Do Productive Government Expenditures Affect Economic Growth? Evidence from Provincial Governments across Indonesia

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ROSDIANA SIJABAT

Faculty of Business Administration and Communication Sciences, Universitas Katolik Indonesia Atma Jaya, Jakarta. Indonesia
rosdiana.sijabat@atmajaya.ac.id

ABSTRACT

This study is intended to examine the impacts of productive expenditures on economic growth on the 25 provinces found in Indonesia before fiscal decentralization (covering 1994–1997) and 33 provinces after decentralization over the period 2011-2015. The empiric approach has been implemented through a panel data approach and regression model estimated to follow the endogenous growth model of Barro (1990). The main findings of this research show that: (1) provincial governments' productive expenditures in education promoted economic growth in the 25 pre-decentralization provinces; and (2) productive expenditures in the security and public order sector, health and education sector have promoted economic growth in the 33 post-decentralization provinces. From these results, it can be concluded that this study has contributed to economic literature by indicating that different types of productive government expenditures offer different impacts on economic growth. The policy implications which can be formulated from the results of this study are that provincial governments should promote and provide incentives for private investments in the public sector because only the education sector (before fiscal decentralization) and the security and public order sector as well as the education sector (after fiscal decentralization) have a statistically significant role in promoting economic growth. This can be realized through public–private partnership, which has greatly increased the performance of public-sector investment around the world. Future research, using relevant control variables to estimate the effects of productive expenditures on economic growth, will provide a greater empiric contribution to the literature.
Keywords: productive expenditures, economic growth, fiscal decentralization.
JEL Classification: H11, O40, H5.

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ABSTRAK

Penelitian ini dimaksudkan untuk menguji dampak dari produktivitas pertumbuhan ekonomi di 25 provinsi yang ada di Indonesia sebelum desentralisasi fiskal (meliputi 1994-1997) dan 33 provinsi setelah desentralisasi selama periode 2011-2015. Pendekatan empiris ini telah dilaksanakan melalui pendekatan data panel dan model regresi yang diperkirakan mengikuti model pertumbuhan endogen Barro (1990). Temuan utama dari penelitian ini menunjukkan bahwa: (1) pengeluaran produktif pemerintah provinsi dalam pendidikan mempromosikan pertumbuhan ekonomi di 25 provinsi pra-desentralisasi; dan (2) produktif penditures dalam keamanan dan ketertiban sektor publik, kesehatan dan sektor pendidikan yang telah mendorong pertumbuhan ekonomi di 33 provinsi pasca-desentralisasi. Dari hasil tersebut, dapat disimpulkan bahwa penelitian ini telah memberikan kontribusi terhadap literatur ekonomi dengan menunjukkan bahwa berbagai jenis tulisan peerintah secara produktif mengeluarkan tawaran dampak yang berbeda terhadap pertumbuhan ekonomi. Implikasi kebijakan yang dapat dirumuskan dari hasil penelitian ini adalah bahwa pemerintah provinsi harus mempromosikan dan memberikan insentif bagi investasi swasta di sektor publik karena hanya sektor pendidikan 9sebelum desentralisasi fiskal) dan keamanan dan ketertiban umum serta sektor pendidikan (setelah desentralisasi fiskal) yang memiliki peran signifikan secara statistik dalam meningkatkan pertumbuhan ekonomi. Hal ini dapat diwujudkan melalui kemitraan sektor privat yang telah sangat sangat berpengaruh pada kinerja sektor publik di dunia. Penelitian kedepannya, dapat menggunakan variabel kontrol yang relevan untuk memperkirakan efek dari pengeluaran produktivitas terhadap pertumbuhan ekonomi yang akan memberikan kontribusi empiris lebih besar untuk literatur.

Kata Kunci: belanja produktif, pertumbuhan ekonomi, desentralisasi fiskal.
JEL Classification: H11, O40, H5.

INTRODUCTION

The role of government in promoting economic growth has long been the subject of discussion within the field of public economics. For years, empirical literature has discussed this fundamental question, which is frequently subject to debate: how can government expenditures promote economic growth? Government expenditures[1] refer to the financial resources allocated by governments to fund development and economic activities (World Bank, 1997). Meanwhile, economic growth is well-understood as an indicator of the economy's efficiency at the macro level and refers to additional aggregate output in the economy. Economic theory indicates that government expenditures have an important role in promoting economic growth through funding and the allocation of public resources, which ultimately promotes increased aggregate demand in the economy. Furthermore, expansionary fiscal policy, be it through increased government

expenditures or through tax cuts, will also increase productive economic activities.

Much research has examined the relationship between public expenditures and economic growth. These include the important findings regarding how government expenditures promote economic growth made by Barro (1990) and Barro and Sala-i-Martin (1995). The research of Barro (1990), known for introducing the ―endogenous growth model‖, is a pioneering work of economic research into the effect of public sector expenditures on economic growth. It finds that increased government expen- ditures for non-productive sectors correlate with low per capita income, whereas productive government expenditures have a positive correlation with long-term economic growth (Barro, 1990, Barro & Sala-i-Martin, 1995). Based on their findings, it can be concluded that governments can use public/government expen- ditures as policy instruments for promoting economic growth.

Indonesia introduced decentralization policy in 1999 through the enactment of two laws: Law No. 22/1999 regarding Local Governments and Law No. 25/1999 on Fiscal Decentralization[2]. The first law grants greater autonomy and devolves responsibilities to local governments in all fields except foreign policy, defense and security, justice, monetary, debt, fiscal matters, and religious affairs. The latter law sets a new direction on intergovernmental financial relationship between central and local government in Indonesia (Brojonegoro & Asanuma, 2003; Suharyo, 2009). Theory provides two arguments for fiscal decentralization: (1) economic efficiency and (2) a better provision of public goods and services. First, fiscal decentralization creates economic efficiency because local governments are better positioned than national governments to deliver public services given their information advantage; this is known as the preference-matching argument. Tiebout (1956) and Oates (2008) divided the basic economic argument on fiscal decentralization into twostrands. First, decentralization will increase economic efficiency because local governments are in better positions than the national govern-

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ment to deliver public services because of the information advantage. As a result, local governments are more capable than central governments in getting the information on local preferences and needs (Faguet, 2001). Second, under decentralization, population mobility and competition among local governments for delivery of public services will ensure the matching of preferences of local communities and local governments (Oates; 1972; Tiebout, 1956, as cited in Davoodi & Zou, 1998, p.244). This matching of preferences may improve allocative efficiency because public services provided by the local government will be better matched to the preferences of the residents of those localities (Lockwood, 2006).

Literature on fiscal federalism suggests one of the measurements of fiscal decentralization is the expenditure assignment to local governments. Expenditure assignment means how spending should be spread among levels of government, or what expenditures should be retained by the central government, and what expenditures should be transferred to sub-national levels of government. What is clear in the literature is that the assignment of expenditure responsibility should precede revenue autonomy, particularly taxing power. This is because the division of taxing power, besides being based on principles of tax assignment, should be determined by the requirements of different spending agencies. Decentralization of tax powers based on expenditure responsibilities is desired so that sub-national governments do not have to rely exclusively on intergovernmental transfers to finance their expenditures. The linking of revenue and expenditure decisions at lower levels of government is considered important to preserve the incentive to provide public services in a cost-effective manner (Shah, 1994). Sidik (2007, pp.190-192) provided two different approaches in expenditure assignments: the 'expenditure-led' approach, and the ‚revenue-led' ap- proach. Under the first approach, functions are first designated as the clear responsibility of one or another level of government on a mutually exclusive basis. The designation is based on objec-

tive criteria such as the degree of local impact of the function in question, considerations of policy and administrative uniformity, general technical and managerial capacity, the existence of spatial externalities or spillovers associated with the function, and of economies of scale, among otherconsiderations.

