



The Keynesian Hypothesis in Vietnamese Provinces: The Instrumental Effect of Tax Revenues

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Abstract

The Keynesian Hypothesis posits that public spending fosters economic growth by enhancing infrastructure, healthcare, education, and social welfare. While studies focusing on provincial governance are essential for understanding local policy impacts, the current literature often faces limitations due to data availability. This study is the first to revisit the Keynesian Hypothesis using data from 63 Vietnamese provinces spanning 2012 to 2019. A two-stage least squares approach was used to account for the instrumental role of taxation in the public spending-economic growth nexus. The study confirmed the hypothesis at the provincial level, emphasizing the importance of taxation and budgeting in mediating and sustaining the positive impacts of public spending on economic development. The study indicated that Vietnam continues to operate as a labor-intensive economy, highlighting the urgent need for a transition to a more capital-intensive model. Among other factors, provincial governance competitiveness is crucial for attracting and facilitating businesses, thereby promoting local and national economic growth. Several implications can be drawn regarding the optimization of tax structures, enhancing the effectiveness of public spending, investing in human capital development, and strengthening local governance to create a more favorable business environment. These insights are vital for policymakers aiming for sustainable economic advancement.

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1. Introduction

Public spending plays a crucial role in shaping the economic and social landscape of any nation, particularly at the level of provincial governance, where local policies are implemented. The [Keynes \(1936\)](#) Hypothesis postulates that an increase in government expenditure would lead to an increase in economic development. This is because as governments allocate resources to various sectors, the impact of these expenditures importantly influences everything from infrastructure development and healthcare access to education quality and social welfare ([Butkiewicz & Yanikkaya, 2011](#); [Fan & Rao, 2003](#); [Filmer & Pritchett, 1999](#)). At the provincial level, effective public spending is essential not only for fostering local economic growth but also for enhancing the quality of life for residents ([Butkiewicz & Yanikkaya, 2011](#); [Flavin, 2019](#); [Mafrolla & D'Amico, 2016](#)). It catalyzes job creation, attracts investments, especially for the private sector, and reduces regional disparities ([Boubaker, Le, Ngo, & Manita, 2023](#)). Moreover, targeted public spending can address specific needs within provinces, such as improving transportation networks in rural areas or funding educational programs that equip the workforce

with necessary skills (Foster, Rana, & Gorgulu, 2022). In an era of increasing globalization and competition, the ability of provinces to effectively utilize public funds can determine their resilience and long-term prosperity (Le, Tran, Ngo, & Bui, 2024). Therefore, understanding the dynamics of public spending is vital for policymakers, stakeholders, and citizens alike, as they navigate the complexities of resource allocation to ensure sustainable development and equitable growth within their communities.

Consequently, the relationship between public spending and economic development has attracted increasing attention from the academic community.¹ For example, Fan (2008) argued that it is not just the scale of public spending but also where and how it allocates the (scarce) resources to different sectors and entities to achieve economic and social targets. Such efficiency of public spending was examined in seven Asian economies (Japan, Singapore, Taiwan, Hong Kong, Malaysia, Thailand, and Korea, 1986-2007) to determine the role of tax income, financial development, and institutions (Wang & Alvi, 2011). Dzhumashev (2014) emphasized the impacts of governance and public spending on economic development, strengthening the corruption-growth nexus. Adegbeye and Akinyele (2022) further argued the importance of natural resources on the efficiency of government spending. Notably, Facchini (2018) also pointed out a research trend where the instrumental variable (IV) approach has replaced Granger's test in accounting for the relationship between public spending and the explanatory factors. Nevertheless, studies at the provincial level are limited, with some focus on Canada (Di Matteo & Di Matteo, 1998; Pickup, 2006) and China (Pan & Liu, 2012; Tang, 2022), where data is available. Our study aims to bridge this research gap as the first study to examine the role of public spending in Vietnam, an emerging economy, using data from its provinces, while also examining the instrumental role of taxation in the public spending-economic growth nexus. In this sense, the contributions of this study are both methodological (regarding the IV approach) and empirical (regarding Vietnamese provincial data).

