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Article

The impact of local government expenditures on local gross regional domestic product per capita in Vietnam

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Abstract: The allocation of funds in the local budget is a matter of concern for the governments and economic scholars. The study examines the influence of local budget expenditures on the GRDP per capita of 63 provinces and municipalities in Vietnam from 2018 to 2022. Regression analysis of panel data reveals that capital expenditure has a positive correlation with local GRDP per capita, whereas current expenditure has a negative correlation with GRDP per capita. Furthermore, the analysis indicates that the percentage of individuals aged 15 and above who are employed and the percentage of urban citizens have an equivalent influence as the GRDP per capita. Conversely, the average age and local Gini coefficient have contrasting effects on GRDP per capita. The author suggests several policy alternatives to assist localities in boosting their GRDP per capita based on the findings of the study model.

Keywords: GRDP; local budget expenditures; capital expenditure; current expenditure; local budget

1. Introduction

Public expenditure is a crucial instrument for the Government to manage and oversee the national economy, serving as a pivotal factor in the economic functioning of all nations worldwide. According to research by Stiglitz and Atkinson (1980), public expenditure should aim to enhance the investment environment and achieve the primary objectives of economic growth in order to foster favourable conditions for economic development. In addition, public expenditure is regarded as a fiscal instrument that aims to affect the economic system in order to optimise economic well-being, primarily by promoting long-term growth (Tanzi and Zee, 1997). National public spending can be classified based on budget management decentralization, including central government public expenditure and local government expenditure. In particular public spending at the local level plays an important role in stabilizing and developing the local economy. The scope of local public expenditures is delimited based on the legal regulations on budget management of each country.

The impact of public expenditure on a country's Gross Domestic Product (GDP) has been mentioned in many previous studies, such as the studies of Alexiou (2007), Dandan (2011), Fölster and Henrekson (1999), Hercowitz and Strawczynski (2004), Korman and Brahmasrene (2007), Kutasi and Marton, (2020), Laudau (1986), Maingi (2017), Poku et al. (2022). In these studies, the national-level public expenditure can have a positive impact on GDP (Hercowitz and Strawczynski, 2004; Korman and Brahmasrene, 2007; Kutasi and Marton, 2020; Maingi, 2017; Poku et

al., 2022) or influence negatively on GDP (Dandan, 2011; Folster and Henrekson, 1999; Laudau, 1986). The research on the influence of national public spending on GDP is characterized by its extensive scope, encompassing several countries across multiple continents. Nevertheless, an examination of the state budget management hierarchy in each country reveals that local government expenditure holds significant significance. Similarly, the Gross Regional Domestic Product (GRDP) serves as a crucial indicator for assessing the progress of the local economy. The research on the effect of local government public spending on GRDP is quite limited (Darma, 2020; Huang and Liu, 2019; Kholifia et al., 2021; Jurun and Pivac, 2011).

Vietnam includes 58 provinces and 5 municipalities, with more than 100 million people (Wikipedia, 2024). Vietnam is one of the countries with a quite special state budget organization system in the world, with complex decentralization of budget management and integration of budget levels (See **Figure 1**). Following the implementation of the 2015 State Budget Law in 2017, the process of decentralising state budget management in Vietnam has experienced numerous modifications. Local government budget expenditure has been expanding, shown through the increasing proportion of local budget expenditures in Vietnam's total state budget expenditures (See **Figure 2**). Conducting detailed research on how changes in local budget expenditures would affect GRDP (a local economic evaluation indicator) is critical, particularly for a developing country with a significant young population and multiple regions.

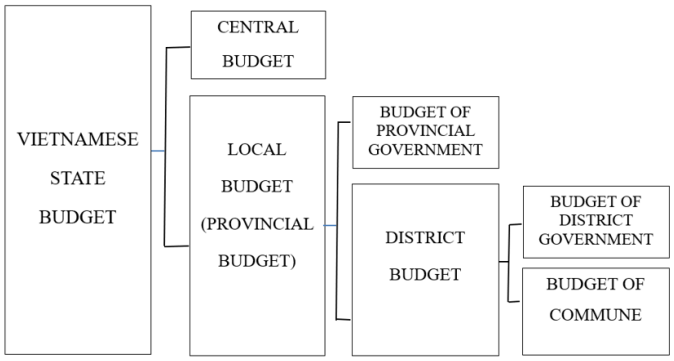

Figure 1. The Vietnamese budget system following the law on state budget No. 83/2015/QH13.