The implementation of fiscal decentralization in 2001 gave regional governments in Indonesia great authority to determine their own budget policies. Regional governments at both the provincial and regency/municipal level thus have broad authority and power in implementing budgets appropriate for the promotion of economic growth and development within their jurisdictions. One implication of this decentralization is that regional economic growth has become increasingly vital. The fiscal policies examined in this study are those regarding public expenditures policies for the productive sectors that may influence economic growth at the provincial level. If stable economic growth is realized, through the spending multiplier regional economic growth will likewise be ensured.

As such, the research questions which will be answered are as follows:

1. What were the trends of provincial government productive expenditures in Indonesia before and after decentralization?
2. What were the impacts of provincial government productive expenditures on public service; (2) security and public order; (3) economy; (4) environment; (5) housing and public facilities; (6) health; and (7) education sector on economic growth on economic growth before and afterdecentralization?

This study is intended to examine the effects of productive public expenditures on economic growth across provinces in Indonesia. More specifically, this study focuses on these two goals; (i) to investigate the trends and compositions of productive government expenditures in Indonesia before and after decentralization, and (ii) to analyze the impacts of provincial government productive expenditures on public service, security and public order, economy, environment, housing and public   facilities,

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health, and education sector on on economic growth before and after decentralization in Indonesia. Previous research into public expenditures and economic growth in Indonesia has focused more on the relationship between central government expenditures and national economic growth (among others Nurlina, 2015; Ramayandi, 2003). To the best of the author's knowledge, no study has analyzed the relationship between government expenditures and economic growth at a local level, especially after decentralization. Such research is important because, after decentralization in 2001, local governments (at the provincial and regency/city level) have maintained their own fiscal authority and responsibility. Theoretically, fiscal and revenue assignment handled by local governments should have a positive contribution on regional economic growth, as decentralization will allow for more efficient regional economies and for regional governments to ensure fiscal efficiency in providing public services (Oates, 1972, 1992). As such, the results of this study will contribute greatly to provincial governments in Indonesia by revealing the different effects of productive government expenditures on local economic growth, both before and after decentralization. In other words, the results of this study will reveal the effectiveness of provincial governments' fiscal policies in promoting economic growth before and afterdecentralization.

Studies by Nurlina (2015) and Ramayandi (2003) analyzed the effect of total government expenditures on economic growth in Indonesia, rather than at the provincial government level. As such, their findings do not reveal any of the implications of fiscal decentralization implementation for public financing. From an econometric perspective, these previous two studies used the time series and error correction models, neither of which is capable of reflecting regional heterogeneity. Recognizing the shortcomings of previous research, this study applies the regression approach and the panel data analytical method. This approach allows province-specific related and cross-province analysis which makes it possible for the implications of fiscal decentralization

in Indonesia to be revealed. This study utilizes the advantages of panel data, accounting for unobserved individual (provincial) heterogeneity, reducing collinearity, improving efficiency, reliability and stability of econometrics estimates, and identifying and measuring effects not detectable in a cross-sectional or a time-series methods. Failure to use panel models when appropriate is a model misspecification error resulting in biased estimates and unreliable diagnostic statistics (Baltagi, 2008; Greene, 2008; Wooldridge, 2002). Hence, the use of panel regression also distinguishes the present study from that of Nurlina (2015) and Ramayandi (2003) and helps improve the knowledge and understanding of the association of productive expenditure and economic growth in the context of fiscal decentralization in Indonesia.

THEORETICAL FRAMEWORK
ROLE OF GOVERNMENT IN THE ECONOMY

Governments can influence the economy through various economic policies, including fiscal policies. Fiscal policies are those policies which are partly implemented by governments by budgeting specific expenditures to achieve macro-economic goals such as job creation, sustained economic growth, and price level stability (Parkin, 2014). Gwartney, Lawson and Holcombe (1998) find that governments' main functions in the economy are to create economic efficiency and promote economic growth. These main functions can be divided into two categories: the protective functions of government and the provision of publicgoods (Lin, 1994, Anomaly, 2015). The functions of governments are discussed comprehensively by Musgrave (1959), who identifies three main government functions: stabilization, distribution and allocation. Stabilization and distribution functions are usually beyond the control of the state or local government and are managed at the national level of government, while the allocation function is the basic concern of the local government. The governments act beyond these three functions to affect the

economy (Gwartney, Lawson, & Holcombe, 1998). More importantly, the government performs these functions in order to overcome market failure and market imperfections and to ensure equality by insisting on the basic rights of citizens to receive certain services, the last being called the ₌welfare roles of government' (Aulich & Nutley, 2001, pp.2-4).

Viewed as institutional units, the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes, to redistribute income and wealth by means of transfers, and to engage in non-market production (European Communities, et al., 2009: 436). According this definition, a government unit has the authority to raise funds from taxes or compulsory transfers from other institutional units, and it has authority to disburse such funds in the pursuit of its policy objectives (European Communities et al. 2009, p.436).

However, if governments take too great a role outside of their main function of governance, then this involvement can have negative implications for the economy. This may occur, for instance, if governments implement fiscal policies such as increasing taxes or loans; both acts can cause economic distortion. Too large a government, realised through high government spending (particularly if allocated for non-productive sectors) will lead to negative economic returns and slow economic growth (Gallaway & Wedder, 1998; Gwartney, Lawson & Holcome, 1998). Governments can use their expenditure budgets, also known as public sector spending, or government purchases, to fulfill their functions. According to Gwartney, Lawson, and Holcome (1998:4), the allocation of government expenditures for infrastructure which supports the economy and provision of certain public goods can promote conducive economic growth. However, the allocation of too many government expenditures, when funded through a rise in taxes and increase in loans, will result in diminishing returns. Likewise, if an increase in government expendi-

tures is more influenced by political factors than economic considerations (i.e. market forces), government expenditures will result in negative economic growth. The concept of diminishing returns can be used to explain how increased government expenditures can have negative implications for the economy. Governments that focus initially on the productive sector and attempt to create an efficient market can maximally promote economic growth. Meanwhile, governments which use their expenditures to provide public needs that are already handled by the private sector, such as food, housing, and healthcare, will ultimately experience negative returns.

THE CHANNEL THROUGH WHICH GOVERNMENT EXPENDITURES AND FISCAL DECENTRALIZATION AFFECTS ECONOMIC GROWTH

Economic growth is one of indicators of the efficiency of a country's economy, as measured by Gross Domestic Product (GDP) and GDP per capita. High economic growth indicates a country's increased ability to produce goods and services and, in turn, causes an increase in that country's output and revenue (Todaro & Smith, 2003). Governments, through their economic policies, have an important role in promoting the capacity and rapid growth of the economy. Governments' contributions through expenditure policies are best discussed by Wagner and Weber (1997) and Keynes (1936). Adolph Wagner, a German economist, was the first to find a positive relationship between government expenditures and economic growth. His findings are known as Wagner's Law, the law of increasing state activity or the law of the expanding state role. Even today, Wagner's Law remains a common theoretical point of reference in efforts to explore the association between government expenditures and economic growth.

