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FISCAL DECENTRALIZATION AND ECONOMIC GROWTH OF VIETNAMESE PROVINCES: THE ROLE OF LOCAL PUBLIC GOVERNANCE

by

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ABSTRACT: *This study offers an insight into the public governance role in the relationship between fiscal decentralization and provincial economic growth in Vietnam. Fiscal decentralization measures are assorted. Applying a sequential (two-stage) estimation for the panel data of 62 provinces of Vietnam over the 2006–2015 period, we find that first, fiscal decentralization is positively related to the economic growth of Vietnamese provinces. Second, the effects of public governance on economic growth vary across provinces depending on various levels of local public governance. Interestingly, the effect of fiscal decentralization is strengthened when this variable is added along with better quality of public governance. In a region of high public governance quality, fiscal decentralization exerts a positive effect on its economic growth. Our findings imply that the design of fiscal decentralization needs to be associated with local governments' ability of public governance to improve the local economic growth.*

Keywords: Fiscal decentralization, Public governance, Local economic growth

JEL Classification C32, E02, E62, O43

1 Introduction

Under fiscal decentralization, local authorities are granted autonomy to use public finance tools such as taxing and spending practices, within the Constitution and the laws, for local social-economic development (Tanzi 1995, Martinez-Vazquez and McNab 2003). The relationship between fiscal decentralization and economic growth has become a critical policy issue in formulating a decentralization system for emerging and transitional economies to fulfil missions of poverty reduction and social equality (Ahmad and Brosio 2009, Craig and Porter 2003). In the context of an emerging economy, Vietnam provides a typical example for examining the growth effects of fiscal decentralization. Vietnam has a unitary political system, but the fiscal system is decentralized. Regarding Vietnam's State Budget Law (2002), more power has been devolved to local authorities in making the decision to distribute fiscal resources within their jurisdictions in harmony with local preferences and efficient services delivery (Morgan and Trinh 2016).

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Under this decentralization mechanism, local governments are in a better position to well respond to the need for local goods provision and local citizen preferences. Moreover, local governments may be more dynamic in local institutional arrangements to further facilitate local economic development, and yet the efficient gain generated by fiscal decentralization is still a challenge. Hard budget constraints could, in fact, be problematic. Rather, the central government can adopt fiscal transfers to intervene in local fiscal balance. The assignments of budget expenditure responsibilities between the central government and local governments in the budget preparation process are mainly implemented by discretionary negotiations. This, however, leads to the compromise in the budget preparation process.

This study reconciles fiscal decentralization theories with Vietnam's experience to answer the question of whether fiscal decentralization affects provincial economic growth in Vietnam. First, we assume that fiscal decentralization is a productivity factor in the production function of the province, which affects provincial productivity growth. The potential linkage between fiscal decentralization and economic growth is based on the assumption that local governments have a better grasp of citizen preferences than the central government, which leads to increased citizen welfare thanks to greater allocative efficiency of decentralized public expenditures. Our research model adapts a production function framework that has widely been applied in the earlier empirical literature on local economic growth as in Lin and Liu (2000), Jin and Zou (2005) and Nguyen-Van et al. (2018).

As suggested by Fiva (2006), a trustworthy measure of fiscal decentralization must quantify local authorities' activities stemming from their autonomy decisions to effectively define the linkage between fiscal decentralization and economic performance. Traditional measures of fiscal decentralization as the ratio of total local tax revenues to total state budgetary revenues or that of total local expenditures to total state budgetary expenditures show a distinct lack of focus on the link between revenue collection and expenditure distribution, or inadequately reflect regional differences in the level of local governments' autonomy related to fiscal allocation. In this regard, we use the self-financing indicator as a proxy for fiscal decentralization as in Song et al. (2018). The self-financing indicator is calculated as the ratio of total local government decentralized revenues (consisting of 100% retained revenues and shared revenues) to total local government budgetary expenditures. Given that fiscal decentralization is high, the degree of local governments' autonomy is reflected by local budget revenues collected to finance local expenditures, which allows them to be independent of fiscal transfers, and local expenditure allocation is reflected by local public services/goods provided for local citizens and improved local governance quality.

Second, it remains undefined how public governance affects the relationship between fiscal decentralization and growth. Some studies show that fiscal decentralization exhibits a true effect on growth in terms of the institutional environment (Akai and Sakata 2002). The appropriateness of political and fiscal institutions shapes the effects of fiscal decentralization on local economic performance (Jin and Zou 2005). Local governments with dynamic governance can drive the private sector into delivering public services. From this perspective, fiscal decentralization increases economic growth and then local government size is reduced (Abdellatif et al. 2015). In this regard, we use the Provincial Competitiveness Index (PCI) as a proxy for local economic governance or institutions. Due to the nature of PCI, local economic governance is assumed to be

highly correlated to fiscal competition (Tiebout 1956), and also to administrative and transactional costs, thus impacting allocative efficiency (Martinez-Vazquez and McNab 2003). In other words, economic governance quality acts as a significant determinant to direct local government spending into increased output and measured growth and then become fundamental to achieve a greater degree of fiscal decentralization (Shah 2006). The study of Neyapti (2013) shows that fiscal incentives increase the effectiveness of fiscal decentralization. We, therefore, use the combination of fiscal decentralization and public governance to estimate its simultaneous effect on the productivity and economic growth of the province.

Third, the data for this study cover 62 provinces of Vietnam over the period of 2006–2015. As Vietnam's economic growth in this period is not high, the data collected during this period are suitable to assess the effect of fiscal decentralization on provincial economic growth. Moreover, the dataset features panel data with various cross-sections. Thus, we consider provincial fixed characteristics such as social-economic and geographical factors, which can display the true effect of fiscal decentralization on the economic growth of the provinces under consideration. Following Kripfganz and Schwarz (2015), we use linear dynamic panel data models with sequential (two-stage) estimation to obtain time-invariant regressors. Specifically, the system GMM with levels is employed initially to deal with endogenous problems. In the second stage, we use a two-step IV estimation for the residuals from the system GMM estimator. The two-stage approach is more robust against misspecification than GMM estimators since this approach obtains all the coefficients of time-invariant variables.

The rest of this study is organized as follows. Section 2 is an overview of Vietnam's fiscal decentralization. Section 3 reviews earlier literature of relevant issues, while empirical models, methods and data are presented in Section 4. The results are discussed in Section 5, followed by Section 6, which reports substantial findings of the study.

2 Overview of fiscal decentralization and public governance in Vietnam

Since economic-political reforms in the late 1980s, Vietnam has seen major achievements in economic growth and become a low-middle-income country. In terms of public governance, Vietnam has made significant progress in governance reforms through building a democratic, strong, clean, professional, modernized, effective and efficient public administrative system (Vasakui et al. 2009, UNDP 2009). In the same vein, as with public governance, the fiscal legal framework evolved strongly in the 1990s. The budget system of Vietnam is nested: state budget consists of the central budget and local budget. The local government budget system includes provincial budget, district budget and commune budget. Notably, the State Budget Law 2002 has decentralized fiscal responsibilities to local governments with main pillars: 100 per cent retained revenues,[1] shared revenues[2] and local government borrowing and expenditure responsibilities within their jurisdictions, in which the 100 per cent retained revenues and

1 These are revenues entirely retained by local governments as taxes and fees related to local lands, local user fees/charges.

2 These are tax revenues shared between the central government and local governments as value added tax, corporate income tax, personal income tax, and excise tax on domestic goods.

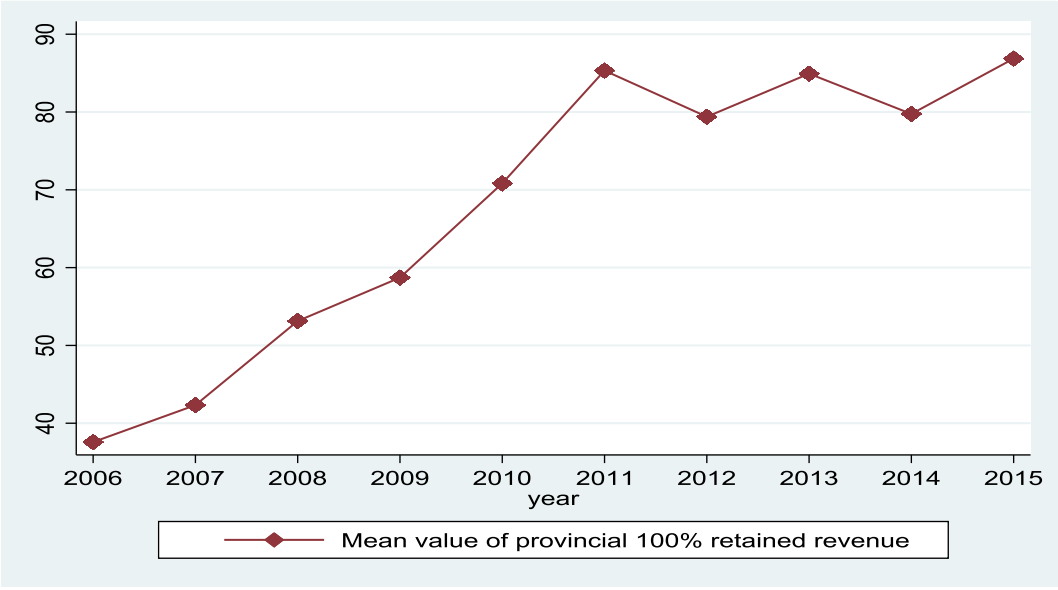

Figure 1 – The increasing trend of total provincial government 100 per cent retained revenues in Vietnam over the period of 2006–2015 ($million, calculated by VND/USD average exchange rate). [Colour figure can be viewed at wileyonlinelibrary.com]
Source: GSO of Vietnam.

shared revenues generate provincial government decentralized revenue. Besides, the central fiscal transfers to local governments are designed to address the fiscal gap and horizontal and vertical imbalances across provinces including fiscal balancing transfers and targeted transfers. If local government expenditure needs still leave a financing gap across the province (i.e. horizontal imbalance), the central government offers balancing transfers to local governments. Targeted transfers are to meet national targets and goals or to meet targets of specific programs in selected provinces. Vietnam has made remarkable progress in fiscal decentralization. For example, decisions on public expenditures for basic public services like education, health and infrastructure have been shifted to local governments. As a result, local authorities undertake 80–90 per cent total current spending on education and 75–80 per cent total current spending on health (Rab et al. 2015). Regarding local revenues, although the central government decides all tax bases and rates, local authorities have a certain degree of freedom over setting fees and charges (i.e. 100% retained revenues) within the ceiling set by the central government. Furthermore, since the 2002 State Budget Law, the central government has implemented revenue-sharing arrangements to be maintained for a stability period of 3–5 years. This can help local authorities to implement measures to gain revenue increments, thus allowing for more local expenditure.