The remainder of the paper is organized as follows. Section 2 provides a brief review of the relevant literature on the examination and evaluation of the healthcare system. Section 3 presents the methodology and data. Section 4 reports and discusses the empirical findings, while Section 5 concludes the paper.

2. Literature Review

Biswal, Dhawan, and Lee (1999) tested three functional forms of Wagner's and Keynes' hypotheses using data from Canada. The study found no long-run relationship between GDP and expenditures (i.e., Wagner's Law), but short-run causation exists between national income and government expenditure (i.e., Keynesian Hypothesis). Therefore, the authors suggested that improvements in public spending could enhance productivity.

Magazzino (2012) assessed the empirical evidence of the Keynesian Hypothesis (and Wagner's Law) in Italy using annual data from 1960-2008. The findings indicated different impacts of public spending on economic development, with the impacts of interest spending and public investment observed in the long run. In this sense, resource reallocation could enhance long-run economic growth, indicating the importance of efficiency and effectiveness of public spending.

Sedrakyan and Varela-Candamio (2019) conducted a comparative analysis using 1996-2014 data from Armenia and Spain, two 'very different countries' in terms of history, structure, and level of economic development, geographic location, and public spending. The authors confirmed the Keynesian Hypothesis and concluded that government expenditures positively impacted economic growth in both countries. Therefore, public spending policy is crucial for economic growth management, especially for long-term targets like education and social protection.

Arestis, Sen, and Kaya (2021) followed the traditional linear/nonlinear Granger-causality approach to test for the linkage between government expenditure and outputs in Turkey. The authors used quarterly data for ten functional groups of Turkish public spending from 2006Q1 to 2019Q2 and examined their differential impacts on GDP, yielding the conclusion that increased government spending boosts long-run output growth, i.e., the Keynesian hypothesis. Consequently, the government can spur economic growth through various expenditure types, in which education and health expenditures positively impact outputs, and efficient resource allocation could enhance income and welfare. On a similar vein, Popescu and Diaconu (2021) applied both Granger's and Johansen's cointegration tests for the short- and long-term analysis, respectively. A six-monthly dataset (1995-2018) on the Romanian economy was used, where a short-term impact of public spending on economic development was observed, but the long-term one was not validated. Therefore, this study also confirmed the finding in Arestis et al. (2021) and further suggested that an increase in public spending may lead to inefficiency in the long run.

Bazán, Álvarez-Quiroz, and Morales Olivares (2022) applied the autoregressive distributed lag (ARDL) with an error correction model (ECM) to examine if Wagner's Law and Keynesian Hypothesis are valid in Peru. The empirical results using time series quarterly data (1980Q1-2021Q4, totalling 168 observations) reported that a cointegration exists between real GDP and public expenditure, both in the short- and long-run impacts.

¹ The Wagner (1958)'s Law, in contrast, argues that the mechanism should be from economic development to public spending (Akitoby, Clements, Gupta, & Inchaustegui, 2006; Irandoost, 2019). This approach, however, is not within the scope of our study.

The authors further suggested that policymakers should consider the Keynesian Hypothesis for economic growth strategies (e.g., welfare enhancement), especially for developing countries such as Peru.

Although the number of studies supporting (and even contradicting) the Keynesian Hypothesis is still increasing, it is noted that they are either using national data (Arestis et al., 2021; Born, D'Ascanio, Müller, & Pfeifer, 2024; Parui, 2022; Sardoni, 2024) or using different factors such as governance, population, and lagged values of public spending itself as an instrument for the endogeneity effect (Afonso, Jalles, & Venâncio, 2024; Cooray & Nam, 2025; Facchini, 2018). Interestingly, while a positive relationship between tax budget and public spending has been found at the national level (Aizenman, Jinjarak, Nguyen, & Park, 2019; Alesina, Favero, & Giavazzi, 2019; Rubin, 2019), no study has examined this effect at the regional one. Therefore, this study is the first to use tax revenue as an IV to examine the Keynesian Hypothesis using data from Vietnamese provinces.