Source: By authors.

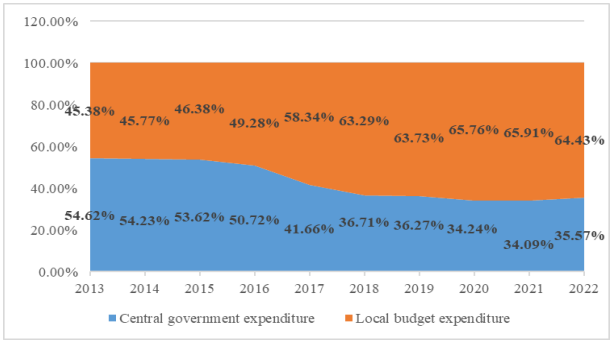

Figure 2. The share of public expenditure in Vietnam from 2013 to 2022.

Source: Vietnamese Ministry of Finance (2024).

This study will focus on assessing the impact of local budget expenditures on local GRDP in Vietnam, in the period from 2018 to 2022. This is the period when Vietnam has applied the 2015 State Budget Law to stabilize, the proportion of expenditure Local budgets in the country's total budget expenditures always reach over 63%. In order to assess the influence of local budget expenditures on the local GRDP per capita, the authors construct a model. The model includes the GRDP per capita as the dependent variable, and the two primary independent variables are capital expenditure and current spending of local governments. Furthermore, the authors also choose several other factors about mean age, workforce participation rate, Gini coefficient, transparency index, and urban population rate. The objective of the research is to elucidate the influence of capital and current expenditures by local governments on the GRDP per capita. This will serve as a foundation for formulating policy recommendations.

The study is structured as follows: the initial portion presents an introduction, while the subsequent section, section 2, offers a comprehensive examination of the theoretical and empirical literature. The methodology is outlined in section 3. Section 4 presents the analysis and interpretation of the study's findings, while section 5 offers the last remarks and overall conclusion.

2. Literature review

The GRDP per capita is a quantitative measure utilized to assess the level of economic progress in a certain region. GRDP is the aggregate of gross value added of all resident producer units in the region. It is an important indicator that can be used to measure the size of the economy of the region (Chamberlin, 2010). Hence, the variables that impact the GRDP will be similar to those that influence the GDP.

The impact of public expenditures on GRDP.

Local government expenditures refer to the financial resources allocated by local authorities to provide public services, including education, healthcare, transportation, security, roadways, and the maintenance of the local government administrative apparatus. Therefore, local government expenditures consist of two primary components: capital expenditures and current expenditures. Capital expenditures pertains to the allocation of funds towards development investments, such as the construction of public buildings or infrastructure. Current expenditures refer to the overall amount of money spent by the local government on its day-to-day operations and maintenance.

According to Darma's (2020) research, government consumption expenditure has a notable effect on GRDP. The author utilises the Partial Least Square (PLS) analysis methodology to examine the data from 2014 to 2018 of East Kalimantan Province, Indonesia. Upon evaluating the variables affecting GRDP, the author determines that population growth, inflation, gross fixed capital creation, changes in inventory, and government consumption expenditures have a considerable positive impact on GRDP. Investment, household consumption spending, consumption of non-profit household institutions, and exports and imports (including products and services) also influence positively (albeit insignificantly) to the GRDP of the province.

Huang and Liu (2020) employs the heterogeneous stochastic frontier model to examine the economic growth patterns of Beijing, Tianjin, and Hebei between 2003 and 2016. The research findings suggest that both the rate of labour ageing from 15 years old and the local government expenditures have a substantial impact on GRDP. Moreover, the study demonstrates that the economic effectiveness of Beijing, Tianjin, and Hebei is directly linked to economic concentration, human resources, industrial composition, infrastructure, level of informatisation, and institutional factors. However, it is inversely related to the government's involvement and economic liberalisation. Subsequently, the authors propose that the government allocate funds towards the creation of infrastructure in impoverished regions, thereby achieving sustained economic growth.