Figures 1–3 depict the trend of fiscal decentralization and fiscal transfers in Vietnam over the 2006–2015 period. Figures 1 and 2 show an increasing trend of total provincial government 100 per cent retained revenue and total provincial government decentralized revenue (i.e. 100% retained revenue and shared revenue) under observations, suggesting that local authorities make efforts to increase assigned revenue

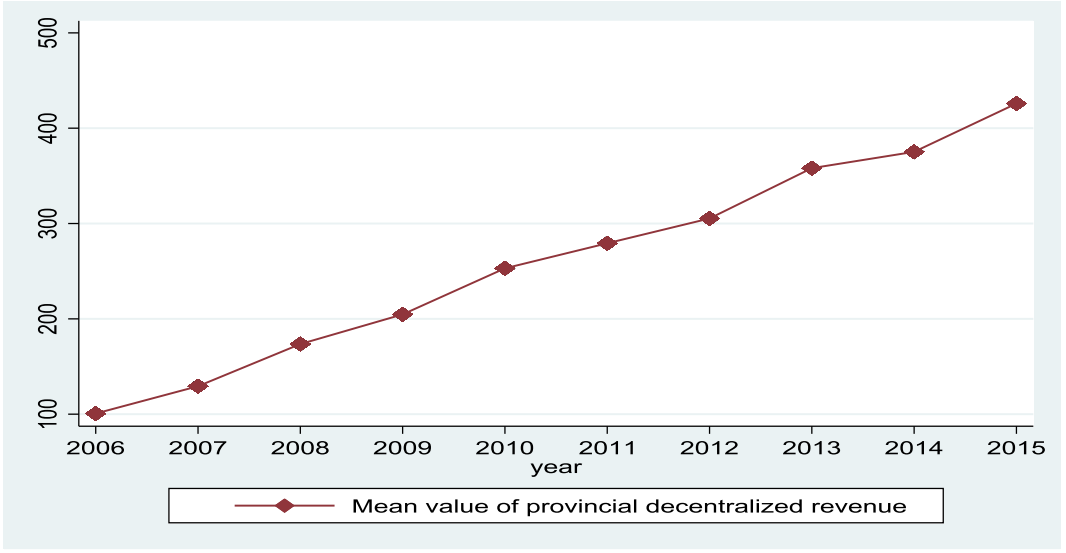

Figure 2 – The increasing trend of total provincial government decentralized revenue in Vietnam over the period of 2006–2015 ($million, calculated by VND/USD average exchange rate). [Colour figure can be viewed at wileyonlinelibrary.com]
Source: GSO of Vietnam.

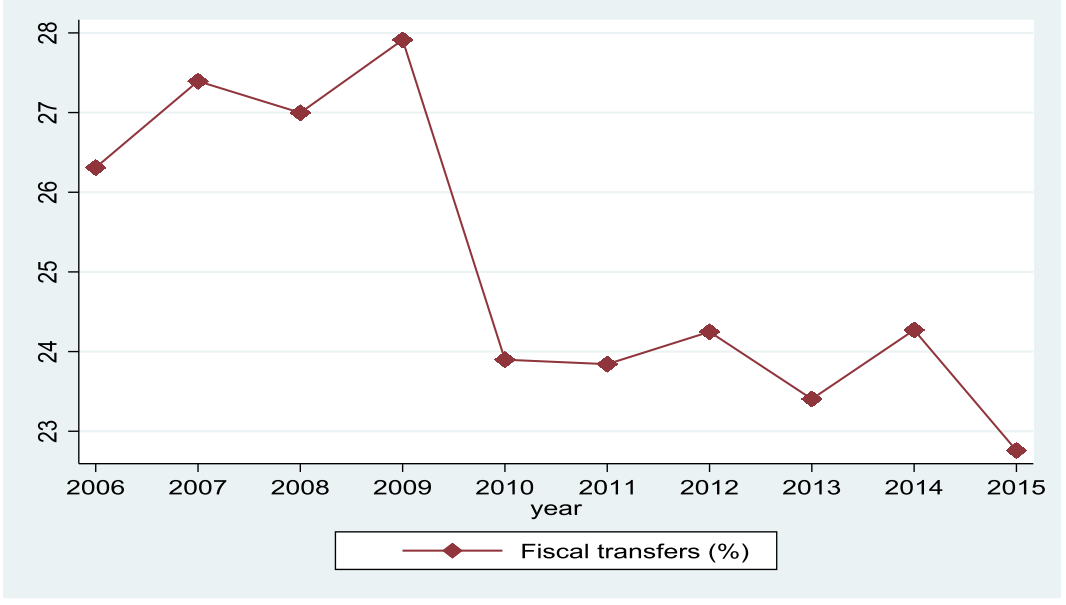

Figure 3 – The decreasing trend of the central fiscal transfers to provinces in Vietnam over the period of 2006–2015. [Colour figure can be viewed at wileyonlinelibrary.com]
Source: GSO of Vietnam.

collection to finance the need for provincial public expenditures in the stability period. Fiscal transfers show a reduced trend in the period of 2010–2015 (Figure 3). In fact, after the 2008 financial crisis, the central government has been increasingly managing local public investment size and has promoted the autonomy of local authorities in public services delivery. In other words, the central government has gradually devolved decentralization policy with a hard budget constraint to local governments.

3 Literature review

Historically, the literature on fiscal decentralization can be categorized into first-generation fiscal decentralization (FGFD) and second-generation fiscal decentralization (SGFD). FGFD has been embedded in the traditional hypothesis that fiscal decentralization leads to optimal local public goods provision because local public goods market may obtain Pareto efficiency when consumer and producer benefits are balanced (Tiebout 1956, Oates 1968). FGFD studies fiscal decentralization mainly on the basis of welfare economics under the assumption of benevolent governments. Recently, the issues of restructuring of institutions, reshaping of intergovernmental relations, and corruption and government size management have dominated debates over fiscal reforms in developing countries (Chandra Jha 2015). In this regard, the so-called SGFD theory has emerged with a new philosophy that the fiscal decentralization system should be extended to take account of the fiscal and political incentives of public authorities. As suggested by Oates (1993), fiscal decentralization needs to be considered in a broader context of institutional evolution. Weingast (2009, 2014) adds that fiscal decentralization should cover fiscal incentives and political accountability to show its importance to economic performance. The existing empirical studies have shown that effects of fiscal decentralization on economic growth remain open for debate (Rodríguez-Pose and Ezcurra 2010, Gemmell et al. 2013, Akai and Sakata 2002, Jin and Zou 2005).

3.1 Fiscal decentralization and economic growth

The classical theory of public finance assumes that public finance has special roles in an economy under the basic functions of resource allocation, income and wealth distribution, and macroeconomic stabilization (Musgrave 1959). In this theory, fiscal decentralization refers to the transfer of fiscal powers and responsibilities from central government to local governments. The classical theory highlights fiscal decentralization with the embedded view that it leads to the provision of optimal local public goods. For example, the 'voting by feet' mechanism of Tiebout (1956) suggests that a citizen reveals his true preferences for local public goods so that Tiebout competition among local governments would improve the allocation of public expenditures for local public goods provision. Oates (1993) further explains that fiscal federalism brings local governments closer to their citizens so that they have better information of citizens' preferences and finally formulate expenditure plans on local public goods even more efficiently and effectively than the central government.

Since the 1990s, the relationship between fiscal decentralization and growth has attracted increased attention from economists. Oates (1993) believes that fiscal decentralization creates a favourable environment facilitating economic growth. However,

Martinez-Vazquez and McNab (2003) argue that the concept of economic growth is not endorsed by the classic theory of fiscal decentralization. So far, classical economists have not provided a theoretical framework to explain a direct relationship between fiscal decentralization and growth. The core of the issue lies in identifying the links between fiscal decentralization and economic growth that lead to the strong beliefs for growth through possible normative discussions. First, fiscal decentralization reinforces the responsibilities of local governments in response to citizen's needs, suggesting a significant role of the local government in distributing public resources for public goods provision. Local governments close to their citizens have opportunities to lower information and transaction costs that lead to increased public expenditure efficiency. Second, fiscal decentralization enhances fiscal competition between local governments. This is an important mechanism for matching citizen's preferences and policy objectives (Tiebout 1956). Moreover, fiscal competition increases the accountability of local authorities, accounting for dwindling government size and public spending. As fiscal competition can be ascribed to more dynamic local governments, it results in increased innovations and imitations among regions (Buser 2011).

Regarding the empirical literature, some existing studies have investigated the relationship between fiscal decentralization and economic growth across countries, but results have been inconclusive. For example, Woller and Phillips (1998) find that the systematic relationship between fiscal decentralization and growth is statistically insignificant in 23 less-developing countries over the period of 1974–1991. Davoodi and Zou (1998) find a negative relationship between fiscal decentralization and growth in 46 developing countries over the 1970–1989 period, but this relationship fails to show up in developed countries. Regarding spending structure, they show that capital spending has a positive effect on growth, while current spending is negative. It is noteworthy that the levels of fiscal decentralization produce various effects on local economic performance. For example, Thiessen (2004) estimates a panel of 26 wealthy OECD countries in the 1973–1998 period and indicates that countries with medium decentralization level obtain marginally higher investment level and marginally higher growth in total factor productivity than countries with low or high decentralization levels. This means that the fiscal decentralization level is too high for the central government to enhance economic growth despite the scale economy. Alternatively, when fiscal decentralization is too low, local governments lack incentives and innovations for the efficient provision of public goods.

