

The impact of public expenditure on economic growth in Vietnamese localities: Research in the context of the impact of Covid-19

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ARTICLE INFO	ABSTRACT
DOI:10.46223/HCMCOUJS.econ.en.14.1.2565.2024 Received: October 19th, 2022 Revised: December 14th, 2022 Accepted: December 15th, 2022 JEL classification code: O10; O11; O16 Keywords: Covid-19; economic growth; provincial public expenditure; Vietnam	The article studies the impact of provincial public expenditure on economic growth in Vietnamese localities in the context of the impact of Covid-19, with balance panel data of 63 provinces and cities collected in the period 2012 - 2021 (Covid-19 pandemic from 2020 to 2021). The results of the model estimate using the least feasible squared method show that public spending positively impacts economic growth in localities even in the context of the impact of Covid-19. The presence of Covid-19 has had a strong negative effect on economic growth in localities considering both the number of infections and the period of infection and has significantly reduced the impact of public expenditure, extra-budget investment, and human resources. This result is consistent with the actual situation in Vietnam during the Covid-19 pandemic. An interesting finding of the study is that the negative impact of corruption on local economic growth has decreased significantly in the context of the impact of Covid-19. Therefore, improving the efficiency of public expenditure, attracting extra-budget investment, and promoting the efficiency of local labor resources are still important to contribute to promoting economic growth in Vietnamese localities.

1. Introduction

The Covid-19 pandemic has evolved in a difficult, harmful, and unpredictable manner over time. The pandemic has had an impact on the entire world, delaying manufacturing and commercial operations and temporarily decreasing Chinese demand for goods and services, which has an impact on the global economy. The Covid-19 pandemic will have an impact on all socioeconomic fields, people's psychology, production activities, business, and trade because Vietnam has a relatively open economy and is geographically close to China. This will have an indirect impact on Vietnam's state budget situation, especially state budget spending because during this time, the Vietnamese government has increased public spending to prevent pandemics and ease business challenges. The state budget is compelled to raise spending on health initiatives, maintaining environmental sanitation, and assisting with pandemic control efforts in order to avoid, contain, control, and stamp out the pandemic. Even the State must raise budget expenditure on social security-related initiatives when a pandemic affects labor and employment (particularly workers in the tourism, service, and food industries) causing high unemployment and underemployment. Additionally, it might be required to implement steps to stimulate the economy and boost investment and consumption to maintain the growth momentum in the event that the

pandemic lasts for a prolonged period of time, which could negatively affect both economic growth and people's living standards. Since it will be necessary to boost state budget expenditure to implement these policies, it is currently not clear how Vietnam's public spending impacts local economic growth during the Covid-19 situation. There is an answer that there were many studies on public spending on economic growth, but research in the context of the impact of Covid-19 in localities has not been available. Thus, this is the gap in research that the authors want to conduct the study. The authors are expected to answer questions such as (1) The efficiency of public spending in the context of Covid-19; (2) The impact of public spending on economic growth in localities before and after the Covid-19 pandemic.

For the above reasons, the authors have studied **"The impact of public expenditure on economic growth in Vietnamese localities: Research in the context of the impact of Covid-19"** to address the objectives and range. The research gap has been established, and the results will have an impact on public investment to support local economic growth after the Covid-19 pandemic.

2. Theoretical basis and previous studies

2.1. Theoretical basis

In this study based on neoclassical growth theory, Barro (1990) extends the research model, systematically looking at behaviors that maximize the benefits of actors in the economy, this growth model is still commonly used when economists consider the relationship between spending, public and economic growth. Assuming government spending is complementary to private sector production, Barro's (1990) model points to the role of government size in economic growth:

Production function: Barro (1990) assumes that government spending on public goods and services (infrastructure spending, protection of property rights, etc.) has a positive effect on private sector production. The aggregate production function in the economy takes the form of the Cobb-Douglas production function as follows:

$$Y = AL^{1-\alpha}K^{\alpha}G^{1-\alpha} \quad (1)$$

We have $0 < \alpha < 1$ where L is labor, K is capital, Y is the output of the economy, G is total government spending, and A is the process of technological improvement. For simplicity, Barro (1990) assumes that L (total labor force in the economy) is fixed. With L fixed, equation (1) shows that the economy's production technology has constant returns to scale for inputs such as government spending and capital. The total production function (1) can be expressed as the variable per worker as follows:

$$y = Ak^{\alpha}G^{1-\alpha} \quad (2)$$

Where $y = Y/L$ and $k = K/L$ are the average output and capital per unit of labor, respectively.