According to Wagner, increases in public expenditures are a natural consequence of economic growth, when said economic growth outpaces growth in total output. Increases in a country's

per capita income may occur because of urbanization, modernization, and industrialization. These processes promote growth in the public sector because, when they occur, governments must improve the availability of public goods and services. Consequently, governments intervene in public funding (Abizadeh & Gray, 1985; Bird, 1971). Furthermore, Wagner views economic growth as being the fundamental determinant of public sector growth. In other words, public expenditures are endogenous to economic growth because urbanization, modernization, and industrialization are all external factors which promote increased public expenditures. This may be expressed mathematically through the formula $G_t = f(Y_t)$, in which G is government expenditures as a measure of the public sector, Y is economic efficiency, and t is time. Increased revenues in a country will be followed by increases in the public sector as well as developments in culture and the economy. Governments must, as these developments occur, improve public services such as education, infrastructure, and transportation (Figure 1).

FIGURE 1. THE ASSOCIATION OF GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH
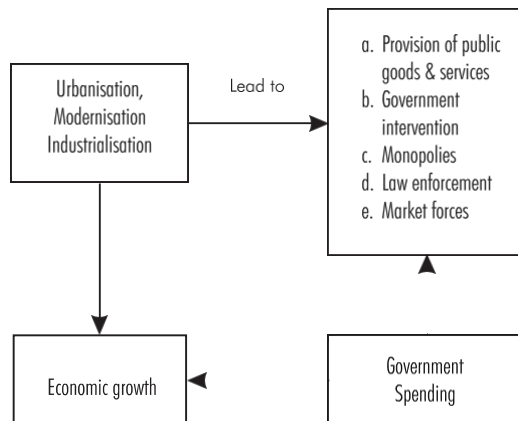
Source: author's view based on Wagner's Law, cited in Sijabat (2015).

The Keynesian approach to the government's role in the economy is rooted in the concept, first introduced by J.M. Keynes

(Keynes, 1936), that is known as ―General Theory‖. Keynes argues that fiscal policy, through increased government expenditures, will contribute positively to economic growth. Increased expenditures affect economic growth through the multiplier effect, as increases in government spending will mobilize the private sector, create new jobs, and ultimately promote increased aggregate demand. For Keynes, State activity is an exogenous factor that contributes to economic development. Keynes' approach may be written mathematically using the formula GDP = C + I + G for a closed economy, with GDP being the national income/output, C being household consumption, I being private-sector activities, and G being government activities. From this formula, it is apparent that income/output is the total of C, I, and G. Consequently, increased government expenditures (G) will promote increased aggregate demand (GDP). Public policy, through increased government expenditure or decreased taxes, promotes increased economic activity, particularly in economies which have slowed. Fiscal policies' effect of increasing aggregate demand will promote increased production capacity, thus leading to job creation and ultimately increased household revenue and consumption. As such, the Keynesian approach emphasizes that public policy will promote increased short-term economic stability and long-term economic growth (Snowdon & Vane, 2005).

The association between government expenditures and economic growth may also be examined using the Armey Curve, first introduced by Richard Armey (1995). According to Armey, the relationship between government expenditures and economic growth is parabola-shaped or an inversely U-shaped. The U-shaped occurs based on the law of diminishing returns in explaining government roles in economy, if government plays no role in the economy, then the output produced will be low and lead to zero economic growth. However, if the government increases its expenditures, positive economic growth will be realized, as shown by Mavrov (2007) and Arpaia and Turrini (2008).

Increased government expenditures promote economic growth because expansive fiscal policies offer an incentive to the economy. Economic growth will be most rapid at the beginning, then slow and ultimately peak. Once economic growth has peaked, increased government expenditures will slow economic growth. This is known as the law of diminishing returns (Facchini & Melki, 2011; Mavrov, 2007; Magazzino, 2014).

FIGURE 2. THE ARMEY CURVE
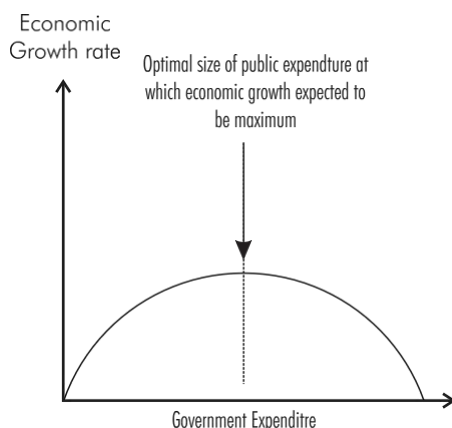
Source: Armey, 1995; Mavrov, 2007.

The literature on fiscal decentralization discusses the impact of fiscal decentralization on economic growth through the allocation of public resources as argued in Tiebout (1956) (Cheikbossian, 2008). Tiebout suggests that the allocation of public resources would be efficient if such services are provided and financed by the governments responsible for those resources. Tiebout proposed his arguments based the following assumptions: (i) given that tastes and willingness to pay differ for geographical, cultural and historical reasons, demand for local public services varies across locations (however, local preferences are reasonably homogeneous). If these assumptions are valid, the central provision of local public goods (if it tends to be uniform across the country), is unlikely to please anybody; and (ii) decentralization would result in every local government providing a

different bundle of local public services, each such service bundle reflecting local preferences. Tiebout's argument implies that mobility of voters is sufficient to ensure efficient allocation of public resources.

In Tiebout's analysis, taxpayers move in order to avoid higher taxes and to advantage themselves through inter-jurisdictional competition, thereby limiting the excessive taxing power of governments. Assuming people are mobile, therefore, competition for mobile people should match bundles of public goods to citizens' preferences. Tiebout claimed that in a system with many jurisdictions, competition among local jurisdictions would ensure efficiency in the production of local public goods and also in the distribution of total population over communities. Tiebout's theory on fiscal federalism also focuses on the economic efficiency of intergovernmental relationships. In his theory, Tiebout provided an explanation of the advantages of distributing power to the lowest level of government. By distributing some functions to the lower government levels, for example the provision of public services, the degree of efficiency in the allocation of resources would increase. Over the long term, efficiency gains from the local delivery of public services would lead to faster local, as well as national, economic growth (Oates, 1972).

In addition, theory explains that fiscal decentralization will create inter-jurisdictional spillover, also known as spillover effects. According to this view, more resources should be allocated to regions that undertake public expenditures benefiting residents of other regions and not only their own residents. This is with particular regard to the provision of public services. If travel costs are low, public goods are non-excludable where residents can obtain utility from the public goods provided in their own municipality as well as from those supplied in neighboring municipalities. Consequently, all residents of that municipality are able to consume the full benefits of the public goods provision because they cannot be excluded from the benefits. Thus, if there are spillovers from local public goods provision, residents of one

municipality may migrate outside their municipality and enjoy the services provided elsewhere. A key point in spillovers literature suggests that spillover benefits that may occur from fiscal decentralization can be achieved when lower-level jurisdictions of government ensure cooperation among one another in providing public goods and services. Such cooperation is important to avoid free riding in the provision of public services, thus enhancing local economicdevelopment.

EMPIRICAL EVIDENCE FROM PREVIOUS STUDIES

Above, it has been explained that government expenditures may have a negative or positive association with economic growth. Empirical studies have proven this. Positive associations between government expenditures, specifically productive ones, and economic growth have been shown by, among others, Barro (1990), Monteiro and Turnovsky (2008), and Alshahrani and Alsadiq (2014). Components of productive expenditures with a negative association to economic growth have been examined by Mura (2014), Bergh and Henrekson (2011), and Saad and Kalacech (2009).