The relationship between fiscal decentralization and growth within a country has also received critical attention in earlier empirical studies. Zhang and Zou (1998) and Jin and Zou (2005) provide evidence that a higher degree of fiscal decentralization of government spending is associated with lower provincial economic growth in China over the 1970–1980 period. Besides, Jin and Zou (2005) suggest that the effects of fiscal decentralization depend on the nature of political and fiscal institutions. Applying a simple model of endogenous growth and incorporating public spending by different levels of government for a panel data set of 30 Chinese provinces for the 1994–2002 period, Ding (2007) finds that fiscal decentralization contributes significantly to economic growth, which is in agreement with the study of Akai and Sakata (2002) for the United States. Jalil et al. (2014) document a significant and positive relationship between fiscal decentralization and economic growth in most provinces in China in both short and long terms over the 1979–2009 period. More interestingly, the non-linear

relationship between fiscal decentralization and economic growth is found in some studies. For example, applying a simple model of endogenous growth in the United States, Xie et al. (1999) conclude that the existing spending shares for state and local governments have been consistent with growth maximization, but further decentralization in public spending may be harmful to growth. In this regard, both studies of Sun et al. (2016) and Yang (2016) emphasize that there is an inverted-U-shaped relationship between fiscal decentralization and economic growth and between the degree of revenue (expenditure) decentralization and the growth of the secondary sector in China.

3.2 Fiscal incentives, political institutions and 'second-generation decentralization theory'

The connection between fiscal decentralization and economic performance can be problematic because of differences in fiscal and political institutions between countries or regions. As suggested by Barro (1996), the root of differences in growth lies in government and its institutions. The role of institutions and public governance in economic growth have been documented in several previous studies (e.g. see Knack and Keefer 1995, Zhang 2012, Duncan 2014, Wang et al. 2014, Demir 2016). In institutional economics, public governance is seen as one of the main factors as it is 'a government's ability to make and enforce rules, and to deliver services, regardless of whether that government is democratic or subject to the rule of law' (Fukuyama 2013). Thus, good governance (or outstanding institutional quality) would increase transparency and accountability of the public sector, which leads to increased effectiveness of public policies. More importantly, because good governance reduces intrusion into the economy, this increases market confidence and stimulates business and economic activities (Zhang 2016, Zhang and Chen 2007).

As aforementioned, the effect of fiscal decentralization on economic performance may stem from potential benefits through resource allocation and income distribution. As proposed by Oates (1993), the potential translation of this effect into an actual contribution to economic growth largely depends on fiscal institutions. The dynamics between public governance and fiscal decentralization have received many interests in public sector reforms due to the inefficiency of public expenditures and the failure of the centralized planning system in emerging economies over past decades (Martinez-Vazquez and McNab 2003). Most fiscal reforms in emerging economies have ignored institutional roots, which leads to government failures. As a result, public choice and economic-political incentives have not been captured in the context of fiscal decentralization (Oates 2005). The so-called second-generation decentralization theory brings fiscal decentralization close to public choice theory, new institutional economics, and information economics (Chandra Jha 2015, Oates 2005). A successful system of fiscal decentralization is associated with incentive structure and potential performance of decentralization governance. In this regard, Faguet (2014) documents that although the relationship between decentralization and public sector outcomes is still a matter of debate, decentralization must be related to institutional and political perspective to foster local economic performance. Political and fiscal incentives match transparency and accountability, which is in line with a hard budget constraint, giving rise to better local economic outcomes. In other words, institutions play an important role in maintaining fiscal discipline in fiscal decentralization (Neyapti 2013).

Recently, some empirical studies have examined the relationship between governance and fiscal decentralization. Applying a simple growth model in association with history, culture, and economic development stage in the United States and using subnational data with assorted measures of fiscal decentralization, Akai and Sakata (2002) maintain that fiscal decentralization enhances economic growth and that shifts toward further fiscal decentralization are appropriate to achieve economic growth in the United States. Abdellatif et al. (2015) find that fiscal decentralization influences economic growth in East European countries over the 2002–2008 period. This result is due to the fact that local governments drive the private sector into delivering public services, thereby reducing local government size. As observed by Escaleras and Chiang (2017), private business activity is found to be a channel linking fiscal decentralization to growth. Using a panel of 29 Chinese provinces over the period of 1970–1999, Jin et al. (2005) detect a positive relationship between the fiscal incentives of local governments and local economic growth in China. This research suggests that fiscal incentives are critical for designing fiscal decentralization policies for economic growth, which agrees with the study of Han and Kung (2015). In terms of political institutions, Pal and Wahhaj (2017) observe that fiscal decentralization increases public spending across local communities with respect to local democracy and customary laws in Indonesia. Im (2010) finds negative relationships between the two factors of fiscal decentralization and political decentralization and economic growth when using a data set of 63 countries with a time series spanning from 1960 to 2007. Specifically, there is a negative relationship between political decentralization and growth in developing countries and between fiscal decentralization and growth in semi-developed countries, but no relationship of this kind exists in developed countries. In the same vein, Bodman (2011) finds little evidence of a direct relationship between fiscal decentralization and output growth, suggesting that federal systems tend to have lower growth rates than unitary states and that countries, especially OECD countries, with more elected tiers of government generally achieve lower economic growth.

Some studies have empirically studied different aspects of Vietnam's fiscal decentralization, such as (i) fiscal decentralization and growth (Nguyen and Anwar 2011, Nguyen 2017), (ii) fiscal decentralization and poor reduction (Rao et al. 1998), (iii) fiscal decentralization and administrative capacity (Rao 2000), (iv) the fiscal decentralization mechanism (Rao 2000, Nguyen-Hoang and Schroeder 2010) and (v) provincial public spending and productivity growth (Nguyen-Van et al. 2018). But little attention has been paid to the relationship between fiscal decentralization and growth in line with public governance.

4 Research method and data

4.1 Research model

Based on a Cobb–Douglas function framework, we assume the production function of the province as follows:

$$Y_{it} = A_{it} K_{it}^{\alpha} H_{it}^{\beta} GI_t^{\delta}, \tag{1}$$

where $i = 1, 2, 3, \ldots, N$ for province; $t = 1, 2, 3, \ldots, T$ for time; Y is provincial output per capita; A_{it} is provincial technology progress; K is provincial physical capital per capita; H is the provincial human capital stock; GI is national government investment spending per capita on basic infrastructure provision (as roads, airports, highways and harbours) that contributes to provincial productivity growth. Parameters α, β, δ are assumed not constant returns to measure production function.

Taking the logarithm of both sides of equation (1), we have the following equation:

$$lnY_{it} = lnA_{it} + \alpha lnK_{it} + \beta lnH_{it} + \delta lnGI_{it} + \varepsilon_{it}. \tag{2}$$

We assume that the term of A_{it} reflects not only technical progress, but also differences in institutions and resources endowments across regions over time. Therefore, a more interesting hypothesis is that A_{it} is supposed to depend on fiscal decentralization, public governance and fiscal transfers, that is $A_{it} = f(FD, GOV, FT)$. Thus, the growth of A_{it} is

$$lnA_{it} = A_0 + \sigma_1 lnFD_{it} + \sigma_2 lnGOV_{it} + \sigma_3 lnFT_{it} + \gamma_{it}. \tag{3}$$

Here, FD is fiscal decentralization. Under the fiscal decentralization regime, provincial government expenditures are assumed to be mainly financed from (i) provincial tax revenue (R), and (ii) increased tax revenue along with economic growth. In this regard, we have

$$\gamma = \frac{R_0\ (1 + \partial y_{it})}{LG_{it}}, \tag{4}$$

where ∂y_{it} is the function of increasing local economic growth; LG is local government expenditures; γ is self–financing level that reflects the freedom level of local governments in allocating fiscal revenues. We use this indicator as a proxy of fiscal decentralization as in the study of Song et al. (2018). If fiscal decentralization is high, this means that the local government's social-economic development policies are rather indicated by self-financing efforts to meet the needs of local public expenditures without relying on fiscal transfers, and the allocation of local public expenditures is rather indicated by improving the quality of local governance and public services/goods provision.

Second, GOV is local public governance. Based on SGFD theories, we hypothesize that local public governance affects not only provincial productivity growth, but also improves the marginal growth effect of fiscal decentralization. Therefore, this hypothesis can be tested to clarify whether the marginal productivity in fiscal decentralization is positively and linearly correlated with GOV.

Third, FT is the central fiscal transfers to local governments to address the fiscal gap and horizontal and vertical imbalances across provinces. However, the literature of fiscal decentralization stresses that such fiscal transfers create a common pool problem and finally allow public officials to disregard budget constraint and fiscal competition, thus inducing a poor public goods provision (Tiebout 1956). For this reason, the effect of FT is opposite to that of FD on productivity growth. This need be tested to clarify whether FT creates the possible distorting effect on provincial productivity growth.