Government sector: Barro (1990) assumes that, to finance its expenditure, the Government applies a fixed tax rate τ . This also implies that the Government always implements a balanced budget. Therefore, τ is also understood as the government's public expenditure ratio, we have:

$$\tau Ly = G \quad (0 < \tau < 1) \quad (3)$$

Combining equation (3) with (1) and (2), we have:

$$G = \tau^{1/\alpha}(AL)^{1/\alpha}k \quad (4)$$

Growth rate: Since consumption, investment, and government spending constitute the total income in the economy, the basic cumulative equation can be written as:

$$\dot{k} = s(1 - \tau)y - \delta k \quad (5)$$

Where δ is the depreciation rate of capital and s is the fixed saving rate of the private sector.

Dividing both sides of equation (5) by k and combining by (2), (3), and (4) we can get the growth rate of output γ_y , as follows:

$$\gamma_y = \alpha [s(1 - \tau)(\tau AL)^{(1-\alpha)/\alpha} + \delta] \quad (6)$$

From this equation we see that the impact of the Government on the growth of the economy can be carried out in two channels as follows:

With the assumption that government spending must be financed by taxes and that the government always implements a balanced budget, the parameter $(1 - \tau)$ in equation (6) reflects the negative effect of taxes or government spending on economic growth. An increase in taxes will reduce the after-tax marginal product of capital and, thus, the rate of capital accumulation and economic growth. Meanwhile, this tax increase also means increased government spending on public goods and services such as bridges, roads, legal systems, etc. These public goods and services increase production marginal product and private sector output as shown in the production function (1). Thus, the parameter $(\tau)(1-\alpha)/\alpha$ in equation (6) reflects this positive effect of public goods and services on economic growth (Pham, 2008a).

In this study, the authors apply endogenous growth theory to conduct empirical research in the localities of Vietnam.

Theory of shock into the economy: this theory refers to any change in macroeconomic variables that will significantly affect a country's economic outcomes and measures of economic activity, such as unemployment, consumption, and inflation (Pavlova & Rigobon, 2007). Shocks are often unpredictable and are often the result of events that are thought to be outside the scope of normal economic transactions. Economic shocks have widespread and lasting effects on the economy and according to Real Business Cycle theory (RBC), are thought to be the root cause of recessions and economic cycles. With the content of the doctrine mentioned, the Covid-19 epidemic has seriously influenced all socio-economic activities in the whole world, and Vietnam is no exception; production supply chains are broken, businesses go bankrupt, people lose their lives, unemployed workers, etc. stalling economies. Thus, it can be seen that the Covid-19 pandemic is a shock to the economy globally and also to Vietnam.

2.2. Review of previous studies

Empirical studies evaluating the impact of government spending on economic growth detect the effectiveness of components of government spending on economic growth. The studies carried out varied widely from country to group of countries, and analyzes were performed on both economic and functional categories of government expenditure structure.

Lee (1995) gave further evidence on the relationship between public spending and economic growth in 38 provinces in Korea, research data from 1963 - 1983. The author uses the endogenous growth model of an open economy. Research has found that public spending slows growth. Furthermore, the study proposes that the components of investment expenditure and the volume of total accumulated capital are believed to be important conditions for economic growth. Nurudeen and Usman (2010) studied data for the period 1977 - 2007 in Nigeria and found the impact of government spending on economic growth, specifically: total government investment spending, total recurrent spending, and government spending on education has a negative effect

on economic growth; meanwhile, spending on transportation, communication and health positively affects economic growth. Liu, Xu, Yu, Rong, and Zhang (2020) used data from 230 Chinese cities for the years 2003 - 2015. The results show that public service spending on education, science, and technology has a negative impact on long-term economic development. Public spending sustainably impedes economic development and even accelerates the onset of a recession.

