This may indicate that political freedom and corruption control do not automatically translate into better human-development outcomes, particularly when bureaucratic capacity and the quality of public services differ across countries.

From the perspective of Sen's (1999) *Development as Freedom*, development requires not only political freedom but also substantive opportunities in education, health, and economic participation. Therefore, democratic institutions must be accompanied by effective public policies to improve human development. The insignificant findings in this model do not establish that democracy or better corruption control reduces HDI; they indicate that their interaction is not statistically associated with HDI in this specification. The difference between Interaction Models I and II should also be interpreted in light of their different interaction terms and estimation methods: REM in Model I and robust FEM in Model II. This result is consistent with Gerring et al. (2012), who suggest that the relationship between democracy and human development may not be immediately apparent, as its benefits can depend on longer-term institutional and socioeconomic conditions.

Unemployment and human development

Baseline Model and Interaction Model I (INT_cLDI_cUE)

Unemployment has a positive and significant effect on the Human Development Index (HDI) in the Baseline REM ($\beta = 0.0060$; $p < 0.009$) and Interaction I REM ($\beta = 0.0059$; $p = 0.011$) models. This interpretation can be explained through Job Search Theory developed by (McCall, 1970), which suggests that individuals evaluate job offers against their reservation wages before deciding whether to accept employment or continue searching. Supporting this explanation, The phenomenon of "educated unemployment" further suggests that unemployment can occur among individuals with higher levels of education who are still seeking positions that match their qualifications (Girsberger & Meango, 2022; Krueger & Mueller, 2016; Sevencan, 2021; Yıldırım et al., 2026). Nevertheless, this positive relationship does not imply that unemployment directly enhances the HDI; rather, it may reflect variations in labor market characteristics across ASEAN countries.

Interaction Model II (cLDI × cCOR)

The results of Interaction Model II show that unemployment has a positive but statistically insignificant association with HDI ($\beta = 0.0062$, $p = 0.188$). This finding indicates that there is insufficient statistical evidence to establish a significant relationship between unemployment and human development in the selected Southeast Asian countries. Since HDI consists of health, education, and standard-of-living dimensions, changes in unemployment do not necessarily translate directly into changes in HDI. This relationship may also depend on income levels, access to education and healthcare, and differences in labor-market conditions. Furthermore, unemployment can be frictional, when individuals are searching for suitable jobs, or structural, when workers' skills do not match labor-market requirements. These differences may contribute to the variation in the relationship between unemployment and HDI across countries.

Social protection policies may also help explain this insignificant relationship by cushioning the effects of unemployment on household welfare and access to essential services. According to the (OECD, 2024), however, social protection systems in Southeast Asia remain uneven, with substantial differences in coverage and limited access among informal workers; several countries also lack adequate unemployment benefits. Therefore, social protection may help maintain access to healthcare, education, and income support in some countries, but its effectiveness varies across the region. These differences may partly explain why unemployment does not have a statistically significant association with HDI in this model. The positive coefficient should therefore be interpreted only as the direction of the estimated relationship, not as evidence that higher unemployment improves human development.

Control of corruption and human development

The results show that control of corruption has a positive and significant association with HDI across all three models, with coefficients of 0.0043 ($p < 0.001$), 0.0045 ($p < 0.001$), and 0.0039 ($p = 0.003$), respectively. Since higher WGI scores indicate stronger corruption control, these findings suggest that better governance is associated with higher human development. This relationship can be explained by the role of corruption control in preventing the misuse of public funds, strengthening accountability, and ensuring that government resources are allocated more effectively to education, healthcare, and other essential public services. Consequently, improved public service delivery can support better living standards and human development. These findings are consistent with (Celik & Kostekci, 2025; Jianu et al., 2026), who report a positive association between corruption control and human development. (Mombeuil, 2021; Ofoeda et al., 2026) further emphasize the importance of governance quality and budget transparency in supporting human development. However, (Nginyu, 2025; Okoth & Omar, 2025) suggest that this relationship may vary across countries and development levels.