Combining equations (2) and (3), the aggregate output of the province is then given approximately as

$$lnY_{it} = \lambda_0 + \lambda_1 lnK_{it} + \lambda_2 lnH_{it} + \lambda_3 lnGI_t + \lambda_4 lnFD_{it} + \lambda_5 lnGOV_{it} + \lambda_6 FT_{it} + \xi_{it}. \quad (5)$$

From the analytical framework of equation (5), the dynamic panel data regression to estimate impacts of fiscal decentralization and public governance on provincial economic growth is thus specified:

$$\Delta lnY_{it} = \chi_0 + \chi_1 lnY_{it-1} + \chi_2 lnK_{it} + \chi_3 lnH_{it} + \chi_4 lnGI_t + \chi_5 lnFD_{it} + \chi_6 lnGOV_{it} + \chi_7 FT_{it} + \upsilon_i + \vartheta_t + \zeta_{it}, \quad (6)$$

where υ_i is a vector of provincial specific fixed effect, ϑ_t is a vector of time effect, ζ_{it} is the error term, $\zeta_{it} \approx$ i.i.d.$(0,\sigma)$; with also fiscal decentralization (*FD*), provincial public governance (*GOV*), fiscal transfers (*FT*), and control variables as provincial capital investment per capita (*K*), provincial human capital (*H*), national public investment spending per capita (*GI*), respectively.

4.2 Measures of variables

Dependent variable

Y is provincial output per capita calculated by gross nominal provincial product (GPP) per capita (divided by provincial population) adjusted by provincial inflation. ΔlnY_{it} is a proxy of economic growth.

Main variables

- Fiscal decentralization (*FD*): we use the self-financing index as a proxy of fiscal decentralization. We calibrate this index as follows:

  √ Self-financing indicator 1 (or Fiscal decentralization 1, FD1):

$$FD(1) = \frac{\text{Total provincial government 100\% retained revenues}}{\text{Total provincial government assigned budgetary expenditures}} \times 100\%.$$

FD(1) corresponds to the ratio of total provincial government 100 per cent retained revenues to total provincial government budgetary expenditures. According to SBL (2002), provincial government 100 per cent retained revenues include taxes and fees related to lands, lottery revenue, and local charges and fees. These revenues represent taxes and fees directly decided and collected by the provincial government. The provincial government budgetary expenditures consist of provincial current expenditure and provincial investment expenditure.

  √ Self-financing indicator 2 (or Fiscal decentralization 2, FD2):

$$FD(2) = \frac{\text{Total provincial government 100\% retained and shared revenues}}{\text{Total provincial government assigned budgetary expenditures}} \times 100\%.$$

FD(2) refers to the ratio of total provincial government 100 per cent retained and shared revenues to total provincial government budgetary expenditures. Provincial government 100 per cent retained revenues plus shared revenues compose total provincial

government decentralized revenue. SBL (2002) regulated revenues shared between the provincial government and central government including valued added tax (except for tax on imports), company income tax (except for tax on companies with uniformed accounting), private income tax, excise tax on domestic goods, and oil fees. Table A1 (see Appendix) provides the rate of revenue sharing between provincial governments and the central government in the stability periods of 2006–2010 and 2011–2015.

The two self-financing indicators mentioned above have the following advantageous points. First, they reflect the relationship between local revenue and expenditure in the framework of the local budget constraint. Therefore, these indicators are helpful to assess the degree of local authorities' fiscal freedom in collecting local budget revenues to finance local expenditures. Second, these indicators reveal that a province with higher revenue increments is likely to allow for more budgetary expenditures in the stability period (3–5 years). Third, these indicators reflect regional differences and local government's governance capacity. The higher this ratio, the higher the local authorities' self-financing capacity. In this study, we use both indicators to check the robust effects of fiscal decentralization on provincial economic growth.

- Local public governance (*GOV*) is a provincial public governance proxied by the Provincial Competitiveness Index, PCI (as detailed in Appendix A3).
- *FT* is the central fiscal transfers to provincial governments calculated by

$$FT = \frac{\text{Central fiscal transfers to provincial governments}}{\text{Total provincial budgetary expenditures} + \text{provincial fiscal transfers}} \times 100\%.$$

Control variables

- K is provincial capital investment per capita (divided by provincial population) adjusted by provincial inflation. $K_{it} = K_{it}^{DPRI} + K_{it}^{FDI}$ in which K_{it}^{DPRI} is provincial private capital investment and K_{it}^{FDI} is provincial foreign direct investment. $K_{it} = (1 - \delta)K_{it-1} + I_{it}$ in which I_{it} is the flows of the capital investment and δ is the depreciation rate of capital investment. Following Mankiw et al. (1992), the parameter (δ) is assumed to be constant with the rate of 0.05.
- H is human capital indicating the accumulation of knowledge, skills, social and personality characteristics that affect people's capacity. Accordingly, higher education is also among methods of accumulating human capital (Oliver, 2004). Therefore, the study uses provincial students enrolled in colleges and universities to the total provincial population as a proxy of provincial human capital accumulation.
- *GI* corresponds to central public investment spending per capita (divided by the total national population).

4.3 Method of estimation

If ignoring the dynamic aspect, we can estimate equation (6) by pooled OLS and FE with robustness, which are common regression techniques for panel data. Because FE models focus on controlling for unobserved heterogeneity, they disregard endogenous problems, which consequently generates biased results. Additionally, when the lag of the dependent variable is included, equation (6) may be endogenous because it is correlated with past and current realizations of the errors.

There are many econometric techniques to deal with endogenous problems. In the context of dynamic panel models, as suggested by Arellano and Bond (1991) and Arellano and Bover (1995), generalized method of moments (GMM) estimators have advantages of producing valid instruments by using lags of exogenous variables as endogenous variables. It is noteworthy that the GMM estimator removes all time-invariant variables due to the first-difference transformation. For this study, we consider fixed effects at the provincial level (such as culture, history, and economic structure), which may affect the relationship between fiscal decentralization and provincial economic growth.

To find the coefficients of time-invariant variables, the assumption is that a certain number of variables uncorrelated with the unit-specific errors cannot be avoided. If the exogeneity of some variables is not clearly defined, it will cause the inconsistency of estimates. Kripfganz and Schwarz (2015) propose a sequential procedure with the two-stage estimation that can offer partial robustness to such misspecification. In the first stage, only the coefficients of time-varying regressors are estimated as in the implementation of the two-step GMM estimator with corrected robust standard errors (Windmeijer 2005):

$$Y_{it} = \beta X'_{it} + \overline{u_i} + \varepsilon_{it} \quad \text{with} \quad \overline{u_i} = f'_i + u_i. \tag{7a}$$

X'_{it} is a vector of explanatory variables in equation (6), and f'_i corresponds to time-invariant variables, which need recovering in a second stage. For example, we take account of regional social- economic and geographic factors, which are assumed to be endogenous and to affect economic growth. Four regional dummy variables are generated and estimated in equation (7b). The Southeast and Mekong River Delta region with high public governance quality is selected as a basic group. Three dummies are clarified for the Northern Mountain region (1), the Red River Delta region (2), and the Highlands and Central region (3). In the second stage, the coefficients of time-invariant regressors are estimated by using a two-step IV estimation for the residuals from the system GMM estimator:

$$Y_{it} - \widehat{\beta} X'_{it} = f'_i + u_i + \widehat{\varepsilon_{it}} \quad \text{with} \quad \widehat{\varepsilon_{it}} = \varepsilon_{it} - X'_{it}\left(\beta - \widehat{\beta}\right). \tag{7b}$$

Hansen's J-test gives the validity of the over-identifying restrictions for each equation (i.e. equations (7a) and (7b), hereafter Hansen test (1) and Hansen test (2)). Moreover, too many instruments lead to weak estimates. As suggested by Roodman (2009), the numbers of instruments should be smaller than the numbers of cross-sections.

4.4 Data description

The raw data are provided by the General Statistical Office (GSO). The PCI data are collected from the Vietnam Chamber of Commerce and Industry (VCCI). Central government capital spending is compiled from Key Indicators for Asia and the Pacific 2017, ADB. A panel data is used to include 62 out of 63 Vietnam's provinces over the period of 2006–2015. Daknong province is dropped out of the research data because of missing data. The definition and statistical description of the variables are reported in Table 1. For the whole sample, *FD*(1) has an average value of 12.348 per cent with a standard deviation of 9.198 per cent and *FD*(2) is 42.392 per cent with a standard

Table 1 – Definitions and descriptive statistics of variables

Variables	Definition, description, and source	Obs.	Mean	Std. Dev.	Min.	Max.
Provincial output per capita (Y)	Gross provincial nominal product (GPP) per capita adjusted by provincial inflation (VND Million), from GSO of Vietnam	620	258.285	339.930	33.759	3787.342
Provincial private investment (PI)	Provincial domestic private investment per capita adjusted by provincial inflation (VND Million), from GSO of Vietnam	620	50.576	390.30	2.593	342.454
Provincial foreign direct investment (FDI)	Provincial foreign direct investment per capita adjusted by provincial inflation (VND Million), from GSO of Vietnam	620	19.020	52.461	0	579.943
Central government capital spending (GI)	Central government capital spending per capita (VND Million) (divided by total Vietnam' population), from Key Indicators for Asia and the Pacific 2017, ADB.	620	2167.217	685.269	1066.276	3028.425
Provincial human capital (H)	Provincial students enrolled in colleges and universities to provincial population (%) as a proxy of human capital, from GSO of Vietnam	617	1.388	2.249	0.017	12.239
Public governance (GOV)	Provincial competitiveness index (PCI) as proxy of local public governance (%), from VCCI in Vietnam (http://eng.pcivietnam.org/publications/full-report)	620	57.102	5.956	36.39	77.2
Fiscal transfer (FT)	$FT = \frac{\text{Central fiscal transfers}}{\text{Total provincial government spending}} \times 100$ (%), from GSO of Vietnam	620	24.985	11.723	0.857	48.547
Fiscal decentralization (FD)	This variable is calculated as follows:					
Fiscal decentralization (1)	$FD(1) = \frac{\text{Total provincial government 100\% retained revenues}}{\text{Total provincial budetary expenditures}} \times 100\%$, from GSO of Vietnam	620	12.348	9.198	0.394	70.270
Fiscal decentralization (2)	$FD(2) = \frac{\text{Total provincial government 100\% retained revenues and shared revenues}}{\text{Total provincial budetary expenditures}} \times 100\%$, from GSO of Vietnam	620	42.392	41.578	4.024	338.390

Source: Data statistics are over the period of 2006–2015.