As stated above, no research project to date has focused specifically on the contributions of productive government expenditures to economic growth in Indonesia. However, two research projects have examined the effects of government expenditures in general on economic growth in the country, namely thoseby Nurlina (2015) and Ramayandi (2003). In her study, Nurlina (2015) examines the effects of government expenditures oneconomic growth between 2004 and 2013 using an OLS approach, with the GDP as the dependent variable and government expenditures (both capital expenditures and routine expenditures) as the independent variables. Nurlina shows a significant positive association between government expenditures and economic growth. Similarly, Ramanyandi (2003), who uses time series econometrics with a cointegration approach and an error correction model, analyzes the effects of government expenditures (pro-

ductive and non-productive) on economic growth. Ramayandi shows that non-productive government expenditures have a negative effect on economic growth.

Alshahrani and Alsadiq (2014) also examine the impact of government spending on economic growth by using a macroeconomic model covering two sectors, private (P) and government (G). They examined government expenditures' effects on economic growth between the years of 1969 and 2010. Using the model developed by Ram (1986), they showed that the government's output is determined by the total labor force (L) and capital (K), whereas private-sector output is determined by external factors within the public (government) sector. This study shows that public expenditures, in the form of domestic investments, public investments, and healthcare investments have a positive effect on economic growth in the long term. Meanwhile, housing expenditures have a positive effect on economic growth in the short term.

Using a multivariate cointegration analysis, Saad and Kalacech (2009) estimate the long-term and short-term effects of government expenditures—specifically, spending on health, the military, education, and agriculture—on economic growth in Lebanon between 1962 and 2007. Their study indicates that government expenditures on education have a positive effect on economic growth over the long term, but a negative effect in the short term. Meanwhile, government expenditures have a negative effect on economic growth over the long term and no significant effect over the short term; this holds true for expenditures on health as well. Based on these results, Saad and Kalacech emphasize the importance of increasing public expenditures on education, as this sector has been shown to promote economic growth.

The influence of government expenditures on economic growth was also examined by Andres and Guerra (2005), who surveyed public expenditures on health in 52 countries in Europe, the Americas, and Asia between 1970 and 1990. This study used the Ordinary Least Square and Generalized Least Square

approaches to investigate the effects of these government expenditures on economic growth. Their survey results indicated that fiscal policies involving government expenditures for health are important for economic growth. Monteiro and Turnovsky (2008) analyze the influence of productive public expenditures allocated as public investment in education and infrastructure. Productive expenditures in these sectors increase final economic output, as they promote increased productivity (human capital). Monteiro and Turnovsky use an endogenous model of economic growth with two sectors: physical capital and human capital funded by public expenditures. They identify physical capital as the final output produced through the use of human capital, physical capital, and government expenditures in public infrastructure. Human capital, meanwhile, is produced in the education sector using human capital, physical capital, and also government expenditures in the education sector. Investments in human and physical capital will increase productivity. In this study, Monteiro and Turnovsky apply the concepts of welfare-maximizing expenditure and growth-maximizing expenditure and find a long-run growth-maximizing and welfare-maximizing expenditure rate as well as an allocation of government expenditures for productive capital. The welfare maximizing rate is lower than growth-maximizing expenditure rate, as are government expenditures. The two-sector model applied shows steady state growth rates and steady state welfare rates, funded both through taxation and through public spending. This indicates a trade-off between economic growth and welfare maximization.

Bergh and Henrekson (2011) research the association between government expenditures and economic growth and find that a 10% increase in public expenditures, in the form of government size, will lead to 5% to 10% negative economic growth. These findings thus indicate that productive expenditures experience decreasing returns. Public funding, using taxation, has negative effects on economic growth. This occurs because, to increase public expenditures, governments must increase taxes or   take

TABLE 1. SUMMARY OF SELECTED EMPIRICAL LITERATURE

NO	AUTHOR(S)	TYPE OF EXPENDITURE	IMPACT ON ECONOMIC GROWTH
1	Nurlina (2015)	Total government expenditures	Total government expenditures have positive impact on economic growth
2	Mura (2014)	Public expenditures on education, health, R&D, Infrastructure	Government expenditures on education, R&D and infrastructure have a positive correlation with economic growth. Health expenditures have a negative impact on economic growth
3	Alshahrani & Alsadiq (2014)	Public expenditures on domestic private investment, public investment, health and housing	Public expenditures on domestic investments, public investments, and healthcare investments have a positive effect on economic growth in the long term. Housing expenditures have a positive effect on economic growth in the short term
4	Bergh & Henrekson (2011)	Productive expenditures	Public expenditures have a negative effects on economic growth
5	Saad & Kalacech (2009)	Public expenditures on military sector (defense), education agriculture, and health	Public expenditures on education have a positive impact on economic growth on economic growth in the long run, but negative in the short run. Public expenditures on defense have a negative impact on economic growth in the short run
6	Monteiro & Turnovsky (2008)	Public expenditures on physical capital and human capital	Public expenditures on physical capital and human capital have positive impct on conomic growth
7	Bose, Haque, & Osborn (2007)	Capital expenditures	Productive expenditures on public capital and education have a positive effect on economic growth
8	Ramayandi (2003)	Non-productive expenditures Productive expenditures	Non-productive expenditure has negative impact on economic growth
9	Devarajan et al (1996	Non-productive expenditures Productive expenditures	Government expenditure on health, transportation, and communication have positive impacts on economic growth
10	Barro (1990)	Non-productive expenditures Productive expenditures	Productive expenditure is associated with higher economic growth, whereas non-productive expenditures one are converselty related with economic growth

Source: Own table based on various literature.

loans, both of which are disincentives for workers and decrease aggregate demand. Using panel data collected from thirty developing countries between the 1970s and 1980s, Bose, Haque, and Osborn (2007) analyze the effects of government expenditures on economic growth with recognition of government budget constraints. This study examines disaggregated government expenditures and finds that productive expenditures in public capital and education have a positive effect on economic growth, whereas expenditures for transportation, communication, and

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investment have no significant impact on economic growth after controlling for government budget constraints. Devarajan, Swaroop, and Zou (1996) use a broader sample of 43 developing countries to analyze the effects of government expenditures between 1970 and 1990. In their study, they argue thatproductive and nonproductive public expenditures can influence economic growth over the long term because these expenditures improve the economic efficiency of the private sector. Their study indicates a positive relationship between nonproductive expenditure and economic growth. The results of their study indicate that government expenditures in education and healthcare have a negative effect on economic growth this due to excessive use of productive expenditure may have been misallocating the productive expenditure.

Using data panels, Mura (2014) analyzes the effects of productive expenditures on economic growth in six European Union member states from Eastern European between 1990 and 2013. This study shows that public expenditures for education, research and development, and infrastructure have a positive effect on economic growth, while public expenditures on health have a negative effect. Research conducted by Barro (1990) into the effect of government expenditures on economic growth has often been referenced. In his study, Barro uses an endogenous growth model and cross-section data. Data is classified as productive expenditures, referring to expenditures which promote economic growth, and non-productive expenditures, referring to expenditures which are growth-retarding. Barro finds that productive government expenditures are capable of improving production and labor efficiency, and, consequently, promoting economic growth. This occurs because economic expenditures allocated for public capital lead to an increase in marginal productivity. Conversely, non-productive expenditures, which take the form of consumer services, limit economic growth. These findings are rather important, given that they differentiate between government expenditures' effects on economic growthwithin developed

nations (advanced economies) and less advanced economies. In less advances economies, Barro finds that government expenditures are high-return, while in relatively advanced economies public expenditures have low returns in economic growth and may, in fact, decrease privateinvestment.