Kelly's (1997) research demonstrated that government spending, particularly investment expenditures and social transfers, has an impact on economic development. Numerous studies have shown that government expenditure on education contributes to economic growth through improving human capital (Barro, 1991; Ranis, 2004), as well as the function of government investment in infrastructure, which supports socio-economic activities and fosters economic development (Albatel, 2000). Yasin (2011) investigated data from Africa's Sub-Saharan region to demonstrate how government investment, commercial openness, and consumer spending all contribute to economic growth. In a similar vein, Ighodaro and Oriakhi (2010) demonstrated that government expenditure had a favorable effect on economic development in Nigeria between 1961 and 2007. According to Asghar, Azim, and Rehman (2011), who examined Pakistani data for the years 1974 to 2008, government expenditure had a beneficial effect on economic growth. According to Arestis, Şen, and Kaya (2020), the authors examine the association between Turkish government spending and production by applying linear and nonlinear Granger causality to two variables and using quarterly time series data from 2006 to 2019. According to research, government spending on things like military, economic assistance, education, housing and community services, health care, and social protection all have a positive impact on economic growth.

Pham (2008a, 2008b) analyzed the government spending structure and growth of the economy in Vietnam in the period 2000 - 2005 with the suggestion that in the short term, there is a rather large difference in efficiency between different budget expenditures in the interaction on economic growth. For example, investment expenditures have a more positive effect than recurrent expenditures in agriculture, forestry, fishery, education and training, health, and other sectors (the transport sector has the opposite positive effect). In addition, investment and recurrent expenditures on transport, education and training, and other sectors have a more positive role in economic growth than corresponding expenditures on agriculture, forestry, fisheries, and the health sector. Research by Hoang, Pham, and Pham (2010) on "Impacts of public spending on economic growth in localities in Vietnam", discusses the impact of provincial and district spending on the economic growth of 31 localities in the two years 2004 - 2005. This study suggests that increasing investment at the district level and decreasing investment at the provincial level have an impact on economic growth. Dang and Do (2014) analyzed the influence of government spending on the growth of the economy in Ho Chi Minh City in the period 1990 - 2012, with time series data, Engle-Granger's cointegration analysis method to measure the long-run relationships between variables and models Error Correction Model (ECM) to investigate the short-run dynamic relationship between economic growth and impact variables in the model. Research results show that recurrent spending has no impact on economic growth, investment spending has a positive impact on economic growth for Ho Chi Minh City, and private investment has a positive impact on the economic growth of Ho Chi Minh City. Nguyen (2017) analyzes the relationship between public expenditure and gross regional domestic product growth in the localities of Vietnam. The research sample includes data on public expenditure and gross regional domestic product for 63 provinces/cities of Vietnam during the period 2013 - 2015. The results show an orthodox direct proportional relationship between the components. of public expenditure, but not total public expenditure, and gross regional domestic product growth in provinces/cities of Vietnam. Specifically, public spending on development investment and one of the social and economic services contribute significantly and positively to the economic development of localities.

Alfada (2019) studied impact of corruption on economic growth in Indonesia through an analysis of the impact of corruption on economic growth across provinces in Indonesia in the period 2004 - 2015. The author uses the corruption threshold effect assessed using a two-stage least squared estimation model (2SLS). The results show that corruption has a declining impact on the growth of provinces in Indonesia.

Kumar and Cao (2020) studied the relationship between public spending and economic growth of countries in the ASEAN region (such as Hong Kong, Japan, China, and South Korea), using the method of analyzing the causality between the two variables by applying linear Granger causation. The results of the study showed a weak co-link relationship between public spending and GDP per capita in these countries during the study period 2008 - 2015.

Irandoost (2019) used data from 12 countries OECD (period 1995 - 2015) to examine the compliance of Wagner's law against Keynesian views. The results of the study are as follows: (i) There is a one-way causal relationship between income (measured as real GDP) per capita and government spending for the United Kingdom, France, Ireland, Netherlands, and Finland; (ii) There is a two-way causality between the two that can vary where causality runs from income (measured as real GDP) per capita to the level of government spending for Spain and Italy; (iii) There is a one-way causal relationship that runs from government spending to real GDP per capita in Norway. Arestis et al. (2020) studied the relationship between government expenditure and the size of the economy in Turkey from 2006 - 2019. The results of the study show government expenditures such as spending on economic assistance, defense, education, housing and community utilities, health, and social protection.