Table 2 – The mean value of fiscal decentralization and public governance in Vietnam's regions

Variables	North Mountain region (1)	Red River Delta region (2)	Highlands and Central region (3)	Southeast and Mekong River Delta region (4)
Output per capita (million VND)	168.202	280.065	198.781	374.313
Fiscal decentralization 1, *FD*(1) (%)	6.397	13.166	11.575	17.349
Fiscal decentralization 2, *FD*(2) (%)	13.688	59.013	34.975	63.333
Fiscal transfers (FT) (%)	33.902	18.929	27.479	18.771
PCI (%)	54.193	57.113	56.710	59.760

Source: GSO of Vietnam and authors' calculation.

deviation of 41.578 per cent. PCI has an average value of 57.102 per cent with a standard deviation of 5.956 per cent.

Table 2 describes the trend of the mean value of fiscal decentralization and public governance across Vietnam's regions over the period of 2006–2015. The Southeast and Mekong River Delta region has the highest mean value of income per capita (VND374.313 million per capita), while the Northern Mountain region has the lowest mean value (VND168 million per capita). Regarding fiscal decentralization (*FD*), self-financing indicators are highest for the Southeast and Mekong River Delta region with *FD*(1) of 17.349 per cent and *FD*(2) of 63.333 per cent and lowest for the Northern Mountain region with *FD*(1) of 6.397 per cent and *FD*(2) of 13.688 per cent. Moreover, the central fiscal transfer to the Northern Mountain region is also highest, over 33 per cent of total provincial expenditures. Regarding economic governance, PCI scores are highest for the Southeast and Mekong River Delta region (59.760%) and lowest for the Northern Mountain region (54.193%). In general, the degree of fiscal decentralization and the capability of economic governance are symmetric across regions of Vietnam. The province with below average governance has been assigned less fiscal responsibility than the province with above average governance. However, it is uncertain whether such fiscal decentralization and public governance have a significant contribution to economic growth among provinces of Vietnam.

Converting these variables into the nature logarithm, we calculate the correlation coefficients between variables as presented in Table 3. Observations show that all variables are significantly and positively related to the log of output per capita except for fiscal transfers (negative correlation). Local governance (*GOV*) is positively related to fiscal decentralization indicators, *FD*(1) and *FD*(2), while it is negatively associated with fiscal transfers (*FT*). Similarly, *FD*(1) and *FD*(2) are negatively associated with *FT*.

5 Results and discussions

5.1 Fiscal decentralization and economic growth

Applying the two-step GMM estimator with corrected robust standard errors, Table 4 presents the regression results on how fiscal decentralization influences provincial economic growth. Columns (1)–(2) show the models estimated without fiscal

Table 3 – Correlation matrix of variables

	Ln(y)	Ln(K)	Ln(H)	Ln(GI)	Ln(FT)	Ln(FD1)	Ln(FD2)	Ln(GOV)
Ln(y)	1.000							
Ln(K)	0.754***	1.000						
	0.000							
Ln(H)	0.329***	0.336***	1.000					
	0.000	0.000						
Ln(GI)	0.686***	0.693***	0.111***	1.000				
	0.000	0.000	0.006					
Ln(FT)	−0.580***	−0.402***	−0.435***	−0.077*	1.000			
	0.000	0.000	0.000	0.055				
Ln(FD1)	0.246***	0.224***	0.291***	−0.165***	−0.439***	1.000		
	0.000	0.000	0.000	0.000	0.000			
Ln(FD2)	0.517***	0.336***	0.441***	−0.002	−0.681***	0.650***	1.000	
	0.000	0.000	0.000	0.953	0.000	0.000		
Ln(GOV)	0.453***	0.394***	0.264***	0.310***	−0.389***	0.356***	0.424***	1.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Source: Statistics are over the period of 2006–2015.

Note: Ln(Y): log of gross provincial nominal product per capita adjusted by inflation. Ln(K): log of provincial capital stock per capita adjusted by inflation. Ln(H): log of provincial students enrolled in colleges and universities to the provincial population. Ln(GI): log of total central government capital spending to the total population of Vietnam. Ln(FT): log of total provincial fiscal transfer divided by total provincial government spending plus total provincial fiscal transfer. Ln(FD1): log of the ratio of provincial 100% retained revenues to total provincial budgetary expenditures. Ln(FD2): log of the ratio of provincial 100% retained revenues and shared revenues to total provincial budgetary expenditures. Ln(GOV): log of provincial competitiveness index. (*), (**), (***) denote significance at level of 1%, 5% and 10%, respectively.

$K_{it} = (I_{it}^{DPRI} + I_{it}^{FDI}) + (1-\delta)K_{i,t-1}$, in which $K_{it} = K_{it}^{DPRI} + K_{it}^{FDI}$, I_{it}^{DPRI} and I_{it}^{FDI} are inflows of provincial domestic investment (DPRI) and foreign direct investment (FDI), respectively; δ is assumed to be around 5 per cent.

decentralization, while Columns (3)–(4) show the models estimated with fiscal decentralization 1 (*FD*1) and fiscal decentralization 2 (*FD*2), respectively. The bottom row of Table 4 reports the statistic values of the two-stage GMM estimation. The *p*-values of the Hansen *J* test (1) and (2) are over 0.100, showing that instruments are not over-identified. The *p*-value of the Arellano–Bond test, AR(2), is also over 0.100, suggesting that these models reveal no serial autocorrelation.

Regarding estimates of control variables in the production function of the province, the lag of log of output per capita (ln$Y(-1)$) is significant and negative in all models, suggesting a convergent tendency of economic growth among Vietnam's provinces. Provincial capital investment negatively affects the economic growth of Vietnam's provinces under observation. This result suggests that the marginal growth effects of capital investment may be diminishing at the provincial level of Vietnam. This result is in line with studies of Su and Bui (2017) and Nguyen and Van Dijk (2012). As in Su and Bui (2017), the authors indicate that public investment crowds out private investment, thus reducing the growth effect of private investment. Moreover, the business environment and institutions are found to be detrimental to private sector investment, and thus harmful to economic growth (Nguyen and van Dijk 2012). This suggests that policymakers should develop strategies toward improving the efficiency of public investment and creating a favourable business environment to improve the productivity growth of the capital investment. This requires better governance to reduce transactional costs, asymmetric information, and risks. The significantly positive estimates of human capital

Table 4 – Effects of fiscal decentralization on provincial economic growth. Dependent variable: $\Delta Ln(Y)$

Variables	(1)	(2)	(3)	(4)
Lag of Ln(Y)	**−0.068*** **	**−0.108*** **	**−0.113*** **	**−0.128*** **
	[0.018]	[0.024]	[0.023]	[0.024]
Capital stock, Ln(K)	**−0.066*** **	**−0.066** **	**−0.068** **	**−0.067** **
	[0.016]	[0.031]	[0.033]	[0.033]
Human capital, Ln(H)	**0.082** **	**0.020** **	**0.016***	**0.015***
	[0.031]	[0.010]	[0.009]	[0.009]
Central investment, Ln(GI)	**0.164*** **	**0.199*** **	**0.224*** **	**0.239*** **
	[0.028]	[0.021]	[0.028]	[0.025]
Fiscal transfers, Ln(FT)		**−−0.056*** **	**−0.050*** **	**−0.045*** **
		[0.014]	[0.015]	[0.015]
Fiscal decentralization 1, FD1			**0.026*** **	
			[0.009]	
Fiscal decentralization 2, FD2				**0.033*** **
				[0.009]
Northern Mountain region	**−0.024**	**−0.005**	**0.015**	**0.019**
	[0.021]	[0.017]	[0.013]	[0.015]
Red River Delta region	**0.029**	**0.030**	**0.044** **	**0.034**
	[0.026]	[0.022]	[0.022]	[0.023]
Highland and Central region	**−0.027**	**−0.003**	**0.006**	**0.002**
	[0.020]	[0.017]	[0.017]	[0.016]
Constant	0.203	0.059	−0.066	−0.156
	[0.106]	[0.148]	[0.136]	[0.151]
Observations	556	556	556	556
Number of id	62	62	62	62
No instruments	57	58	59	58
AR(2)	0.337	0.251	0.236	0.232
Hansen test (1)	0.175	0.173	0.168	0.162
Hansen test (2)	0.141	0.146	0.880	0.216

Notes: The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Instruments used for models (1) and (2) are Ln(GI), Ln(FT) and FD1.
Instruments used for models (3) and (4) are Ln(GI), Ln(FT) and FD2.

suggest that human capital accumulation has an important contribution to the productivity growth in Vietnam, which is in line with studies of Zhu (2002) and Santarelli and Tran (2013). The coefficient on central government capital spending is positive, implying that central government investment is substantially beneficial to provincial economic growth, which is consistent with the study of Zhang and Zou (1998). In fact, with the advantages of economies of scale, the central government is supposed to have advantages in investing infrastructure like roads, highways, airports which are beneficial to economic growth across Vietnamese provinces. Regarding fixed characteristics (or time-invariant variables), the social-economic and geographic factors of the Red River Delta region positively affect regional economic growth. In fact, Red River Delta region includes Hanoi, the capital of Vietnam, which has received a much higher share of fiscal expenditures from central government. They have invested much in infrastructure during the period of study. That can explain the higher level of economic growth in this region in comparison to other regions.