RESEARCH HYPOTHESES

Two main schools of thought have been consulted to understand the association between government expenditures, particularly productive expenditures, and economic growth: Wagner's Law and the Keynesian Approach. Both schools of thought hold that public expenditures can have a positive influence on economic growth. However, different empirical studies have had inconclusive results regarding the association of productive expenditures and economic growth. As found by Barro (1990), economic growth depends greatly on stocks and capital. An increase in productive expenditures, accumulated in the form of stocks and capital, will increase the amount and size of investments and promote job creation. Through the spending multiplier, the increase in stocks and capital will promote economic growth in the various regions (Barro, 1990). As such, under Barro's view, the regression coefficient of all productive expenditures is expected to be positive. Focusing on the theory and empirical evidence surrounding government expenditure and economic growth, this study posits the followinghypotheses:

$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$

there is no positive association between productive government expenditures for (1) public service; (2) security and public order; (3) economy; (4) environment; (5) housing and public facilities; (6) health; and (7) education sector on economic growth of provinces beingstudied.

$H_1: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 \neq 0$

there is a positive association between productive government expenditures for (1) public service; (2) security and public order;

(3) economy; (4) environment; (5) housing and public facilities; (6) health; and (7) education sector on economic growth of provinces being studied.

The hypotheses are tested by comparing the estimated value and the critical value of t-statistics and F-statistics obtained from the panel regression model. F-statistics are used to determine if all independent variables together statistically affect the dependent variable. While t-statistics are employed to see if each independent variable individually associates with the dependent variable, and it plays a predominant role in multivariate regression. The hypothesis testing is stated as follows: the null hypothesis cannot be rejected if the estimated test statistics value is d⫫ critical value. On the other hand, the null hypothesis can be rejected if the estimated test statistics value is > the critical value.

RESEARCH METHOD

This study adopts a quantitative approach because of its nature in testing hypotheses that develop a statistical association among the variables of numerical data. The endogenous theory of economic growth emphasizes the importance of differentiating between different classes of government expenditures, between productive expenditures and non-productive expenditures, to better examine the effects of these expenditures on economic growth (Barro, 1990: Mura, 2014; Christie & Rioja, 2011). Productive expenditures are defined as expenditures which promote the production process and increase marginal productivity, thus ensuring long-term economic growth. Non-productive expenditures, meanwhile, are defined as expenditures with no direct effect on the production of goods and services (Barro, 1990). Productive expenditures are expenditures which can create efficiency within the private sector and have a positive effect on such production factors as capital and labor (Barro, 1990; Barro & Sala-I-Martin, 1992; Mura, 2014). Productive expenditures may have positive effects because they are included within the function of private production (Mura, 2014; Zimèík, 2016).

The samples for this research are the 25 provinces which existed in Indonesia before decentralization and the 33 provinces which exist at present, after decentralization[3]. Financial data was collected from the Directorate General of Financial Balance of the Indonesian Ministry of Finance[4]. To compare economic growth performance, this analysis has been divided into two periods. The first is before fiscal decentralization, meaning before 1998; the period 1994–1997 has been chosen to represent this period. Second is after fiscal decentralization, for which the years 2011 to 2015 have been chosen for analysis. As stated above, fiscal decentralization was implemented in 2001, with the legal framework being ratified by the government in 1999. As such, the pre-decentralization period covers several years before this law was passed. The period after fiscal decentralization covers 2001 to 2016, but considering the availability of data and the creation of new provinces, analysis has been limited to the period between 2011 and 2015. This selection is expected to give the most up-to-date portrait of provincial fiscal policies' effects on economic growth in the various provinces. This period was selected purely for the availability of data and in recognition of resource limitations. Although the analysis period is not lengthy, it is hoped that it will provide a general understanding of economic performance and government expenditures both before and after fiscal decentralization was implemented in Indonesia.

The budget data used is divided into two analysis periods: before decentralization (1989–Importantly, these periods will offer a comprehensive understanding of expenditures before and after fiscal decentralization. Data on the Gross Domestic Regional Product (GDRP)[5] originates from the Census Bureau, both at the national and provincial level. For the purpose of this study, productive government expenditures classification is used based on the Classification of the Functions of Government (COFOG)[6]. According to COFOG, government expenditures are divided into two types: productive expenditures and non-productive expenditures. Productive expenditures consist of gen-

eral public services, defense, public order and safety, economic affairs, environmental protection, housing and community amenities, health, and education. Based on local government budgetary system in Indonesia, total government expenditures are categorized as: (1) operational (current) expenditures, and (2) capital expenditures. Local government expenditure data in this study is constructed from two versions of local budget reports, one structured according to Governmental Accounting Standards *(Standar Akuntansi Pemerintahan)* and the other structured according to a regulation of the Ministry of Domestic Affairs. The first type of budget divides total expenditures into operational (current/routine) and capital expenditures, while the second classifies expenditures as direct expenditures and indirect expenditures. Based on the COFOG categories and regional budget structures mentioned above, the productive expenditures analyzed here are expenditures for (1) public service; (2) security and public order; (3) economy; (4) environment; (5) housing and public facilities; (6) health; and (7) educationsector.

All nominal expenditure used in the analysis did not indicate actual changes in expenditure. For this reason, all nominal expenditure was first converted from nominal values to real values by dividing nominal values with the consumer price index (CPI)[7]. The CPI was used because it indicates cost of living or cost of maintaining the same standard of living in certain period of time. By converting the nominal value of expenditure into their real value, real improvement or deterioration in the expenditure can be seen throughout the analysis (Parkin, 2014; Trotman, 1997).

REGRESSION MODEL

Most studies into the effect of government expenditures on economic growth use an econometric time series or cross-section approach. Neither of these, however, is able to indicate individual heterogeneity. As such, panel data analysis was used here to take advantage of the techniques ability to examine provincial heterogeneity. The influence of productive expenditures on eco-

nomic growth will be estimated following the balanced panel data model (Baltagi, 2008). This model is used because numerous observations in different provinces have been adjusted to ensure that each cross-section (i.e. province) has the same regular frequency of data. The econometric model to be estimated is adapted from the studies of Barro (1990) and Mura (2014), as follows:

$$Y_{it} = \beta_0 + \mathbf{X_{it}}\,\beta + \left(u_{it} + v_{it}\right)$$

(1)

In which Y_{it} is a dependent variable, covering provincial area (i) in a specific period (t); X_{it} is a vector of the independent variable; β_1, β_2, β_3, β_4, β_5, β_6 and β_7 are coefficients of regressions, and å is a stochastic disturbance term with standardproperties.

$\varepsilon_{it} = (u_i + v_{it})$ is a composite error, in which u_i is a time-invariant effect of the individual province and v_{it} is idiosyncratic error. Based on Equation (1), the OLS estimator will be consistent with the condition $E(X'\varepsilon)=0$ in which $\varepsilon_{it} = u_i + v_{it}$ is a composite error. As such, $E(X'_{it}\,v_{it})=0$ and $E(X'_{it}\,u_{it})=0$ are required. Equation (1) can be written more specifically by entering the dependent variable and all independent variables, namely to actual GDRP as a measurement of economic growth and each province's productive expenditure components, asfollows:

$$\text{RGDRP}_{i,t} = \beta_0 + \beta_1\text{PUBLIC}_{it} + \beta_2\text{SECURITY}_{it} + \beta_3\text{ECO}_{it} + \beta_4\text{ENV}_{it} + \beta_5\text{HOUSE}_{it} + \beta_6\text{HEALTH}_{it} + \beta_7\text{EDU}_{it} + \beta_{it}$$

(2)

In which RGDP refers to Real Gross Domestic Regional Product, PUBLIC denotes expenditures on public services, SECURITY is expenditures on security and public order, ECO refers to expenditures on economy, ENV is expenditures on environment, HOUSE is expenditures on housing and public facilities, HEALTH refers to expenditures on health and EDU is public expenditures on education. Equation (1) is named as Model (1) which the equation to estimate the impact of productive expen-

ditures on economic growth before the fiscal decentralization era that covers 1994-1997, and the other one is Model (2) estimates the impact of productive expenditures on economic growth before after fiscal decentralization era which selected for the period of 2011 and 2015.