Economic growth and human development

Economic growth has a negative and statistically insignificant effect on the Human Development Index (HDI) in the Baseline REM ($\beta = -0.0001$; $p = 0.526$), Interaction I REM ($\beta = -0.0002$; $p = 0.378$), and Interaction II FEM-robust ($\beta = -0.0022$; $p = 0.415$) models. Although the coefficient in the third model is more negative, none of the results is statistically significant. Consequently, there is insufficient evidence to conclude that economic growth influences the HDI across these three models.

These findings are consistent with (Kızılkaya et al., 2024), who found a negative and insignificant effect of economic growth on HDI in Brazil. (Luqman & Li, 2021; Mawad et al., 2026) also identified a negative relationship between economic growth and human development. These findings suggest that economic growth does not necessarily translate into improved quality of life and should therefore be accompanied by equitable distribution of development benefits and improvements in education and healthcare.

FDI and human development

Based on the estimation results presented in Tables 4.15 and 4.16, this study compares three specifications: the baseline model (without interaction), Interaction Model I, and Interaction Model II. The results indicate that foreign direct investment (FDI) has a positive and statistically significant effect on the Human Development Index (HDI) across all three models, with coefficients of 2.88×10^{-13} ($p = 0.031$), 2.92×10^{-13} ($p = 0.030$), and 2.80×10^{-13} ($p = 0.039$), respectively. These findings suggest that FDI consistently contributes positively to human development in ASEAN countries.

The positive effect of FDI on HDI may occur through several channels, including job creation, technology transfer, skills development, and increased labor productivity. This finding is consistent with (Githaiga & Wenani, 2023; Le-Bao et al., 2025; Le et al., 2024), who report a positive relationship between FDI and human development. Similarly, (Amriddinova, 2024; Djokoto & Abawiera, 2023; Kim & Cho, 2023) identify a positive contribution of FDI to human development, particularly in developing and recipient countries. More recently, (Mintah et al., 2026) also found a positive and significant association between FDI and HDI, especially its education dimension. These findings suggest that FDI can support human development by expanding employment opportunities, facilitating technology transfer, and improving workforce capabilities. Therefore, FDI serves not only as an additional source of capital but also as a mechanism for enhancing people's quality of life.

Policy implications

First, ASEAN governments should strengthen transparency, accountability, and institutional oversight to ensure public resources effectively support human development.

Second, employment policies should prioritize productive jobs, skills development, formalization, and social protection rather than focusing solely on reducing unemployment.

Third, FDI policies should encourage investments that generate employment, technology transfer, and workforce development. Finally, democratic reforms should be supported by effective institutions and administrative capacity to translate political participation into better education, healthcare, and living standards. Overall, stronger institutional quality, productive investment, and inclusive policies are essential to improving human development across ASEAN.

Conclusions

This study examined the determinants of human development in 10 ASEAN countries over the period 2010–2023 using a balanced panel and three model specifications. The findings reveal that the relationship between institutional and economic factors and HDI varies across models. Liberal democracy has a negative and significant association with HDI in the baseline and democracy–unemployment models, but becomes insignificant in the robust democracy–corruption model. Similarly, unemployment is positive and significant in the first two models but loses significance in the third. In contrast, control of corruption and FDI consistently show positive and significant associations with HDI, while economic growth has a negative but insignificant relationship. Neither interaction term is statistically significant. These findings suggest that human development depends not only on political and economic conditions but also on institutional capacity to translate resources into better living standards. In particular, corruption control and productive foreign investment appear to be important factors associated with human development. The results also highlight that economic growth and democratic institutions do not automatically translate into improved human development without effective governance and public service delivery. This study has several limitations. The relatively short observation period may restrict the assessment of long-term institutional changes, while

the liberal democracy index captures only one dimension of democratic quality. Furthermore, the observational nature of the analysis limits causal interpretation, and the interaction results indicate some sensitivity across model specifications. Future research could employ dynamic panel methods, alternative democracy indicators, and measures of employment quality, informality, social protection, and public expenditure. Further comparative studies across ASEAN countries could also examine the institutional conditions under which democratic accountability contributes more effectively to human development.

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