3. Research Design

Available annual data for 63 provinces in Vietnam during the 2012-2019 period were collected from the Vietnamese General Statistics Office - [GSO \(2019\)](#) and the Vietnam Chamber of Commerce and Industry - [VCCI \(2020\)](#). The full list is provided in [Appendix 1](#). It is noted that data prior to 2012 is also not available and often comes with missing values ([GSO, 2019](#)). We also do not examine the turbulence time of 2020-present because the recent COVID-19 pandemic overstressed the production mechanism of the provinces and thus may bias the main purpose of our analysis, i.e., the Keynesian Hypothesis. Nevertheless, the data was deflated using the 2010 values and had been tested for unit root – all are stationary and can be used in our estimation. We follow the recent literature ([Arestis et al., 2021](#); [Cooray & Nam, 2025](#); [Parui, 2022](#)) to construct our empirical model as follows:

$$GDP_{it} = \alpha_0 + \alpha_i PS_{it} + \beta_j X_{j it} + \vartheta_i + \mu_t + \varepsilon_{it} \quad (1)$$

Where GDP_{it} measures the real gross domestic product of province i in year t (at 2010 constant price in billion VND), PS_{it} represents the public spending/investment of province i in year t (at 2010 constant price in billion VND), $X_{j it}$ is a vector of control variables for the province, such as population and land area. ϑ_i captures the provincial fixed effects, μ_t accounts for the relevant time effects, and ε_{it} is a random error term. Note that in 2010, the exchange rate was 1 USD \approx 18,612.92 VND ([World Bank, 2024](#)).

As discussed earlier, while [Equation 1](#) represents a basic model of the Keynesian Hypothesis, it neither accounts for the endogeneity of public spending nor the moderating impact of taxation (e.g., more tax budget, more spending). Therefore, following [Wooldridge \(2016\)](#); [Fernandes, Veiga, Ferreira, and Hughes \(2021\)](#) and [Ngo, Trinh, Haouas, and Ullah \(2022\)](#) we extend it to a two-stage least squares (2SLS) using taxation (TAX, total provincial budget revenue at 2010 constant price in million VND) as an instrument for PS as follows.

In the first stage, PS is regressed against TAX and other exogenous variables X.

$$PS_{it} = \theta_0 + \theta_1 TAX_{it} + \delta_j X_{j it} + \epsilon_{it} \quad (2)$$

Then, in the second stage, the predicted values of PS (denoted as \widehat{PS} , derived from the first stage) is used to estimate GDP, instead of their original values, using.

$$GDP_{it} = \alpha_0 + \alpha_i \widehat{PS}_{it} + \beta_j X_{j it} + \vartheta_i + \mu_t + \varepsilon_{it} \quad (3)$$

The selection of X variables also relies on previous literature. We first follow the seminal framework of [Solow \(1956\)](#) and [Solow \(1957\)](#) to include capital (K, proxied by the total capital stock recover using perpetual inventory method of the [OECD \(2009\)](#), at 2010 constant price in billion VND), land (N, production land as total land minus residential area, in thousand hectares), and labour (L, total labour force at 15 years old and above, in thousand persons) as the three main factors of the (provincial) production function. To account for the spillover effects between provinces ([Ouyang & Fu, 2012](#); [Peng, Yin, Wen, & Kuang, 2021](#); [Ying, 2000](#)) we examine the province's openness (OPEN, the ratio between total exports and imports to GDP), freight transportation (FREIGHT, the value of freight carried by local land, air, inland waterway and maritime transport in thousand tons), and exports (EX, total export value at 2010 constant price in billion VND), assuming that the more connected the province is the better change for it to develop. Lastly, we also argue that the governance factor, as suggested by [Afonso et al. \(2024\)](#) and [Cooray and Nam \(2025\)](#), could reflect the province's government effectiveness in attracting businesses to enhance its production. Those factors include corruption (CORRUPT, an index representing the proportion of firms have to pay informal charges to operate) and the provincial competitiveness index (PCI, the overall index reflecting the attractive of the province to businesses), which are popularly used in the literature ([Dao, Mai, Ngo, Le, & Ho, 2021](#); [Dzhumashev, 2014](#); [Khalifaoui, Arminen, Doğan, & Ghosh, 2023](#); [Lu, Kweh, Nourani, & Lin, 2021](#); [Ngo, Le, Tran, Nguyen, & Nguyen, 2019](#); [Nguyen, Mickiewicz, & Du, 2018](#); [Vu, 2016](#)). [Table 1](#) reports the descriptive statistics of the variables involved.