According to Alcatel (2000), the allocation of public funds towards investment and regular consumption has an impact on the GDP. Ahuja and Pandit (2020) conducted a comprehensive study that investigates the correlation between public expenditure and economic growth. They utilized an extensive panel data set encompassing 59 nations from 1990 to 2019. Their research reaffirms the connection between public spending and GDP growth.

Furthermore, Jermsittiparsert et al. (2019) conducted a study examining the correlation between government expenditure and GDP in five ASEAN countries: Thailand, Singapore, Indonesia, Philippines, and Malaysia. The authors utilise panel data spanning from 1990 to 2014. The independent variables, excluding government expenditure, consist of gross capital formation, portfolio investment, labour, trade, total reserve, and gross savings.

The impact of other variables on GRDP.

Jurun and Pivac (2011) conducted research on the factors that influence GRDP per capita in different regions of Croatia. This was done due to the notable economic and social disparities observed among these regions in 2005. The model consists of 10 independent variables, including employment, gross investment, output of significant agricultural products, exports, imports, and others. The research demonstrates that the export values have a substantial impact on GRDP in Croatia. The export value is the total revenue from exporting goods and services from each province to foreign countries.

Hofmann and Wan (2013) highlighted that the urban population has a significant impact on the GDP. The rate of urban citizens is the proportion is the proportion of people living in urban areas in the total average population of the region in one year.

Huang and Liu (2020) shows that the rate of labour ageing from 15 years old influences on GRDP. The rate of labor aging starting at the age of 15 is the proportion of people from 15 years old in the total average population of the region in one year.

The average life expectancy is a contributing factor to the GDP in developing nations (Upreti, 2015). The average life expectancy refers to the mean number of years that an individual residing in a specific location is projected to live, based on the death rates specific to different age groups within that region during a particular year (OECD, 2009).

Furthermore, the correlation between fiscal transparency and GDP growth has been established through the research conducted by Ellis and Fender (2003). The transparency index is collected from the annual Public Administration Performance Index (PAPI) report in Vietnam. The transparency index is calculated from three components such as (i) a public and transparent list of poor households; (ii) a public and transparent budget of the commune level; and (iii) a public and transparent plan of using land and compensation framework for land (CECODES, RTA and UNDP, 2013).

In addition, Ortega-Díaz (2003) demonstrates that the Gini index has a detrimental impact on the gross state product per capita. The Gini index quantifies the degree to which the distribution of income or consumption among individuals or households within an economy diverges from a state of perfect equality (Farris, 2010).

3. Methodology

3.1. Data

We utilise annual panel data from 2018 to 2022, encompassing 63 provinces and municipalities, based on data availability. The study variables comprise the per capita GRDP, capital expenditure of local governments, current spending of local governments, the rate of labour ageing commencing at the age of 15, the rate of urban citizens, Gini index, transparency index, average life expectancy, and export value. The data source is indicated in the **Table 1** below.

Table 1. The sources of data.

No.	Name of variable	Unit	Source
1	GRDP per capita	million VND	General Statistics Office
2	Local government capital expenditure	million VND	General Statistics Office
3	Local government current expenditure	million VND	General Statistics Office
4	The rate of labor aging starting at the age of 15	percentage	General Statistics Office
5	The rate of urban citizens	percentage	General Statistics Office and author calculated
6	The average life expectancy	year	General Statistics Office
7	Gini index		General Statistics Office
8	The export value	million USD	Ministry of Industry and Trade
9	The transparency index		Annual Papi report

Source: By authors.

3.2. Model specification

Using GRDP per capita as our dependent variable, we employ a multi-regression model for this study with GRDP per capita modeled as a function of local government capital expenditure, local government current expenditure, the rate of labor aging starting at the age of 15, the rate of urban citizens, Gini index, the transparency index, the export value. GRDP per capita will be calculated by dividing

GRDP by the average population of the region in one year. The design of model is illustrated as the table below (see **Table 2**).

Table 2. The design of the research model.

No	Content	Code	Expected direction of impact
Dependent variable			
1	GRDP per capita	GRDP_per_capita	
Independent variable			
2	Local government capital expenditure	cap_public_exp	(+)
3	Local government current expenditure	cur_public_exp	(−)
4	The rate of labor aging starting at the age of 15	rate_labor	(+)
5	The rate of urban citizens	rate_urban_citizen	(+)
6	Gini index	Gini	(−)
7	The transparency index	Trans_index	(+)
8	The average life expectancy	ave_age	(−)
9	The export value	export_value	(+)

Source: By authors.