TABLE 2. SUMMARY OF REGRESSION VARIABLES: DEPENDENT VARIABLE IS GDRP

Productive Expenditures	Operational Definitions	Symbol	Predicted Association with Economic Growth
Public services	Total public expenditures on public services (Rupiah) expressed as a percentage of the GDRP in a given year.	PUBLIC	+
Security and public order	Total public expenditures on security and public order (Rupiah) expressed as a percentage of the GDRP in a given year.	SECURITY	+
Economy	Total public expenditures on economy (Rupiah) expressed as a percentage of the GDRP in a given year.	ECO	+
Environment	Total public expenditures on environment (Rupiah) expressed as a percentage of the GDRP in a given year.	ENV	+
Housing & public facilities	Total public expenditures on housing and public facilities (Rupiah) expressed as a percentage of the GDRP in a given year.	HOUSE	+
Health	Total public expenditures on health (Rupiah) expressed as a percentage of the GDRP in a given year.	HEALTH	+
Education	Total public expenditures on education (Rupiah) expressed as a percentage of the GDRP in a given year.	EDU	+

Source: Own table.

ECONOMETRIC PROCEDURES

The basic model used for panel analysis is the linear model. To determine whether a linear or nonlinear test is appropriate, the MacKinnon, White, and Davidson Test(MacKinnon, White, & Davidson, 1983) was employed to determine whether the preferred model is a linear function form or a log-log function form.

The hypothesis tested under MWD test is written as follows:
H_0: the suitable model is a linear regression model, or the dependent variable is a linear function of the independent variables.

H_1: the suitable model is a log-log regression model, or the dependent variable is a linear function of logs of the independent variables.

After obtaining the appropriate model specifications, a diagnostics test was run to ensure that the estimates obtained through regression fulfil the Gauss-Markov conditions; namely, the estimates are Best Linear Unbiased Estimates (BLUE) (Greene, 2008; Gujarati, 1995). Properties of the BLUE estimator are (1) follows a normal distribution where the mean values are equal to the real values of the regression coefficients; (2) has minimal variance; (3) is linear where each of its element is a linear function of the dependent variable (Gujarati, 1995). The Gauss-Markov conditions assume independent and identically distributed errors, so that the errors have an expected value of zero, a constant variance, and are uncorrelated with each other (Greene, 2008; Gujarati, 1995).

Heteroskedasticity occurs most often in cross-sectional data, but heteroskedasticity may also arise in this study since the variance of each province may not be constant. Heteroskedasticity in regression arises if the variance of the errors varies across observations. If this exists, the homoskedasticity assumption, that is, is violated. Under homoskedasticity, the average relationship between dependent variables and independent variables is the same throughout the sample. When the homoskedastic assumption is violated (i.e. s^2 is not constant across the sample) OLS estimates are unbiased but the estimators become inefficient. Heteroskedasticity occurs most often in cross-sectional data, but heteroskedasticity may also arise in this study since the variance of each province may not be constant. White's Test (1980) is used for heteroskedasticity is used to detect the presence of heteroskedasticity in the regressionmodel.

White's test on the error distribution is run by regressing the squared residuals on all distinct regressors, cross-products, and squares of regressors. The test statistic is distributed X^2 (Chi-

squared) under the null hypothesis of homoskedasticity. White heteroskedasticity consistent standard errors and covariance or Newey-West HAC (Newey & West, 1987) will be used if panel models encounter heteroscedasticity. White's HC calculates the standard errors of estimation using the White Correction for Heteroskedasticity. Newey-West's HAC use general variance-covariance estimation to account for heteroskedasticity and autocorrelations which are particularly appropriate when the nature of heteroskedasticity and autocorrelation are unknown. In this study, the application of White HC and Newey-West HAC is appropriate because the precise nature of the heteroskedasticity in the regression models is unknown. Although the use of White HC and Newey-West HAC do not solve the heteroskedasticity and serial correlation in the regression models, estimators obtained from White's HC and Newey-West's HAC lead to more valid inferences about the coefficients of regression (see, West & Agbola, 2005). The coefficients obtained from Newey-West HAC remain unchanged, they enable the calculation of standard errors in a way that is intended to remove homoskedasticity and serial-correlation in the error terms in the regression models (generally, the Newey-West estimator produces larger standard errors).

Furthermore, the Hausman Test (Hausman, 1978) was conducted to determine whether the Fixed Effects Model (FEM) or the Random Effects Model (REM) was the appropriate regression panel model. The REM assumes the individual effects, ($á_i$), is uncorrelated with all independent variables, X_{it}, and combines the individual specific effects with the error term to form a composite error term ($á_i + u_{it}$). Time-invariant unobserved effects in the error term cause the composite errors to be serially correlated. To deal with this problem, the REM uses the Generalised Least Squares (GLS) regression method. The main problem with the REM approach is that when the individual specific effects are correlated with any of the independent variables, the estimates are not consistent. Whereas in FEM, the individual effects, $á_i$, are allowed to be correlated with the observed indepen-

dent variables. In the FEM procedure the individual effects are estimated. The Hausman test compares the fixed effects to the random effects models by testing the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. Or in simple words, it checks whether the unobserved provinces' effects are correlated with the independent variables.

FINDINGS

Descriptive Evaluation on Government Expenditures and Economic Growth in Provinces Before and After Fiscal Decentralization

The performance of fiscal policies implemented by provincial governments can be seen through the economic growth attained by said provinces. Meanwhile, a high GDRP is indicative of increased production capacity in a region, which is followed by increased per-capita income and standards of living in the provinces studies. Based on Table 3, real GDRP growth before fiscal decentralization policies tended to be higher than after fiscal decentralization policies were implemented. It is shown that, between 1994 and 1995, the average real economic growth at the provincial level was above 4%, and reaches 7.1% and 8.3% in 1994 and 1995 respectively; such an economic growth rate was not achieved in the years after decentralization examined (i.e. 2011–2015). The average real economic growth rate in that period has not exceeded 4.5% over the past five years. The highest economic growth rate at the provincial level was 4.4% in 2012, while the lowest was 3.9% in 2014. Meanwhile, before fiscal decentralization, the economic growth rates were less than 5%.

Real economic growth at the Indonesian provincial level before and after fiscal decentralization can be seen in more detail in Table 4. Between 2011 and 2015, the provinces which attained the greatest economic growth were those in eastern Indonesia— Central Sulawesi, with an average economic growth of 9%, followed by South Sulawesi (6.7%), West Sulawesi (6.6%), South-

East Sulawesi (6.5%), and Gorontalo (5.6%). If compared to the period before decentralization, then the provinces with the greatest average economic growth were also found in eastern Indonesia: Irian Jaya (9.5%), South-East Sulawesi (7.9%), and North Sulawesi (7.7%). As such, there has been no significant shift in the division of economic performance as viewed from real economic growth.

TABLE 3. REAL GDRP GROWTH BEFORE & AFTER FISCAL DECENTRALIZATION (%)

	Before Decentralization		After Decentralization
1994	6.5	2011	4.1
1995	4.0	2012	3.9
1996	8.3	2013	4.3
1997	7.1	2014	4.4
		2015	4.2

Source: Author's calculcation.