Table 1. Descriptive statistics.

Variable	Mean	Standard deviation	Minimum	Maximum
Dependent variable				
GDP	10.298	0.931	8.134	13.794
Independent variables				
PS	9.426	0.980	7.582	13.009
K	11.728	0.861	9.991	14.771
L	6.575	0.554	5.322	8.482
N	5.972	0.778	4.271	7.392
OPEN	0.836	1.206	0.001	9.646
FREIGHT	9.298	1.119	6.565	12.031
EX	9.459	2.003	0.443	13.812
CORRUPT	57.946	9.937	27.536	80.808
PCI	60.182	4.307	45.117	73.396
Instrumental variable (IV)				
TAX	15.304	1.162	12.360	19.414

Note: Except for CORRUPT and PCI, which are indices, all other variables were transformed into natural logarithmic values for normalization purposes.

4. Empirical Results

We first test for the 2SLS model of Equations 2 and 3, compared to the traditional ordinary least squares (OLS) model in Equation 1. The appropriateness and superiority of 2SLS can be reflected via the two tests: a Hausman's test for the endogeneity characteristic of PS, and an identification test for the suitability of TAX as an instrumental variable for PS. For the Hausman test, the null hypothesis that both models (OLS and 2SLS) are consistent is rejected with a χ^2 statistic of 24.33 accompanied by a p-value of 0.004. It suggests that PS is not exogenous and 2SLS is thus more appropriate. For the identification test, we applied both the under-identification test (returning an Anderson canonical correlation LM statistic of 131.23 and p-value of 0.001) and weak identification test (returning a Cragg-Donald Wald F statistic of 183.01, much higher than the 10% Stock-Yogo critical value of 16.38). In addition, the first-stage estimation using Equation 2 reported a coefficient of 0.440 (p-value=0.001) for TAX, indicating a statistically positive relationship between this instrument and PS. Consequently, we concluded that TAX is an appropriate IV for PS and that the estimation results from the 2SLS model should be used for further analyses and discussions.

The results of 2SLS estimations, accordingly, are presented in Table 2. The key takeaway is that TAX positively increases PS (in the first stage), which in turn, continues to positively increase GDP (in the second stage). Consequently, this finding confirms the Keynesian Hypothesis at the provincial level and, as the first study in the field, also emphasizes the role of taxation and budgeting in the public spending-economic growth nexus.

Table 2. Regression results.

2A. First-stage regression (Dependent variable: PS)

Variable	Coefficient	Standard error	t-statistic	p-value
TAX	0.440	0.032	13.530***	0.001
(Other variables are not reported)				

2B. Second-stage regression (Dependent variable: GDP)

Variable	Coefficient	Standard error	t-statistic	p-value
PS	0.458	0.032	14.420***	0.001
K	0.006	0.033	0.180	0.861
L	0.715	0.125	5.740***	0.001
N	-0.589	0.629	-0.940	0.349
OPEN	0.022	0.010	2.120**	0.034
FREIGHT	0.257	0.128	0.010**	0.044
EX	0.020	0.013	1.490	0.136
CORRUPT	0.001	0.001	1.230	0.219
PCI	0.021	0.007	3.130***	0.002

Note: ** and *** denote the significance levels at 5% and 1%, respectively.