The general model for the study is as follows:

$$\text{GRDP per capita} = \beta o + \beta 1 \text{cap\_public\_exp} + \beta 2 \text{cur\_public\_exp} + \beta 3 \text{rate\_labor} + \beta 4 \text{rate\_urban\_citizen} + \beta 5 \text{Gini} + \beta 6 \text{Trans\_index} + \beta 7 \text{ave\_age} + \beta 8 \text{export\_value} + uijt \quad (1)$$

From Equation (1), we will transform it into the log-linear form, the model specified is as below:

The research model has the following form:

$$\ln\text{GRDP per capita} = \beta o + \beta 1 \ln\text{cap\_public\_exp} + \beta 2 \ln\text{cur\_public\_exp} + \beta 3 \ln\text{rate\_labor} + \beta 4 \ln\text{rate\_urban\_citizen} + \beta 5 \text{Gini} + \beta 6 \ln\text{Trans\_index} + \beta 7 \ln\text{ave\_age} + \beta 8 \ln\text{export\_value} + uijt \quad (2)$$

3.3. Hypothesis

Hypothesis 1: The local government capital expenditure has impact on GRDP per capita.

Hypothesis 2: The local government current expenditure has impact on GRDP per capita.

Hypothesis 3: The rate of labor aging starting at the age of 15 has impact on GRDP per capita.

Hypothesis 4: The rate of urban citizens has impact on GRDP per capita.

Hypothesis 5: The Gini index has impact on GRDP per capita.

Hypothesis 6: The transparency index has impact on GRDP per capita.

Hypothesis 7: The average life expectancy has impact on GRDP per capita.

Hypothesis 8: The export value has impact on GRDP per capita.

3.4. Model estimation

3.4.1. The first regression

Research sample

The descriptive statistics indicate that the majority of variables exhibit significant disparities between the highest and lowest values, hence highlighting the wide range of research sample selection (see **Table 3**). The majority of variables exhibit low standard deviation values. Certain variables exhibit left or right skewness, however, the number of observations displaying such skewness is minimal and has a negligible impact on the overall sample.

Table 3. Data descriptives for the first regression.

Variable	Obs	Mean	Std. dev	Min	Max
lnGRDP_per_capita	315	4.14218	0.4470425	3.260785	5.87838
lncap_public_exp	315	8.537654	0.6236857	7.230563	10.71342
lncur_public_exp	315	9.067423	0.4843123	8.085795	10.79267
lnrate_labor	315	3.003876	0.3561788	2.104134	3.918005
lnrate_urban_citizen	315	3.272811	0.4944458	2.28242	4.47108
Gini	315	0.360622	0.0575663	0.203	0.525
lnTrans_index	315	0.3504232	0.1140247	0	0.8750613
lnave_age	315	0.5864803	0.2272742	0.0128372	1.080626
lnexport_value	315	10.58487	0.6965535	0.6740811	10.76948

Source: Result from STATA 17.

To assess the relationship between the variables in the model prior to testing, the study analyses the correlation coefficient matrix to find the correlation coefficient of the variables (see **Table 4**).

Table 4. Correlation coefficient matrix of the first regression.

	lnGRDP_per_capita	lncap_public_exp	lncur_public_exp	lnrate_labor	lnrate_urban_citizen	Gini	lnTrans_index	lnave_age	lnexport_value
lnGRDP_per_capita	1.00000								
lncap_public_exp	0.6402*	1.00000							
lncur_public_exp	0.3590*	0.8109*	1.00000						
lnrate_labor	0.5855*	0.0621*	0.4448*	1.00000					
lnrate_urban_citizen	0.6329*	0.3905*	0.2414*	0.4868*	1.00000				
Gini	−0.4185*	−0.4314*	−0.2336*	−0.2252*	−0.2130*	1.00000			
lnTrans_index	0.0319	−0.0622	−0.0722	−0.1526*	0.004	0.0557	1.00000		
lnave_age	−0.5705*	−0.4407*	−0.2292*	−0.1364*	−0.3432*	0.5214*	−0.0376	1.00000	
lnexport_value	−0.3852*	−0.4407*	−0.3654*	−0.2713*	−0.2884*	0.2153*	−0.0966*	0.2439*	1.00000

Source: Result from STATA 17.