Phung and Nguyen (2022) assessed the impact of economic openness and household spending on economic growth in Vietnam on the basis of the application of the ARDL model in the period from the first quarter of 2010 to the fourth quarter of 2021. The results of the study show that in the long term, household spending and trade openness of the economy all have the same impact as GDP in which the trade openness of the economy has the strongest impact. In the short term, household spending and the trade openness of the economy both have a negative impact on GDP and the GDP of the previous period also has a negative impact on GDP.

Tran, Nguyen, and Nguyen (2022) used the spatial regression method in the article, which is "The impact of fiscal decentralization on economic growth in Vietnam." The study analyzed the effect of fiscal decentralization on the growth of the economy in 63 provinces and cities of Vietnam in the period 2010 - 2020. Research results indicate that budget decentralization management has brought positive impacts on the economic development of provinces and cities in Vietnam; Regression results show that the decentralization of budget revenues and the decentralization of budget expenditures not only have a positive impact but also have a spillover effect on other localities in improving GRDP per capita. In addition, the study also found positive impacts of foreign direct investment, provincial competitiveness, the scale of private investment as well as the economy's openness on the development of the local economy.

3. Research data and methods

3.1. Research model

The studies presented thus far provide evidence that public expenditure has affected economic growth. This research's model is determined as follows:

$$GDP_t = \alpha_0 + \alpha_1 * BS_{it} + \alpha_2 * PI_{it} + \alpha_3 * BC_{it} + \alpha_4 * BI_{it} + \text{control variables} + \varepsilon_i + u_t \quad (7)$$

Table 1

Variables description

Symbol		Variable measurement method	Reference
Dependent variable			
GRDP growth rate	GDP	$(GRDP_1 - GRDP_0) / GRDP_0$	Devarajan, Swaroop, and Zou (1996); Liu et al. (2020), Nguyen (2017)
Independent variables			
Ratio of public expenditure to GRDP	BS	Total government spending/GRDP	Attari and Javed (2013); Arestis et al. (2020); Devarajan et al. (1996); Ighodaro and Oriakhi (2010); Nurudeen and Usman (2010); Yasin (2011), Hajamini and Falahi (2018); Liu et al. (2020); Tran, Nguyen, and Nguyen (2022); Nguyen (2017)
Ratio of Non-State Investment (Private and FDI) to GRDP	PI	(Private capital + FDI)/GRDP	Barro (1990); Dang and Do (2014); Tran, Nguyen, and Nguyen (2022)
Ratio of recurrent expenditures/GRDP	BC	Recurrent expenditures/GRDP	Lee (1995); Kelly (1997); Nurudeen and Usman (2010)
Ratio of state budget expenditure on development investment to GRDP	BI	Development spending/GRDP	Lee (1995); Kelly (1997); Nurudeen and Usman (2010)
Control variables			
Labor-to-population ratio	NL	Total working-age population/Total local population (NL)	Barro (1991); Ranis (2004)
Corruption Index	PAPI	Survey of VCCI	Alfada (2019)
Number of Covid-19	CV	Number of Covid-19/Year	Author's

3.2. Research method

In most recent studies using panel data, pooled regression model (POOL), Fixed Effects Model (FEM), and Random Effects Model (REM) are currently the most popular methods (Ashraf, 2020; Al-Awadhi, Alsaifi, Al-Awadhi, & Alhammadi, 2020; Liu et al., 2020). These methods commonly, which are perfectly suitable if the regression assumptions are not violated. However, all these research models suffer from defects in autocorrelation and Heteroskedasticity, so these estimation methods are no longer reliable. In this case, Wooldridge (2001) suggests that the Feasible Generalized Least Squares (FGLS) method would be suitable chosen, for unbiased and

efficient estimation results (Beck & Katz, 1995; Hoechle, 2007). Therefore, this method will be used to estimate the results of the impact of provincial public spending on economic growth in localities in the context of the impact of the Covid-19 pandemic. Durbin-Wu-Hausman test is used to examine residuals of each endogenous in regression of the original model. The endogenous problems test showed no endogenous phenomena in the post-estimation research model using FGLS (Davidson & MacKinnon, 1993).