As explained above, government expenditures are financial policy instruments that play an important role in promoting economic growth. Increases and decreases in expenditures can be used as a measure for economic expansion and contraction, as realised through GDRP. This can be examined in more detail by comparing total provincial government expenditures with provinces' GDRP. Table 5 below shows trends in provincial government expenditures in ratio with GDRP before and after the implementation of fiscal decentralization. The higher ratio of government expenditures to GDRP since decentralization indicates a tendency towards implementing expansive financial policies at the provincial level. This table shows that the lowest average ratio of government expenditures to GDRP (1.3%) was found in East Java, with the highest (10%) in Aceh. Following Aceh, the provinces with the highest total expenditures as a percentage of the GDRP are almost all outside Java—West Nusa Tenggara (9.7%), Papua (7.6%), North Maluku (7.2%), North Kalimantan (7%), West Papua (6%), and Maluku (5.9%). Provinces with low total expenditures as a percentage of the GDRP (less than 2%)

TABLE 4. PROVINCES RANKED BY REAL GDRP GROWTH BEFORE

Before Decentralization		After Decentralization	
Irian Jaya	9.5	Sulawesi Tengah	9.0
Sulteng	7.9	Sulawesi Selatan	6.7
Sulut	7.7	Sulawesi Barat	6.6
NTT	7.6	Sulawesi Tenggara	6.5
DKI Jakarta	7.5	Gorontalo	5.6
Bali	7.4	Jawa Timur	5.4
Sulsel	7.3	Bali	5.3
Lampung	7.2	Sulawesi Utara	5.2
Kalsel	7.0	DKI Jakarta	5.1
Kalbar	6.9	Jambi	4.7
Jatim	6.9	Sumbar	4.6
Sumbar	6.8	Lampung	4.5
Sultra	6.7	Sumatera Utara	4.5
Sumsel	6.7	Jawa Tengah	4.5
DI.	6.5	Banten	4.4
Yogya	6.4	Kalimantan Tengah	4.4
Jabar	6.3	Bengkulu	4.3
Kalteng	6.3	Maluku	4.3
Bengkulu	6.3	Jawa Barat	4.3
NTB	6.0	Maluku Utara	4.1
Jambi	6.0	Sumatera Selatan	4.0
Jateng	4.6	DIY	4.0
Maluku	4.1	NTB	3.8
Kaltim	3.3	Kalimantan Barat	3.7
Riau	2.8	Kepulauan Riau	3.7
		NTB	3.6
		Kalimantan Selatan	3.5
		Bangka Belitung	3.0
		Papua Barat	2.1
		Papua	2.0
		Kalimantan Timur	0.5
		Riau	0.3
		Aceh	0.1

Source: Author's calculation.

are North Sumatra (1.9%), Central Java (1.7%), and West Java (1.6%)

Total provincial government expenditures, as shown in Fig-

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TABLE 5. PROVINCES RANKED BY TOTAL EXPENDITURE AS % OF REAL GDRP

Before Decentralization		After Decentralization	
DKI Jakarta	13.2	Aceh	10.0
Jatim	10.4	Nusa Tenggara Barat	9.7
Sulteng	7.8	Papua	7.6
Kalteng	4.9	Maluku Utara	7.2
Sultra	4.8	Kalimantan Utara	7.0
NTT	4.3	Papua Barat	6.0
Lampung	4.2	Maluku	5.9
Maluku	4.0	Riau	5.9
Jambi	3.9	Bengkulu	5.0
Kalsel	3.9	Sulawesi Barat	4.9
Sulsel	3.8	Banten	4.7
Bengkulu	3.8	Gorontalo	4.3
DIY	3.3	Bali	4.1
IRJA	3.3	NTT	4.1
Bali	3.1	Kalimantan Selatan	4.0
Jateng	3.0	Kepulauan Riau	3.9
Sulut	2.8	Kalimantan Tengah	3.8
NTB	2.8	DI Yogyakarta	3.4
Jabar	2.4	Sulawesi Utara	3.2
DI Aceh	2.1	Kalimantan Barat	3.2
Sumbar	2.0	Sulawesi Tengah	3.0
Sumsel	1.6	Bangka Belitung	2.7
Kalbar	1.6	Sumatera Barat	2.6
Riau	1.3	Sulawesi Tenggara	2.5
Kaltim	1.2	Kalimantan Timur	2.4
		Sumatera Selatan	2.3
		Jambi	2.3
		Lampung	2.0
		Sumatera Utara	1.9
		Jawa Tengah	1.7
		Jawa Barat	1.6
		Jawa Timur	1.3

Source: Author's calculation.

ure 3, consist of routine expenditures and capital expenditures, or direct expenditures and indirect expenditures. Based on their function, expenditures are divided into 33 different sectors[8]. Figure 3 shows a trend in total provincial government expenditures and GDRP growth from 2011 to 2015. On average, provincial government expenditures increased by 14.8%, while GDRP growth was only 0.1%. In the provinces analysed, the greatest growth in provincial government expenditures was in 2012, reaching 42%. This was a drastic increase over 2011, whenprovincial government expenditures saw negative growth of 11%. However, in that year the GDRP saw negative growth of 8.8%. Negative GDRP growth was also found in 2015, reaching -4.4%. GDRP growth in 2012, 2013 and 2014 were respectively 4%, 4.9%, and 4.7%; during this period, provincial government expenditures increased by 42%, 19.6% and 13.8%.

FIGURE 3. GDRP GROWTH AND GOVERNMENT EXPENDITURE GROWTHBEFORE AND AFTER FISCAL DECENTRALIZATION, AVERAGE (%)
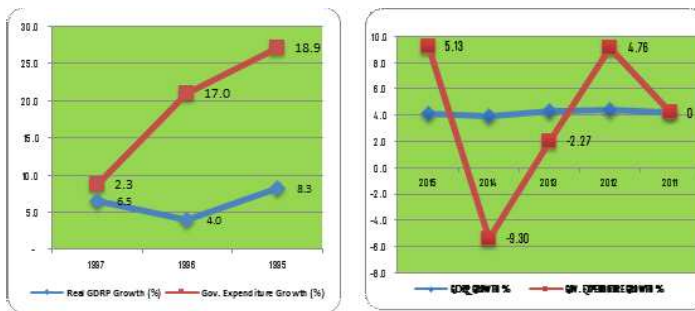
Despite no clear pattern of government expenditure growth in response to fiscal decentralization, the increase in government expenditures in the early years of fiscal decentralization show no marked changes. However, in later years, increases in government expenditures indicated that the implementation of fiscal decentralization had led to sharp increases in provincial governments' spending, particularly in 2012 and 2013, before shifting to negative in 2015. From this trend in provincial governments'

expenditures and the GDRP growth, it cannot readily be concluded that government spending has a significant role in stimulating economic growth, for the marked increase in expenditures in 2012 was not followed by marked economic growth that year.

MACKINNON, WHITE AND DAVIDSON TEST

The MWD test was run to check if either linear functional form or log-log was more appropriate for the panel data used in the study. The results are reported in Table 6. The table shows that almost all of the linear estimates (Z_1) and logarithmic transformation (Z_2) are significant, suggesting that both linear and log-log functional forms are appropriate. Based on these results, the log-log functional form was used to maintain consistency with previous cross-sectional analysis.

TABLE 6. RESULT OF THE MWD TEST FOR MODEL 1 AND MODEL 2

	Z_1 (Linear)	Z_2 (Non-linear)	Decision
Model1	(12.0810)*	(0.0685)*	Significant
	(1.9753)**	(1.9753)**	
Model2	4.0242*	1.2086*	Significant
	1.9864**	1.9864**	

Note: number of observation = 165, k = 9; * t-statistics; ** t-table.
Source: Own calculation using EVIEWS 8.