The correlation coefficients of the variables are often below 0.8. Out of all the variables, only cap_public_exp and cur_public_exp have a correlation coefficient that exceeds 0.8. This indicates the presence of potential multicollinearity among the variables in the model. Hence, the author conducted a Pooled Ordinary Least Squares (OLS) test for the model and an autocorrelation test using the VIF coefficient to ascertain the presence of multicollinearity. Mean VIF and all VIF are less than 10. This indicates that there is no presence of multicollinearity in the regression model (The obtained results are in the following **Table 5**).

Table 5. VIF coefficients of variables of the first regression.

Variable	VIF	1/VIF
lncap_public_exp	5.15	0.194232
lncur_public_exp	3.28	0.304525
lnrate_labor	2.00	0.500721
lnave_age	1.73	0.576746
Gini	1.52	0.658686
lnrate_urban_citizen	1.50	0.666744
lnexport_value	1.27	0.787788
lnTrans_index	1.06	0.944964
Mean VIF	2.19	

Source: Result from STATA 17.

Regression model

The author conducted a sequential regression analysis using Pooled OLS, FEM, and REM models to examine the suitability of different regression methods (see the Appendix A). Next, the author conducted the Breusch-Pagan Lagrangian test to choose the appropriate regression method, using the following procedure (see **Table 6**).

Table 6. Breusch-Pagan Lagrangian test results of first regression.

	Var	SD = sqrt (Var)
lnGRDP_per_capita~a	0.199847	0.4470425
e	0.0056697	0.0752976
u	0.0566059	0.23792
Test: Var (u) = 0		
Chibar2(01) = 461.78		
Prob > Chibar2 = 0.0000		

Source: Result from STATA 17.

According to the findings of the Breusch-Pagan Lagrangian test, it may be inferred that the REM regression model is the most suitable and chosen.

Once the REM regression model is chosen, the author proceeds to examine the shortcomings of the model: the autocorrelation test, specifically the Wooldridge test, is conducted with the hypothesis:

Ho: There is no first-order autocorrelation.

The result of Wooldridge test is F (1.62) = 96.353 with Prob > F = 0.0000. That means the conclusion rejects the hypothesis H0, and the model has autocorrelation.

Heteroscedasticity test: based on the results of the Breusch-Pagan Lagrangian test as above with Prob > chibar2 = 0.00 < 5%, it can be concluded that the model has heteroscedasticity.

Because autocorrelation and heteroskedasticity are present in the REM model, the author opts to utilise the FGLS model (feasible generalised least squares estimation method). The regression findings are presented in **Table 7** as below:

Table 7. FGLS regression result of the first regression.

lnGRDP_per_capita	Coefficient	Std. err.	z	*P* > |z|	[95% conf. interval]	
lncap_public_exp	0.1934314	0.01659	11.66	0.000	0.1609176	0.2259453
lncur_public_exp	−0.1006232	0.02156	−4.67	0.000	−0.1428776	−0.0583688
lnrate_labor	0.2505659	0.02343	10.7	0.000	0.204653	0.2964788
lnrate_urban_citizen	0.2503092	0.02075	12.06	0.000	0.2096419	0.2909765
Gini	−0.5652808	0.08611	−6.56	0.000	−0.734051	−0.3965106
lnTrans_index	−0.0294439	0.0277	−1.06	0.288	−0.0837416	0.0248538
lnave_age	−0.542519	0.03729	−14.55	0.000	−0.6156052	−0.4694327
lnexport_value	−0.0172187	0.01227	−1.40	0.161	−0.0412664	0.006829
_cons	2.495231	0.19316	12.92	0.000	2.116652	2.873811

Source: result from STATA 17.

The FGLS regression findings indicate that two variables, lntrans_index and lnexport_value, have *p*-value coefficients greater than 5%. The author excluded these two variables from the research model due to their lack of statistical significance, and subsequently conducted a new regression analysis.

3.4.2. The second regression

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

Adjusted regression model

Table 8. The design of adjusted model.