For the provincial production factors, we can confirm the positive role of labour (L) but not capital (K) or land (N). This evidence is in line with previous findings that Vietnam is still a labour-intensive manufacturing economy (Hanson, 2021; Liu, Barrett, Pham, & Violette, 2020; Tran & Ngo, 2014) and thus, future restructuring toward a capital-intensive one should be considered (Hayton, 2020; Ngo, 2014) to bring the country to follow the footsteps of the Asian Dragons and Tigers such as China, South Korea, and Taiwan (Chang, Batmunkh, Wong, & Jargalsaikhan, 2019; Solomon, 1999; Strangio, 2020; Tang, Lai, & Ozturk, 2015). This suggestion is further supported by the positive and significant relationships between OPEN and FREIGHT on economic growth: provinces with higher trade connectivity with others tend to have a higher level of development (Dao et al., 2021; Nguyen et al., 2018; Peng et al.,

2021). Lastly, we also found that the local governance competitiveness helps attract and facilitate businesses in the province, in turn, promoting economic development. Previous studies, including Vu (2016); Dao (2017) and Le and Duy (2021) among others, also argued that PCI has a positive effect on growth in the number of enterprises and output generated in the business sector, particularly thanks to better labour training, transparency, and business support services.

5. Conclusions

The Keynesian Hypothesis posited that public spending fosters economic growth by enhancing infrastructure, healthcare, education, and social welfare. This study is the first to revisit this hypothesis using data from 63 Vietnamese provinces (2012-2019) under the mediation role of taxation. Our empirical results, using the 2SLS approach to account for this mediation effect, confirmed the Keynesian Hypothesis at the provincial level and thus highlighted the role of taxation and budgeting in the public spending-economic growth nexus. The results also reveal that Vietnam remains a labor-intensive economy, indicating that future transitioning toward a capital-intensive model is necessary. Among other factors, it was suggested that provincial governance competitiveness plays a crucial role in attracting and facilitating businesses, which in turn promotes local (and national) economic development. This study also provides several key implications for Vietnam and similar emerging economies: (i) the tax structures should be optimized to ensure that they effectively fund public spending initiatives that contribute to economic development; (ii) the government should implement robust mechanisms for effective public spending programs; (iii) investments in workforce development and human capital are still crucial alongside attracting/promoting capital (e.g., FDI) and technology; and (iv) strengthening local governance can foster a more favorable business environment and stimulate growth.

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Appendix 1. List of 63 Vietnamese provinces.

No.	Province	Region	No.	Province	Region
1	Ha Noi	I	33	Quang Nam	III
2	Vinh Phuc	I	34	Quang Ngai	III
3	Bac Ninh	I	35	Binh Dinh	III
4	Quang Ninh	I	36	Phu Yen	III
5	Hai Duong	I	37	Khanh Hoa	III
6	Hai Phong	I	38	Ninh Thuan	III
7	Hung Yen	I	39	Binh Thuan	III
8	Thai Binh	I	40	Kon Tum	IV
9	Ha Nam	I	41	Gia Lai	IV
10	Nam Dinh	I	42	Dak Lak	IV
11	Ninh Binh	I	43	Dak Nong	IV
12	Ha Giang	II	44	Lam Dong	IV
13	Cao Bang	II	45	Binh Phuoc	V
14	Bac Kan	II	46	Tay Ninh	V
15	Tuyen Quang	II	47	Binh Duong	V
16	Lao Cai	II	48	Dong Nai	V
17	Yen Bai	II	49	Ba Ria - Vung Tau	V
18	Thai Nguyen	II	50	Ho Chi Minh City	V
19	Lang Son	II	51	Long An	VI
20	Bac Giang	II	52	Tien Giang	VI
21	Phu Tho	II	53	Ben Tre	VI
22	Dien Bien	II	54	Tra Vinh	VI
23	Lai Chau	II	55	Vinh Long	VI
24	Son La	II	56	Dong Thap	VI
25	Hoa Binh	II	57	An Giang	VI
26	Thanh Hoa	III	58	Kien Giang	VI
27	Nghe An	III	59	Can Tho	VI
28	Ha Tinh	III	60	Hau Giang	VI
29	Quang Binh	III	61	Soc Trang	VI
30	Quang Tri	III	62	Bac Lieu	VI
31	Thua Thien-Hue	III	63	Ca Mau	VI
32	Da Nang	III			

Note: Vietnam has six regions of red River Delta (Region I), Northeast (Region II), Central Coast (Region III), Central Highlands (Region IV), Southeast (Region V), and Mekong River Delta (Region VI).