3.3. Research data

Research data is collected from various sources. The number of Covid-19 infections was provided by the Ministry of Health (MoH). This data was added up from statistics by date. Public spending, Recurring expenditure, Development investment, Non-state capital, and Labor in 63 provinces and cities of Vietnam in the period 2012 - 2021. This database was collected from statistical yearbooks of 63 provinces and cities of Vietnam, provided by the General Statistics Office (GSO). The corruption index of 63 provinces and cities of Vietnam was collected from the Vietnam Chamber of Commerce and Industry (VCCI).

4. Research results

4.1. Statistical results

The study used Stata 15.0 software to analyze the descriptive statistical results of the independent and dependent variables shown in Table 2.

Table 2

Descriptive statistics of research criteria and multicollinearity (VIF)

Variables	Unit	Medium	Median	Min	Max	Std	VIF
GRDP growth rate (GDP)	%	10.43	10.36	-26.02	49.79	5.71	
Ratio of local budget expenditure/GRDP (BS)	%	27.55	23.75	3.45	126.07	15.43	8.06
Ratio of development investment/GRDP (BI)	%	6.57	5.79	1.06	24.88	3.84	2.72
Ratio of recurrent expenditures/GRDP (BC)	%	13.96	11.70	1.15	53.84	9.08	7.19
Ratio of non-budget expenditure/GRDP (PI)	%	27.92	25.80	5.51	169.75	14.51	1.06
Labor-to-population ratio (NL)	%	58.58	58.66	30.12	72.20	4.85	1.42
Corruption Index (PAPI)	Point	6.26	6.35	0.00	8.29	0.91	1.06
Number of Covid-19 infections (CV)	Number	2,602	0.00	0.00	498.619	23.318	1.43

Statistical results of the research sample of 63 provinces, and cities in Vietnam in the period 2012 - 2021 (Table 2) show that the average growth rate of GRDP is 10.43% and the growth margin is very strong, the growth rate can be up to 49.79%/year, but there are also years when it decreases to 26.02%. Total state budget expenditure accounted for 27.55% of GRDP on average, recurrent expenditure accounted for 13.96% of GRDP on average, investment expenditure accounted for 6.57% of GRDP on average, non-state budget capital on average accounted for

27.92% of GRDP, the proportion of the population in working age on average accounts for 58.58% of the total population of the localities. The average local corruption index is 6.26 points, which is also quite high. The results in Table 3 indicate that VIF coefficients are small ($VIF < 10$), according to Gujarati (2012), the model does not have severe multicollinearity.

4.2. Regression results and tests

Controlled FGLS regression results (Table 3).

Table 3

Regression's result of the GDP model

Dependent Variables: GRDP growth rate (GDP)	Regression Model			
Independent Variable	Model 01	Model 02	Model 03	Model 04
Ratio of local budget expenditure/GRDP (BS)	0.103** (2.43)	0.090** (2.17)	0.07548*** (2.72)	0.100*** (3.91)
Ratio of investment and development expenditures/GRDP (BI)	-0.218** (-2.19)	-0.148 (-1.51)	-0.006 (-0.09)	0.094 (1.46)
Ratio of recurrent expenditures/GRDP (BC)	-0.0958 (-1.35)	-0.0952 (-1.40)	-0.131*** (-2.97)	-0.203*** (-4.84)
Ratio of non-budget spending/GRDP (PI)	0.096*** (5.23)	0.100*** (5.84)	0.082*** (5.16)	0.070*** (4.69)
Labor-to-population ratio (NL)	0.215*** (4.10)	0.130** (2.29)	0.076** (2.12)	0.092*** (2.89)
Corruption Index (PAPI)	-0.646*** (-2.70)	-0.611*** (-2.58)	-0.351** (-2.57)	-0.141 (-1.09)
Number of cases of Covid-19 infections (LCV)		-0.315*** (-3.44)		
Have cases of Covid-19 infections (NCV)			-4.361*** (-8.73)	
Covid-19 Infections Periods (TCV)				-4.947*** (-11.73)
Constant	-0.72	4.15	6.444***	4.536**
Model suitability	Wald chi2(7)	Wald chi2(7)	Wald chi2(7)	Wald chi2(7)
F Stat/Wald chi2	71.10***	93.04***	179.55***	259.51***
Control				
Heteroskedasticity	No	No	Yes	Yes
Serial Correlation	Yes	Yes	Yes	Yes
Endogenous	Yes	Yes	Yes	Yes