No	Content	Code	Expected direction of impact
Dependent variable			
1	GRDP per capita	GRDP_per_capita	
Independent variable			
2	Local government capital expenditure	cap_public_exp	(+)
3	Local government current expenditure	cur_public_exp	(−)
4	The rate of labour ageing starting at the age of 15	rate_labor	(+)
5	The rate of urban citizens	rate_urban_citizen	(+)
6	Gini index	Gini	(−)
7	The average life expectancy	ave_age	(−)

Source: By author.

After eliminating 2 variables (lntrans_index and lnexport_value), the research model is adjusted as follows (see **Table 8**). Beside, the descriptives of the second regression is presented in **Table 9**.

The adjusted research model has the following form:

$$\text{lnGRDP per capita} = \beta o + \beta_1 \text{lncap\_public\_exp} + \beta_2 \text{lncur\_public\_exp} + \beta_3 \text{lnrate\_labor} + \beta_4 \text{lnrate\_urban\_citizen} + \beta_5 \text{Gini} + + \beta_6 \text{ lnave\_age} + \text{uijt} \quad (3)$$

Table 9. Data descriptives of the second regression.

Variable	Obs	Mean	Std. dev	Min	Max
lnGRDP_per_capita	315	4.14218	0.4470425	3.260785	5.87838
lncap_public_exp	315	8.537654	0.6236857	7.230563	10.71342
lncur_public_exp	315	9.067423	0.4843123	8.085795	10.79267
lnrate_labor	315	3.003876	0.3561788	2.104134	3.918005
lnrate_urban_citizen	315	3.272811	0.4944458	2.28242	4.47108
Gini	315	0.360622	0.0575663	0.203	0.525
lnave_age	315	0.5864803	0.2272742	0.0128372	1.080626

Source: result from STATA 17.

Table 10. Correlation coefficient matrix of the second regression.

	lnGRDP_per_capita	lncap_public_exp	lncur_public_exp	lnrate_labor	lnrate_urban_citizen	Gini	lnave_age
lnGRDP_per_capita	1.00000						
lncap_public_exp	0.6402*	1.00000					
lncur_public_exp	0.3590*	0.8109*	1.00000				
lnrate_labor	0.5855*	0.0621*	0.4448*	1.00000			
lnrate_urban_citizen	0.6329*	0.3905*	0.2414*	0.4868*	1.00000		
Gini	−0.4185*	−0.4314*	−0.2336*	−0.2252*	−0.2130*	1.00000	
lnave_age	−0.5705*	−0.4407*	−0.2292*	−0.1364*	−0.3432*	0.5214*	1.00000

Source: Result from STATA 17.

Table 11. VIF coefficients of variables of the first regression.

Variable	VIF	1/VIF
lncap_public_exp	5.11	0.195786
lncur_public_exp	3.23	0.309122
lnrate_labor	1.95	0.513296
lnave_age	1.73	0.578765
Gini	1.51	0.663072
lnrate_urban_citizen	1.47	0.681582
Mean VIF	2.5	

Source: Result from STATA 17.

The correlation coefficients of the variables are often below 0.8 (see **Table 10**). Out of all the variables, only cap_public_exp and cur_public_exp have a correlation coefficient that exceeds 0.8. This indicates the presence of potential multicollinearity among the variables in the model. Consequently, the author conducted a Pooled OLS test on the model and an autocorrelation test using the VIF coefficient to ascertain the presence of multicollinearity. Mean VIF and all VIF are less than 10. This indicates that there is no presence of multicollinearity in the regression model (The outcomes are as follows) (see **Table 11**):

The second regression model

The author conducted a sequential regression analysis using Pooled OLS, FEM, and REM models to examine the suitability of different regression methods (see appendix B). Next, the author conducted the Breusch-Pagan Larganian test to choose the appropriate regression method, using the following procedure:

The author performed a sequential regression study utilising Pooled OLS, FEM, and REM to assess the appropriateness of various regression approaches. Subsequently, the author performed the Breusch-Pagan Larganian test to choose the suitable regression approach, employing the subsequent procedure (see **Table 12**).

Table 12. Breusch-Pagan Lagrangian test results of first regression.