Table 5 – Impacts of the levels of public governance on provincial economic growth. Dependent variable: $\Delta Ln(Y)$

Variables	(1)	(2)	(3)	(4)
Lag of Ln(Y)	**−0.113*** **	**−0.108*** **	**−0.129*** **	**−0.128*** **
	[0.023]	[0.020]	[0.025]	[0.024]
Capital stock, Ln(K)	**−0.068** **	**−0.071** **	**−0.068** **	**−0.067** **
	[0.033]	[0.032]	[0.034]	[0.033]
Human capital, Ln(H)	**0.016***	**0.019** **	**0.015***	**0.015***
	[0.009]	[0.008]	[0.009]	[0.009]
Central investment, Ln(GI)	**0.224*** **	**0.219*** **	**0.238*** **	**0.239*** **
	[0.028]	[0.030]	[0.025]	[0.025]
Fiscal transfers, Ln(FT)	**−0.050*** **	**−0.047*** **	**−0.044*** **	**−0.045*** **
	[0.015]	[0.014]	[0.015]	[0.015]
Fiscal decentralization 1, FD1	**0.026*** **	**0.025** **		
	[0.009]	[0.010]		
Fiscal decentralization 2, FD2			**0.031*** **	**0.033*** **
			[0.009]	[0.009]
Below-average governance, GOV_be	**−0.017***		**−0.019***	
	[0.010]		[0.011]	
Above-average governance, GOV_ab		**0.016***		**0.017***
		[0.010]		[0.010]
Northern Mountain region	**0.023**	**0.022**	**0.023**	**0.027**
	[0.015]	[0.015]	[0.017]	[0.017]
Red River Delta region	**0.048** **	**0.046** **	**0.039***	**0.038***
	[0.022]	[0.022]	[0.023]	[0.023]
Highland and Central region	**0.012**	**0.009**	**0.006**	**0.007**
	[0.018]	[0.018]	[0.018]	[0.018]
Constant	−0.062	−0.045	−0.131	−0.170
	[0.136]	[0.131]	[0.156]	[0.151]
Observations	556	556	556	556
Number of id	62	62	62	62
No instruments	59	58	59	58
AR(2)	0.236	0.240	0.199	0.232
Hansen test (1)	0.168	0.153	0.161	0.162
Hansen test (2)	0.658	0.703	0.272	0.754

Notes: The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Instruments used for models (1) and (2) are Ln(GI), Ln(FT), GOV and FD1.
Instruments used for models (3) and (4) are Ln(GI), Ln(FT), GOV and FD2.

Regarding main variables, the estimates for fiscal decentralization indicators display consistent effects on provincial economic growth. Fiscal decentralization indicators, *FD*(1) and *FD*(2), show significant and positive effects on economic growth, which supports the fiscal autonomy and competition theories of Oates (1972) and Tiebout (1956). Our findings imply that fiscal decentralization may stimulate Vietnam's local governments to increase tax revenue collection to finance local public goods provision. More interestingly, the effect degree of *FD*(2) on economic growth (0.033%) is larger than that of *FD*(1) (0.026%), suggesting that revenue sharing arrangements give more fiscal freedom to local authorities in making the decision on revenue collection and fiscal distribution, leading to higher economic growth as in the spirit of Oates (1972).

Table 6 – Effects of the combinations of fiscal decentralization and public governance on economic growth. Dependent variable: $\Delta Ln(Y)$

Variables	(1)	(2)	(3)	(4)
Lag of Ln(Y)	**−0.114*** **	**−0.113*** **	**−0.127*** **	**−0.128*** **
	[0.022]	[0.022]	[0.023]	[0.024]
Capital stock, Ln(K)	**−0.074** **	**−0.074** **	**−0.067** **	**−0.067** **
	[0.033]	[0.033]	[0.033]	[0.033]
Human capital, Ln(H)	**0.016***	**0.016** **	**0.015***	**0.015***
	[0.008]	[0.008]	[0.008]	[0.009]
Central investment, Ln(GI)	**0.235*** **	**0.232*** **	**0.237*** **	**0.239*** **
	[0.028]	[0.027]	[0.025]	[0.025]
Fiscal transfers, Ln(FT)	**−0.050*** **	**−0.051*** **	**−0.046*** **	**−0.045*** **
	[0.015]	[0.015]	[0.016]	[0.015]
Fiscal decentralization 1, FD1	**0.029*** **	**0.015** **		
	[0.011]	[0.006]		
GOV_be	**0.017**		**−0.028**	
	[0.042]		**[0.028]**	
GOV_ab		**0.075*** **		**0.059*** **
		[0.026]		[0.021]
FD1*GOV_be	**0.016**			
	[0.016]			
FD1*GOV_ab		**0.026** **		
		[0.009]		
Fiscal decentralization 2, FD2			**0.029*** **	**0.012***
			[0.009]	[0.068]
FD2* GOV_be			**0.005**	
			[0.014]	
FD2* GOV_ab				**0.033*** **
				[0.008]
Northern Mountain region	**0.037***	**0.020**	**0.022**	**0.020**
	[0.021]	[0.022]	[0.024]	[0.024]
Red River Delta region	**0.052** **	**0.053** **	**0.039***	**0.040***
	[0.022]	[0.023]	[0.023]	[0.023]
Highland and Central region	**0.016**	**0.013**	**0.007**	**0.008**
	[0.018]	[0.019]	[0.018]	[0.018]
Constant	−0.079	−0.113	−0.137	−0.200
	[0.140]	[0.137]	[0.150]	[0.152]
Observations	556	556	556	556
Number of id	62	62	62	62
No. instruments	59	58	59	58
AR(2)	0.220	0.227	0.230	0.232
Hansen test (1)	0.153	0.149	0.159	0.162
Hansen test (2)	0.446	0.180	0.601	0.246

Notes: The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Instruments used for models (1) and (2) are Ln(GI), Ln(FT), GOV and FD1.
Instruments used for models (3) and (4) are Ln(GI), Ln(FT), GOV and FD2.

Regarding fiscal transfers, our estimates are significantly negative (see columns (1)–(4) in Table 4). Our finding supports the view of the second-generation theory of fiscal decentralization for hard budget constraint and local economic performance. Hence, central discretion through fiscal transfers should be removed to foster hard budget constraint and fiscal discipline.

Table 7 – Effects of fiscal decentralization and public governance on economic growth: Analysis of Vietnamese regions. Dependent variable: $\Delta Ln(Y)$

	Northern Mountain region		Red River Delta region		High Land and Central region		Southeast and Mekong River Delta region	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lag of Ln(Y)	**−0.069*** **	**−0.081*** **	**−0.073*** **	**−0.068*** **	**−0.061*** **	**−0.61*** **	**−0.037*** **	**−0.048*** **
	[0.008]	[0.009]	[0.012]	[0.016]	[0.012]	[0.010]	[0.007]	[0.009]
Capital stock, Ln(K)	**0.004**	**0.020*** **	**0.010**	**0.034*** **	**0.005**	**0.003**	**0.006**	**0.007**
	[0.003]	[0.004]	[0.010]	[0.011]	[0.005]	[0.003]	[0.007]	[0.007]
Human capital, Ln(H)	**0.013***	**0.011**	**0.005**	**−0.009**	**−0.0002**	**−0.001**	**−0.0008**	**−0.003**
	[0.007]	[0.008]	[0.007]	[0.005]	[0.004]	[0.003]	[0.006]	0.007]
Fiscal decentralization 1, FD1	**0.012**		**0.012***		**−0.004**		**0.031** **	
	[0.008]		[0.007]		[0.008]		[0.013]	
Fiscal decentralization 2, FD2		**0.015**		**0.029** **		**−0.001**		**0.032*** **
		[0.012]		[0.014]		[0.008]		[0.011]
Local governance, GOV	**0.002** **	**0.003*** **	**0.005*** **	**0.002***	**0.0006**	**0.0006**	**0.002*** **	**0.002*** **
	[0.0006]	[0.0006]	[0.002]	[0.002]	[0.0007]	[0.0005]	[0.0007]	[0.0007]
Constant	0.728***	0.677***	0.829***	0.361***	0.478***	0.489***	0.463***	0.446***
	[0.066]	[0.095]	[0.180]	[0.077]	[0.078]	[0.072]	[0.072]	[0.071]
Observations	135	135	90	90	162	162	171	171
Number of id	15	15	10	10	18	18	19	19
No. instruments	16	14	10	9	18	18	18	18
AR(2)	0.340	0.321	0.684	0.593	0.165	0.670	0.157	0.152
Hansen test (1)	0.241	0.132	0.616	0.153	0.241	0.170	0.170	0.167
Hansen test (2)	0.115	0.675	0.104	0.113	1.000	0.426	0.814	0.110

Notes: The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

5.2 The role of public governance

To shed light on how public governance influences economic growth, we add public governance to the study models. Meanwhile, in order to determine whether the impact of public governance levels on economic growth varies across provinces, we construct two dummy variables, which define the levels of public governance quality as public governance 'below' the average (*GOV_be*), and public governance 'above' the average (*GOV_ab*) based on the mean value of PCI (57.102%) over the period of 2006–2015. The approach of the dummy variable technique is helpful to examine the stability of the effects of fiscal decentralization between below-average governance and above-average governance. This technique allows estimating a single regression instead of splitting the sample into two different groups. More importantly, since data are pooled, the degree of freedom is increased, thus improving the robustness of estimates. The two categories of public governance quality are defined:

i. If PCI <57.102%, GOV_ be = 1, otherwise GOV_ be = 0;
ii. If PCI > = 57.102%, GOV_ab = 1 and otherwise GOV_ab = 0.