Note: The symbols ***, **, and * imply 1%, 5%, and 10% level of significance, respectively
t statistics in parentheses

Model 1: No Covid-19 variable; Model 2: Model with variable Covid-19; Model 3: Model with Covid cases; Model 4: Model with infected and uninfected phases of Covid-19

We examined the influence of the Covid-19 pandemic on provincial public spending on local economic development from four distinct angles. Model 1 has no effect on the Covid-19 variable; Model 2 has a control model with Covid-19 infections as a variable; Model 3 has a control model with Covid-19 infections as a control variable; Model 4 has a control model with a Covid-19 infection stage variable. Table 3 demonstrates that all four models have F-statistics and Wald has a probability value of less than 5%, making them all appropriate. The outcome of choosing this option is as follows:

State budget expenditure at the provincial level has a positive impact on the economic growth of localities in both cases where the Covid-19 factor is controlled and the Covid-19 factor is not controlled, with the estimated coefficient of four models (Table 3) from 0.076 to 0.103 at the 1% level. This result is relevant to Keynes' theory that public spending can promote the purchasing power (aggregate demand) of the economy and is also relevant to previous research such as Afonso and Furceri (2010), Barro (1990), Butkiewicz and Yanikkaya (2011), Dar and AmirKhalkhali (2002), Folster and Henrekson (1999, 2001), Grier and Tullock (1989), Guseh (1997), Hansson and Henrekson (1994), Hajamini and Falahi (2018), Schaltegger and Torgler (2006), Romero-Ávila and Strauch (2008). This result is relevant to the actual situation of Vietnam in the context of a developing country that needs large capital from the state budget for socio-economic development orientation. This estimate also shows that the impact of local budget expenditure on local economic growth decreases with the impact of Covid-19, this difference is clear when controlling for the model with the number of infections and Covid-19 infection status by province (model 2 and model 3).

Non-state budget investment expenditure (including private capital and FDI) has a positive impact on the growth rate of the local economy with an impact level from 0.07 to 0.10 at the 1% level in all four models, i.e., the controlled case for the Covid-19 variable (Model 1) and without the Covid-19 factor (Model 2, Model 3). In case Covid-19 is controlled, the impact of non-state budget investment expenditure is reduced compared to the case where the impact of Covid-19 is not considered. Specifically, Model 1 has a regression coefficient of 0.96 and 0.07 in model 4. This is completely consistent with the theory of Solow (1957) and consistent with previous studies of Afonso and Furceri (2010), Butkiewicz and Yanikkaya (2011), Barro (1990), Dar and AmirKhalkhali (2002), Grier and Tullock (1989), Guseh (1997), Folster and Henrekson (1999, 2001), Hansson and Henrekson (1994), Hajamini and Falahi (2018), Schaltegger and Torgler (2006), Romero-Ávila and Strauch (2008). In fact, this result is completely consistent with the fact that non-budget spending on GRDP in localities has increased significantly in the period 2012 - 2021 (from 23.96% in 2012 to 31.24% in 2021), during the Covid-19 period was higher than before the Covid-19 pandemic (30.31% and 27.31%).

The inspection results also confirm that the policies and guidelines of the Party and State are completely appropriate and have been effectively implemented by localities. Therefore, the results show that two sources of capital outside the state budget have had a very good impact on economic development in Vietnam's localities in recent years. *For private capital*: the Party and State's guidelines for multi-sector economic development, in which they highly appreciate the role of the private economy and as a result, the private economy continuously maintains its growth rate, accounting for 39 - 40% of GRDP, attracting about 85% of the labor force of the economy (General Statistics Office 2021), creating important resources for investment attraction, business development, economic development, economic restructuring, increasing budget revenue, creating jobs, improving people's living standards, and ensuring social security, etc. In fact, the names of Brands such as Sungroup, Vingroup, Masan, TH True milk, Thaco, Vinfast, etc. have affirmed the