	Var	**SD = sqrt (Var)**
lnGRDP per capita~a	0.199847	0.4470425
e	0.0057122	0.0755791
u	0.590238	0.242948
Test: Var (u) = 0		
Chibar2(01) = 482,75		
Prob > Chibar2 = 0.0000		

Source: Result from STATA 17.

Based on the results of the Breusch-Pagan Lagrangian test, it may be concluded that the REM regression model is the most appropriate and preferred. After selecting the REM regression model, the author then proceeds to analyse the limitations of the model. Specifically, they run an autocorrelation test, the Wooldridge test, with the hypothesis: Ho: There is no first-order autocorrelation.

The result of Wooldridge test is F (1.62) = 94.940 with Prob > F = 0.0000. That means the conclusion rejects the hypothesis H0, and the model has autocorrelation. Heteroscedasticity test: based on the results of the Breusch-Pagan Lagrangian test as above with Prob > chibar2 = 0.00 < 5%, it can be concluded that the model has heteroscedasticity.

Because the REM model exhibits autocorrelation and heteroskedasticity, the author opts to employ the FGLS model (feasible generalised least squares estimation method). The regression findings are presented below (see **Table 13**):

Table 13. FGLS regression results.

lnGRDP_per_capita	**Coefficient**	**Std. err.**	**z**	***P*** **> |z|**	**[95% conf. interval]**	
lncap_public_exp	0.1988116	0.0164714	12.07	0.000	0.1665283	0.2310949
lncur_public_exp	−0.0920522	0.0221923	−4.15	0.000	−0.1355482	−0.0485561
lnrate_labor	0.2427686	0.02347	10.34	0.000	0.196666	0.2887706
lnrate_urban_citizen	0.2584048	0.0205727	12.56	0.000	0.218083	0.2987265
Gini	−0.599914	0.0869368	−6.9	0.000	−0.770307	−0.4295211
lnave_age	−0.5481767	0.0376454	−14.56	0.000	−0.6219603	−0.4743931
_cons	2.19434	0.1625369	13.5	0.000	1.875774	2.512907

Source: Result from STATA 17.

The FGLS regression result is chosen as the most appropriate outcome, and the regression equation is expressed as follows:

$$\begin{aligned}\text{lnGRDP per capita} = {} & 2.19434 + 0.1988116\text{lncap\_public\_exp} - \\ & 0.0920522\text{lncur\_public\_exp} + 0.2427686\text{lnrate\_labor} + \\ & 0.2584048\text{lnrate\_urban\_citizen} - 0.599914\text{Gini} - 0.5481767\text{lnave\_age} + \text{uijt}\end{aligned} \quad (4)$$

4. Research result

The experimental findings indicate that the variables in the research model, namely local government capital expenditure, local government current expenditure, the rate of labor aging starting at the age of 15, the rate of urban citizens, the Gini index, and the average life expectancy are all positively linked with the GRDP per capita. The author's expectations and observations align with the direction of the impact of the independent variables. The relationship between GRDP per capita and the independent variables can be illustrated as follows:

In the case of other things being equal, when local government capital expenditure increases by 1%, GRDP per capita increases by 0.1988116%. The allocation of funds for development purposes will enable the province to construct additional infrastructure, including highways, bridges, airports, and other necessary facilities, to facilitate economic growth. Thus, when the amount of development spending increases, the per capita GRDP also rises. In the case of other things being equal, when local government current expenditure increases by 1%, GRDP per capita decreases by 0.0920522%. The current expenditure is allocated to sustain the local government system. Due to the constraints of the local budget, as routine expenditures increase, there is a corresponding decrease in the allocation of funds towards the development of the province.

In the case of other things being equal, when the rate of labor aging starting at the age of 15 increases by 1%, GRDP per capita increases by 0.2427686%. In the case of other things being equal, when the rate of urban citizens increases by 1%, GRDP per capita increases by 0.2584048%. In the case of other things being equal, when the Gini index increases by 1%, GRDP per capita decreases by 59.9914%. In the case of other things being equal, when the average life expectancy increases by 1%, GRDP per capita decreases by 0.5481767%.

The Gini index will have the greatest influence on the GRDP per capita of the province, depending on the coefficients of the independent variables. Subsequently,

the influence of the average life expectancy on GRDP per capita is ranked second. The GRDP per capita is ranked third in terms of the rate of urban people and fourth in terms of the rate of labor aging commencing at the age of 15. The effect of local government spending, both capital expenditure and current expenditure, on GRDP per capita is minimal.