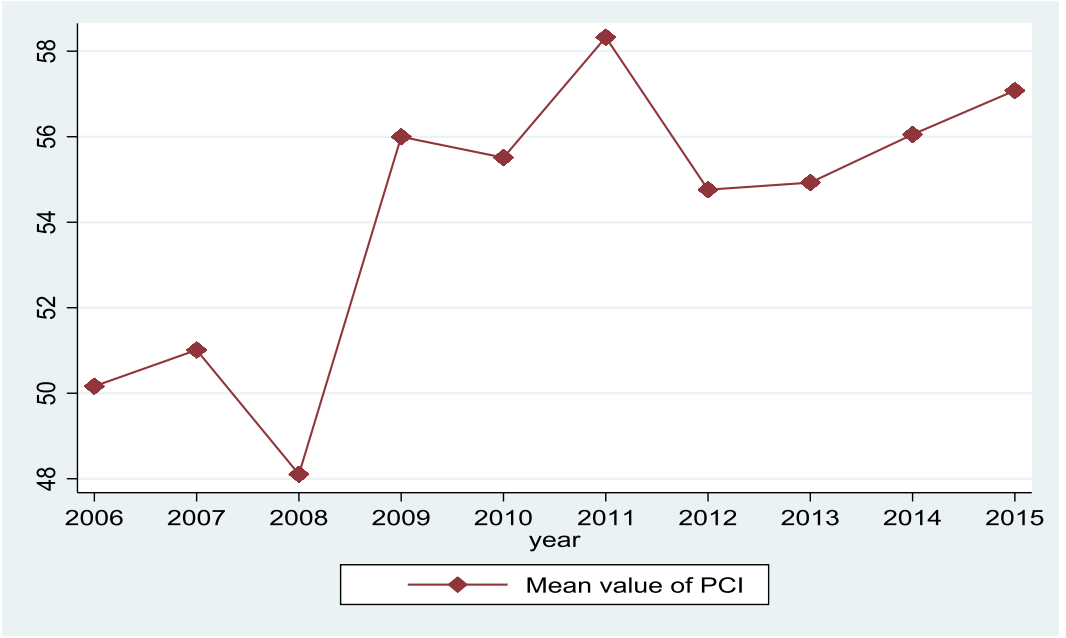

Figure 4a – The trend of increased PCI scores in the Northern Mountain region over the period of 2006–2015. [Colour figure can be viewed at wileyonlinelibrary.com]
Source: GSO of Vietnam.

As shown in Table 1, the Red River Delta region with PCI of 57.113 per cent and the Southeast and Mekong River Delta region with PCI of 59.760 per cent are considered above-average governance regions. Other regions are below average-governance ones. The results are shown in Table 5 using two-stage GMM estimation. Columns (1) and (3) show the models estimated with *GOV_be*. Columns (2) and (4) show the models estimated with *GOV_ ab*. The bottom row of Table 5 displays all *p*-values of Hansen tests and Arellano–Bond tests, which validate the results of the two-stage estimates.

The coefficients of fiscal decentralization indicators show consistent effects as in Table 4. Regarding public governance quality, the effects of *GOV_be* are significant and negative on economic growth (see columns (1) and (3)). The coefficients on *GOV_ab* are significant and positive (see columns (2) and (4)). These results imply that the provinces with above-average public governance grow at a faster rate than provinces with below-average public governance.

5.3 The relationship between public governance and fiscal decentralization

To understand how the various levels of public governance quality improve the effect of fiscal decentralization on economic growth, we generate combination terms for the following groups: *FD*(1)**GOV_be and FD*(1)**GOV_ab*, and *FD*(2)**GOV_be and FD*(2)*_ab*. Table 6 presents the results by the two-stage estimates. Columns (1) and (2) show the model estimated with *FD*(1)**GOV_be and FD*(1)**GOV_ab*. Columns (3) and (4) are the models with *FD*(2)**GOV_be and FD*(2)**GOV_ab*. Observations show that the sign

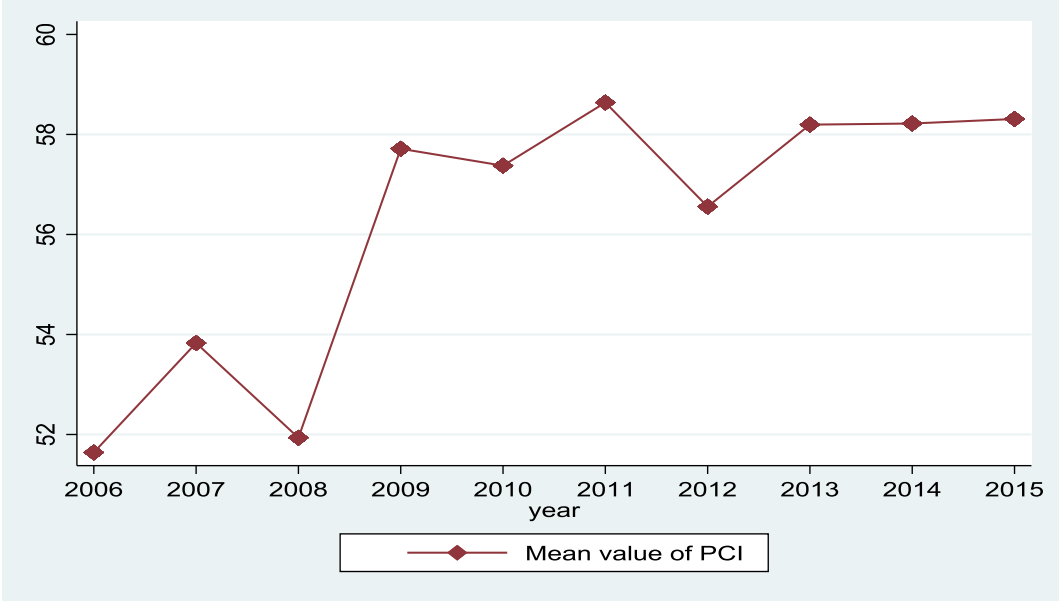

Figure 4b – The trend of increased PCI scores in the Highlands and Central region over the period of 2006–2015. [Colour figure can be viewed at wileyonlinelibrary.com]
Source: VCCI of Vietnam and authors' calculation.

and degrees of the effects of *FD*(1) and *FD*(2) on economic growth are consistent with the results of Table 5. The coefficients of *FD*(1)**GOV_be* and *FD*(2)**GOV_be* are positive but insignificant. Meanwhile, the coefficients of *FD*(1)**GOV_ab* and *FD*(2)**GOV_ab* are positive and significant.

Our results suggest that below-average governance regions are unlikely to generate any beneficial effect of fiscal decentralization on economic growth. According to VCCI and USAID (2016), most Vietnam provinces with below-average PCI are faced with some poor governance aspects, such as lack of transparency, high transaction cost and corruption, thus leading to reduced economic growth. The estimates for above-average governance group indicate significant and positive effects on economic growth, suggesting that the level of above-average governance reduces asymmetric information, transactional costs and risks in allocating scarce fiscal resources, thereby resulting in innovation and competition for economic growth (Liu et al. 2016). Our results show the explanatory power of public governance in improving the effect of fiscal decentralization and inputs on the economic outcome. As indicated in Neyapti (2013), institutions are important for fiscal decentralization to raise fiscal discipline and economic outcomes.

5.4 A disaggregate analysis of regions

Given Table 1, the degree of fiscal decentralization and the quality of public governance are different across regions. Therefore, to further decide how the impact of fiscal decentralization on economic growth varies across regions considering public

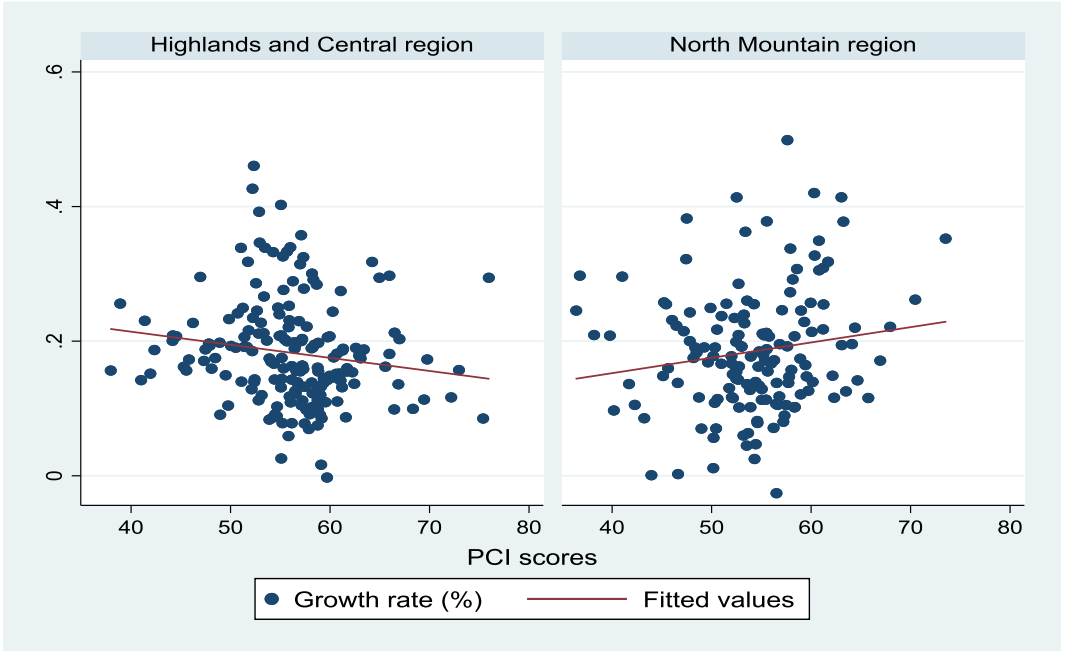

Figure 5 – Correlation between PCI scores and GDP growth: (i) Highlands and Central region, (ii) and North Mountain region over the period of 2006–2015. [Colour figure can be viewed at wileyonlinelibrary.com]
Source: GSO and VCCI of Vietnam and authors' calculation.

governance, we estimate the effects of fiscal decentralization and public governance for each region. For a disaggregate analysis of regions, we divide the sample into four subsamples: Northern Mountain region, Red River Delta region, Highlands and Central region, and Southeast and Mekong River Delta region (see the Appendix). Because the numbers of cross-sections for each region are rather narrow, to solve the problem of weak instruments in the system GMM estimator, the economic growth model of the province is only estimated with such primary variables as the lag of *Y*, *K, H, FD*(1), *FD*(2) and *GOV*.