position of Vietnamese products with international stature and great influence in the global supply chain. In addition to agricultural products such as rice, coffee, pepper, and cashew, etc. many products of Vietnam's industrial goods group have been known to the world, of which, Vinfast cars are an example. *For FDI capital:* FDI capital plays an essential role in the economy of developing countries, and Vietnam in particular. Therefore, Vietnam also always perfects the legal framework to attract FDI, creating many favorable conditions to attract investment in industrial 4.0. As a result, Vietnam has attracted an average of more than 07 billion USD in FDI capital per year, about 2.2 million USD per person.

Recurring spending has a negative impact on the growth of the local economy when the Covid-19 factor is controlled and has no impact when the Covid-19 factor is not controlled. FGLS estimation results (Table 3) show that recurrent expenditure is not statistically significant in Model 1 (no Covid-19 variable) and Model 2 (number of Covid-19 infections) in the model, but statistically significant at the 1% level in Model 3 and Model 4. This is quite consistent with the local realities of developing countries. This result is also relevant to the previous comments of Afonso and Furceri (2010), Butkiewicz and Yanikkaya (2011), Barro (1990), Dar and AmirKhalkhali (2002), Folster and Henrekson (1999, 2001), Grier and Tullock (1989), Guseh (1997), Hansson and Henrekson (1994), Hajamini and Falahi (2018), Schaltegger and Torgler (2006), Romero-Ávila and Strauch (2008). This result is consistent with the local conditions of Vietnam, recurrent expenditure activities are mainly spent on state management activities, especially during the Covid-19 period. The ratio of recurrent spending to GRDP during the Covid-19 period was 12.32% lower than the period before Covid-19 (14.37%), a decrease of 3.45% in 2021 compared to 2012.

Investment spending has a negative impact on local economic growth when the Covid-19 factor is controlled and has no impact when the Covid-9 factor is not controlled. FGLS estimation results (Table 3) show that the ratio of development investment spending over GRDP is statistically significant at 5% with model 1 (no Covid-19 variable) but not statistically significant in Model 2, Model 3, and Model 4. This is quite relevant to the reality in the localities of developing countries. This result is also relevant to the previous comments of Afonso and Furceri (2010), Butkiewicz and Yanikkaya (2011), Barro (1990), Dar and AmirKhalkhali (2002), Folster and Henrekson (1999, 2001), Grier and Tullock (1989), Guseh (1997), Hansson and Henrekson (1994), Schaltegger and Torgler (2006), Hajamini and Falahi (2018), Romero-Ávila and Strauch (2008). This result is also consistent with the results of the analysis of investment efficiency in Vietnam's localities, which proves that public investment results are not effective with some shortcomings such as slow disbursement of public investment capital, corruption, legal problems, etc.

The working-age population of the localities is an important factor that has a positive and strong impact on economic growth in the localities. The estimation results in Table 3 indicate that all 4 models have positive regression coefficients from 0.076 to 0.215, which are statistically significant at the 5% level. This is completely consistent with the theory of economic growth of Solow (1957) including capital and labor, labor is an important factor in creating the value of domestic products, and practical in the localities of Vietnam also proves this result to be appropriate because Vietnam's population is in the "golden structure" stage, which is a high proportion of the population with working capacity (from 15 to 64 years old), currently accounting for about 69% of the total population. This is a period that brings great opportunities to improve the quality of the population and the quality of human resources - the decisive factor for the country's sustainable development. Thus, the localities of Vietnam have taken advantage of the golden structure of the population to develop the local economy. At the same time, the estimation

results also demonstrate that the impact of the working-age population on local economic growth has decreased significantly when there is an impact of Covid-19.

For controlling corruption, the estimation results find a negative impact of local corruption on economic growth at the 1% level. These suggest that controlling corruption can constrain the allocation of government resources, which in turn can constrain economic growth. This is suitable for Vietnam, a developing country so institutional quality is in the process of improvement. This result is also relevant to the previous comments of Aidt, Dutta, and Sena (2008), and Colombatto (2003). Even the research results are relevant to some research before, analyzing data on countries with a better level of development, such as Huang (2016), and Kato and Sato (2015). This result is also relevant to practice in Vietnamese localities. If corruption, embezzlement will create unfairness between the components. and enterprises, state budget capital will be lost, leading to negative impacts on economic growth in the localities of Vietnam.