5. Conclusion

Based on the regression models, it has been observed that the influence of local government spending on GRDP per capita is relatively lower when compared to the impact of factors such as the rate of labor aging commencing at the age of 15, the rate of urban people, Gini index, and average life expectancy. To enhance the GRDP per capita, the local government can implement a public expenditure strategy aimed at increasing the labor force participation rate of individuals aged 15 and above, as well as the proportion of urban residents. In addition, the local government must devise strategies aimed at reducing the Gini index.

Next, the author seeks suggestions on how local government expenditures might be utilized to improve the GRDP per capita. The suggestions are as follows: Firstly, the local government should allocate a greater portion of its budget to developmental initiatives. Particularly in provinces located in hilly regions, it is imperative to construct a highway to facilitate the smooth transportation of products and services for the benefit of the inhabitants. The capital expenditures should be allocated towards improving the electricity transmission system to adequately supply energy for local manufacturing businesses. Then, the local government should allocate additional funds to incentivize the population to have children, particularly in regions with low birth rates such as Vietnam Ho Chi Minh City, Binh Duong Province, Dong Nai Province, and others. The provinces require a youthful workforce to stimulate their local economies. Finally, the local government should prioritize public policy initiatives aimed at reducing income inequality to lower the Gini index. One way to decrease the Gini index is by allocating additional funds to assist vulnerable individuals in achieving sustainable livelihoods. Another approach is to provide financial help to underprivileged students, enabling them to pursue higher education and secure better employment prospects in the future.

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Appendix A

Regression method	**Pools OLS**	**FEM**	**REM**
Variables	**lnGRDP_per_capita**	**lnGRDP_per_capita**	**lnGRDP_per_capita**
lncap_public_exp	0.1724727*** (0.000)	0.1712281*** (0.000)	0.1724727*** (0.000)
lncur_public_exp	0.0524055* (0.236)	0.1342733*** (0.008)	0.0524055^{NS} (0.236)
lnrate_labor	0.2943114*** (0.000)	0.2760366*** (0.000)	0.2943114*** (0.000)
lnrate_urban_citizen	0.2368816*** (0.000)	0.2125875*** (0.000)	0.2368816*** (0.000)
Gini	−0.4689468*** (0.004)	−0.4196778** (0.012)	−0.4689468*** (0.004)
lnTrans_index	-0.0623624^{NS} (0.173)	-0.0683534^{NS} (0.133)	-0.0623624^{NS} (0.173)
lnave_age	−0.6546018*** (0.000)	−0.8119194*** (0.000)	−0.6546018*** (0.000)
lnexport_value	-0.0163815^{NS} (0.128)	-0.0156925^{NS} (0.152)	-0.0163815^{NS} (0.128)
_cons	1.283416*** (0.002)	0.7554177 (0.125)	1.283416 (0.002)
Adjusted R−squared	0.661	0.6319	0.661

Note: ** $p < 0.01$, * * $p < 0.05$, *$p < 0.10$, NS: Not significant.

Appendix B

Regression method	**Pools OLS**	**FEM**	**REM**
Variables	**lnGRDP_per_capita**	**lnGRDP_per_capita**	**lnGRDP_per_capita**
lncap_public_exp	0.1762969*** (0.000)	0.1753262*** (0.000)	0.1762969*** (0.000)
lncur_public_exp	0.060378NS (0.171)	0.1400642*** (0.006)	0.060378NS (0.171)
lnrate_labor	0.2905845*** (0.000)	0.275029*** (0.000)	0.2905845*** (0.000)
lnrate_urban_citizen	0.2333011*** (0.000)	0.2024632*** (0.001)	0.2333011*** (0.000)
Gini	−0.4720669*** (0.004)	−0.4232702** (0.011)	−0.4720669*** (0.004)
lnave_age	−0.6417804*** (0.000)	−0.7623928*** (0.000)	−0.6417804*** (0.000)
_cons	0.9997443 (0.008)	0.4862767 (0.276)	0.9997443
Adjusted R−squared	0.6580	0.6282	0.6580

Note: ** $p < 0.01$, * * $p < 0.05$, *$p < 0.10$, NS: Not significant.