Table 7 presents the estimated results of fiscal decentralization and public governance for Vietnam's regions. Observations show that the effects of *FD*(1) and *FD*(2) are positive for the Southeast and Mekong River Delta region and the Red River Delta region, but not for the Northern Mountain region and the Highlands and Central region. Interestingly, the coefficients on *FD*(1) and *FD*(2) for the Southeast and Mekong River Delta region are 0.031 per cent and 0.032 per cent, respectively, which are higher than those for the Red River Delta region (0.012% and 0.029%, respectively). This result may be in part because the degree of fiscal decentralization of the Southeast and Mekong River Delta region is higher than that of the Red River Delta region. Notably, the effects of *FD*(1) and *FD*(2) are insignificant for the Highlands and Central region and the Northern Mountain region, respectively. Observations show that the degree of fiscal decentralization of these regions is lower than the mean value of fiscal

Table 8 – Effects of fiscal decentralization and public governance on economic growth: A robustness check. Dependent variable: $\Delta Ln(Y)$

Variables	(1)	(2)	(3)	(4)
Lag of Ln(Y)	**−0.167*** **	**−0.167*** **	**−0.165*** **	**−0.165*** **
	[0.017]	[0.017]	[0.022]	[0.022]
Capital stock, Ln(K)	**0.026***	**0.026***	**0.029** **	**0.029** **
	[0.013]	[0.013]	[0.012]	[0.012]
Human capital, Ln(H)	**0.011** **	**0.011** **	**0.012***	**0.012***
	[0.005]	[0.005]	[0.007]	[0.007]
Central investment, Ln(GI)	**0.166*** **	**0.166*** **	**0.152*** **	**0.152*** **
	[0.027]	[0.027]	[0.029]	[0.029]
Fiscal transfers, Ln(FT)	**−0.040*** **	**−0.040*** **	**−0.035*** **	**−0.035*** **
	[0.011]	[0.011]	[0.011]	[0.011]
Fiscal decentralization 1, FD1	**0.018***	**0.018***		
	[0.011]	[0.011]		
Fiscal decentralization 2, FD2			**0.016***	**0.016***
			[0.009]	[0.009]
Local governance, GOV		**0.001** **		**0.001** **
		[0.000]		[0.000]
Northern Mountain region	**0.015**	**0.023**	**0.013**	**0.022**
	[0.012]	[0.014]	[0.013]	[0.015]
Red River Delta region	**0.026**	**0.030***	**0.018**	**0.022**
	[0.018]	[0.018]	[0.021]	[0.021]
Highland and Central region	**0.013**	**0.017**	**0.008**	**0.013**
	[0.015]	[0.016]	[0.016]	[0.017]
Constant	−0.274**	−0.224	−0.240	−0.187
	[0.133]	[0.146]	[0.165]	[0.174]
Observations	520	520	520	520
Number of id	58	58	58	58
No. instruments	52	52	50	50
AR(2)	0.940	0.942	0.930	0.930
Hansen test (1)	0.100	0.100	0.081	0.081
Hansen test (2)	0.249	0.296	0.153	0.646

Notes: Robustness check is conducted by dropping outlier provinces as Vinh Phuc, Ba Ria Vung Tau, HCM City and Binh Duong. The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

decentralization under observations (see Tables 1 and 2). As a result, a low degree of fiscal decentralization would not promote economic growth.

Similarly, the effect of *GOV* is positive for the Southeast and Mekong River Delta region and the Mekong River Delta region, respectively. Interestingly, the Northern Mountain region with PCI of 54.193 per cent is lower than the mean value of PCI of 57.102 per cecnt, but this region has a significantly positive effect of *GOV* on economic growth. Figure 4a depicts the trend of increased PCI of the Northern Mountain region, especially in the 2010–2015 period. This result may be because the region increasingly improves the quality of public governance, thus leading to an increase in economic growth (see Figure 5). It is worth noting that the effect of *GOV* is insignificant for the Highlands and Central region. Figure 4b shows that the quality of public governance for the Highlands and Central region seems not to be overwhelmingly dominant in the 2010–2015 period, thus giving rise to a reduction in the economic growth (see Figure 5).

Table 9 – Effects of fiscal decentralization and public governance on economic growth: A robustness check of Vietnamese regions. Dependent variable: $\Delta Ln(Y)$

	Red River Delta region		Southeast and Mekong River Delta region	
Variables	(1)	(2)	(3)	(4)
Lag of Ln(Y)	**−0.104*** **	**−0.089*** **	**−0.053*** **	**−0.058*** **
	[0.020]	[0.027]	[0.009]	[0.010]
Fiscal decentralization 1, FD1	**0.027***		**0.025** **	
	[0.015]		[0.012]	
Fiscal decentralization 2, FD2		**0.059***		**0.035*** **
		[0.034]		[0.013]
Local governance, GOV	**0.007** **	**0.006** **	**0.002*** **	**0.002*** **
	[0.003]	[0.002]	[0.001]	[0.001]
Constant	1.199***	1.040***	0.577***	0.590***
	[0.286]	[0.274]	[0.056]	[0.067]
Observations	81	81	144	144
Number of id	9	9	16	16
No. instruments	14	13	16	18
AR(2)	0.845	0.726	0.195	0.101
Hansen test (1)	0.532	0.437	0.249	0.313
Hansen test (2)	0.762	0.070	0.195	0.226

Notes: Robustness check is conducted by dropping outlier provinces as Vinh Phuc for Red River Delta region; Ba Ria Vung Tau, HCM City and Binh Duong for Southeast and Mekong River Delta region. The results are estimated by the sequential (two-stage) estimation. Robust in brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

5.5 Outliers and check robustness

When analysing data on fiscal decentralization, we find that there are likely to be outliers in fiscal decentralization *FD*(2). The mean value of *FD*(2) of the provinces as Vinh Phuc, Binh Duong, Ho Chi Minh City, and Ba Ria-Vung Tau is larger than 1, while that of the whole sample is 0.423 per cent over the period of 2006–2015. In fact, observations show that these provinces have advantages in attracting FDI flows, thus tax revenue shared from the FDI sector significantly increases the size of these provinces' decentralized revenue. To check robustness, we eliminate these provinces from the sample. Table 8 presents the results of the robustness check. The effects of fiscal decentralization and local governance are found to be significantly positive on provincial economic growth, which are consistent with Tables 4 and 5. Similarly, breaking down regions related to these provinces, the results of Table 9 show that fiscal decentralization and local governance have significantly positive effects on the economic growth for the Red River Delta region and the Southeast and Mekong River Delta region, which are consistent with those of Table 7. Moreover, the results in Tables 8 and 9 are estimated with a sample of 58 provinces, which exclude four outliers including Vinh Phuc, Binh Duong, Ho Chi Minh City and Ba Ria-Vung Tau. The results show that capital stock has significant positive impact on economic growth (Tables 8 and 9), opposite to the effect in Tables 4, 5 and 6. This reflects the fact that capital stock in the four provinces is very high and the marginal effects of increasing capital investment in these provinces are likely negative. Meanwhile, the results imply that the capital investment in the 58 remaining provinces still have positive contribution to local economic growth.

6 Conclusions

Based on the production function of a province, the paper investigates the relationships among fiscal decentralization, local governance, and economic growth of Vietnam's provinces. We assume that fiscal decentralization and public governance are productivity factors in the production function of a province, which affect its productivity growth and economic growth. The study covers the panel data set of 62 provinces over the 2006–2015 period. Several noticeable results can be reported.

First, the study finds that fiscal decentralization measured by self-financing indicators has a positive effect on the economic growth of the province. Our implications are that institutional arrangements to align tax revenue collection with local public expenditure assignments benefit the effectiveness of resource allocation relevant to the economic growth of Vietnam's province.

Second, using PCI as a proxy of public governance, the study shows that the growth effect of public governance varies across provinces, which may be due to differences in levels of public governance. Good public governance (above-average public governance) has a significantly positive effect on the economic growth of a province.

Third, observations show that the effects of fiscal decentralization on economic growth vary across provinces according to the levels of public governance. The effects of fiscal decentralization, if interacted with below-average public governance, on economic growth are insignificant, while the interaction effect of fiscal decentralization with above-average public governance is significant and positive on economic growth.

Fourth, regional analysis reveals that higher degrees of fiscal decentralization and better public governance, as typified by the Mekong River Delta region and the Red River Delta region in the study, show positive effects on the regional economic growth. The Northern Mountain region has significantly improved governance quality, thus resulting in regional economic growth. Meanwhile, the Highlands and Central region needs to continue to develop social- economic policies towards enhancing the degree of fiscal decentralization freedom and improving local governance to accelerate its regional productivity growth.

In summary, the growth effect of fiscal decentralization is still controversial concerning both theoretical bases and empirical evidence. The study contributes to this debate on the basis of such an emerging economy as Vietnam. Our findings support the view of the second-generation fiscal decentralization theory that when formulating a fiscal decentralization, the central government should pay much attention to (i) revenue-sharing arrangements and the local government's fiscal autonomy; and (ii) local public governance. This paper demonstrates that good public governance helps to improve the efficient allocation of public resources in line with transparency and accountability, thus leading to productivity growth.

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The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Appendix

Table A1 – The ratios of shared revenue between the central government and local governments in the period of 2006–2015

Order	Provinces	2006–2010	2011–2015	Average*
1	Ha noi	45%	42%	43.5%
2	Hai Phong	90%	88%	89%
3	Quang Ninh	76%	70%	73%
4	Vinh Phuc	67%	60%	63.5%
5	Bac Ninh	100%	93%	96.5%
6	Da Nang	90%	85%	87.5%
7	Quang Ngai	100%	77%	88.5%
8	Khanh Hoa	53%	61%	57%
9	Ho Chi Minh City	26%	23%	24.5%
10	Dong Nai	45%	51%	48%
11	Vung Tau	46%	44%	45%
12	Binh Duong	40%	40%	40%
13	Can Tho	96%	91%	93.5%
14	The rest	100%	100%	100%

Source: Vietnam's Ministry of Finance, and authors' calculation (*).