5. Conclusion and policy recommendations

This study was conducted to examine the impact of provincial public spending on economic growth in 63 provinces, and cities of Vietnam in the context of the impact of the Covid-19 pandemic in the period 2012 - 2021. The official economy is measured by the growth rate of GRDP, and the budget expenditure is calculated by the ratio to GRDP and other control variables with 04 models tested, including 02 cases without control and controlled with the Covid-19 variable. The Feasible Generalized Least Squares (FGLS) approach with control for serial autocorrelation defects and Heteroskedasticity is widely used in estimating the balanced panel data model used. in this study. The main findings from this study can be summarized as follows:

Firstly, public budget expenditure has a positive impact on the growth of the economy in 63 provinces, and cities in Vietnam in the period 2012 - 2021. The presence of Covid-19 has significantly reduced the impact of public budget spending on the economic growth of provinces in general. The study also found that Covid-19 is the cause of making the negative impact of recurrent spending on local economic growth more obvious. Besides, public investment has not been effective for economic growth, especially when there is the impact of the Covid-19 pandemic. Meanwhile, off-budget investment becomes productive even with the impact of Covid-19, although the impact is attenuated.

Secondly, the study also affirms that the labor force is still the main factor contributing to the economic growth of Vietnamese localities in the period 2012 - 2021. However, the impact was significantly reduced in the presence of the Covid-19 epidemic. The findings from the study show an interesting signal that the negative impact of corruption has decreased significantly during the Covid-19 pandemic.

From the above research results, the study has proposed solutions to contribute to promoting the economic growth of Vietnamese localities after the Covid-19 pandemic.

(1) According to the estimation results, provincial public expenditure has a positive impact on economic growth, therefore in the future period 2022 - 2030, provinces need to maintain the level of state budget expenditure for economic development in the localities, besides, it needs to improve the efficiency of public spending to avoid losses and waste. For recurrent expenditures, provinces need to review and reduce spending because an increase in spending will negatively affect economic growth. For investment expenses, it is necessary to consider investing with a central focus, not spreading investment, speeding up disbursement, and completing on schedule to ensure investment costs. Contribute to economic growth.

(2) Attracting non-state capital: First, it needs to continue to strongly improve procedures, administrative regulations, quality of infrastructure, simplify business establishment procedures and customs, tax, social insurance, thereby improving competitiveness with countries in the region; Second, training highly qualified technical labor resources to meet the requirements of employers, especially the ability to master technology, exploit and operate to create added value for the business; Third, adjust policies to minimize risks in technology and financial investment for FDI enterprises; Fourth, reduce the financial burden and create motivation to attract new generation FDI such as tax reduction for environmentally friendly technology projects; Fifth, promote the attraction of private capital to participate in the common capital for socio-economic construction in localities.

(3) Developing human resources to serve the country's industrialization and modernization: According to the research results, labor has a positive impact on economic growth in localities, thus, Vietnam must continue to take advantage of the remaining time of the golden population period to make a breakthrough in economic development. To achieve this goal, it needs to implement the following solutions: strengthen skills training for workers and employees to increase the value of products created.

(4) Strengthening control of corruption from the central to local levels: It is necessary to promote one-stop government, one-stop local government to create conditions for investors to invest, all publicly and transparently on the system, regulating the processing time of documents when investors and enterprises use public services if any locality violates it, it will be strictly handled.

Limitations of the study

This study has shown important evidence that public expenditure has had a significant impact on economic growth in Vietnam in the Covid-19 pandemic context. However, this research still contains some limitations that may develop in the direction of further studies. The results can be confirmed or improved if there are additional variables about the local context, such as the level of urbanization, population, economic structure, etc. or macro factors, such as inflation, and economic openness, etc. In addition, the endogenous problem in the study was only controlled by econometrics with the Hausman test, which was not clearly explained by the theory to determine endogenous variables and instrumental variables. The next research direction should consider overcoming the above 02 problems of research variables and using the Generalized Method of Moments (GMM).

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