Based on the results of the MWD test, it was determined that the most appropriate regression model was the non-linear functional form model, or log-linear. As such, Equation (2) can be rewritten as:

$$LRGDRP_{i,t} = \beta_0 + \beta_1 LPUBLIC_{it} + \beta_2 LSECURITYit + \beta_3 LECO_{it} + \beta_4 LENV_{it} + \beta_5 LHOUSE_{it} + \beta_6 LHEALTH_{it} + \beta_7 LEDU_{it} + \varepsilon_{it}$$

(3)

Afterwards, an appropriate panel model selected was undertaken, with the choice being between the FEM (Fixed Effect Model) and REM (Random Effect Model). The FEM assumes a correlation between unobserved province-specific heterogeneity with the independent variables researched, and can be formulated E(XitI ëi) = 0. Meanwhile, REM assumes no correlation

between unobserved province-specific heterogeneity and independent variables, or E(XitI ëi) $=$ 0. If the unobserved province- specific heterogeneity correlates with the independent variables, then the most appropriate regression model for panels is FEM. However, if unobserved province-specific heterogeneity does not correlate with independent variables, then REM is the most ap-propriate.

The hypothesis used in the Hausman test is as follows:

H_0: Individual effects and independent variables are not correlated; $E(X_{it}I\lambda_i) = 0$
H_1: Individual effects and independent variables are correlated; $E(X_{it}I\lambda_i) \neq 0$

HAUSMAN TEST

To test whether or not unobserved province-specific heterogeneity correlates with independent variables, the Hausman Test was run; the results are summarised in the table below. If the Hausman statistic value is significant, then the null hypothesis which states that unobserved province-specific heterogeneity in the regression model has no correlation with the independent variables is rejected. However, if the Hausman statistic value is not significant, then the null hypothesis is irrefutable. Based on the Hausman test, as shown below, it was concluded that the Chi-Squared and p-value were significant at á = 5%. As such, fixed effects estimators are the most appropriate for use in Model (1) and Model (2).

TABLE 7. SUMMARY OF THE HAUSMAN TESTS RESULTS

	Test	Chi-squared	Prob> Chi-squared	Results
Model 1	Fixed-Effects vs. Random-Effects	14.644	0.041	Rejects H_0
Model 2	Fixed-Effects vs. Random-Effects	14.942	0.036	Rejects H_0

Source: Own calculation using EVIEWS 8.

As shown above, in general the data panels showed heteroscedasticity, namely $E(å_{it}2)$; in other words, the error terms did not have a constant variance. If the variance of the error term was constant, or $Vj(å_i) = ó2$, for all i (provinces), then the appropriate model would be homoscedastic (Williams, 2015:1). The data panels also experienced the issue of serial correlation owing to the involvement of the time dimension (or cross section dimension) in the data; as such, the effects of dependent variables were distributed among several time periods (Baltagi,2008).

In the estimated model, heteroscedasticity could occur because of differences in the subpopulations or the other effects of interactions. For instance, the influence of provincial governments' productive expenditures on economic growth differed for different groups of residents or residents in different districts and sub-districts (see for instance Williams, 2015). To test whether or not the panel model used contained heteroscedasticity, the Breusch-Pagan-Godfrey test (Breusch & Pagan, 1979) was applied with both a null hypothesis—that the model was homoscedastic—and an alternative hypothesis—that the model was heteroscedastic. The results of this test indicated issues heteroscedasticity and serial correlation. Based on the results of this test, regression Model (1) and Model (2) were applied using White cross-section standard errors & covariance estimators, which are designed to accommodate arbitrary heteroscedasticity and cross-section serial correlation (see also, Curto, Pinto, Morais, & Lourenço, 2011).

Table 8 below shows the results of the panel regression using White Robust Estimators for Model (1) and Model (2). Briefly, it can be seen that the panel regression model used is relatively good. Based on a test of joint significance using the f-statistic of Model (1) and Model (2), it can be seen that the f-statistic > f-table. This indicates that all independent variables, all productive expenditures, have a predictive power to explain variations in economic growth as a dependent variable owing to the significant f-statistic. In other words, all independent variables together

statistically affect the dependent variable.

The panel regression results for Model (1) cover the period selected to examine the effects of seven productive expenditures on economic growth before fiscal decentralization. These results show that, of the seven types of productive expenditures estimated, five have negative regression coefficients: expenditures for public services (PUBLIC), expenditures for economic growth (ECO), expenditures for the environment (ENV), expenditures for housing (HOUSE), and expenditures for healthcare (HEALTH). These negative regression coefficients indicate a reverse direction connection between economic growth and these five types of productive expenditures. Although, based on the t-test, it can be concluded that these five variables are not statistically significant in explaining variations in economic growth, the negative signs of these five coefficients go against the expect positive signs/direction.

Next, using a t-test with á = 5%, a t-table value of 1.655 was attained. If compared to the t-statistic value of all independent variables in the formulated regression, only the t-statistics from education expenditures are significant, reaching 2.041. This indicates that, of the seven productive expenditures predicted to have a positive relationship and be statistically significant, only productive expenditures in education had a statistically significant effect on economic growth at the provincial level before fiscal decentralization in the period studied (1994–1997). The negative signs obtained from five types of productive expenditure are at odds with expectations, because this implies that those productive government expenditures are associated with a relatively lower rate of economic growth. This finding does not support the theoretical expectation that productive expenditures in these sectors have a positive association with economic growth.

This regression coefficient of public expenditures within the education sector can be understood as meaning that every increase of one unit in public expenditures within the education sector led economic growth of 1.859% between 1994 and 1997.

This indicates that government expenditures in the education sector are capable of promoting greater human capital development, and this was the sole important factor in realizing economic growth before fiscal decentralization was implemented. Similar results can be found in several previous studies, including those of Saad and Kalacech (2009) and Mura (2014). The coefficient of government expenditures for security and public order was also positive, but not statistically significant.

In Model (2), unlike in the period before fiscal decentralization, public expenditures in security and public order were shown to have a positive and statistically significant association with economic growth after fiscal decentralization. The regression coefficient obtained was 4.869; as such, it could be said that every additional share of provincial expenditure on security and public order will expand economic growth by about 4.9%. Similar results were found by (Chairil, Sinaga, & Febrianti, 2013), who showed that, in Indonesia, government expenditures on the military had a positive effect on economic growth. Although the allocation of public expenditures for security and public order is connected only indirectly to the activities which create economic growth, the regression results show that provinces with larger public expenditures on security and public order enjoy greater economic growth. Expenditures in this sector can promote economic growth because they support the recognition and protection of property rights, leading residents to conduct more productive activities that create capital accumulation (Mylonidis, 2008). The positive association between expenditures for security and public order, including military expenditures, has been shown to involve a co-integration and unidirectional relationship between said expenditures and a country's economic growth, such as in Turkey (Gokmenoglu, Taspinar, & Sadeghieh, 2015).

As found in Alshahrani and Alsadiq (2014) as well as in Devarajan et al., (1996), government expenditures on health sector is found to be a driver of economic growth across provinces. This result implies a 1% change in government expenditure on

health sector causes an approximately 2% increase in economic growth across provinces, *ceteris paribus*. The positive association between expenditures in the education sector and economic growth is also confirmed in Model (2), namely for the period after fiscal decentralization. In this period, education expenditure is significant with a bigger magnitude of about 4.441 at the 1% level; a 1% in expenditure on education is associated with a 4.441% change in the economic growth of the 33 provinces being studied, other things being equal. One important possible explanation for such encouraging findings is Law No 20 of 2003 on the National Education System, which establishes education as an obligatory function of local government following decentralization. According to Chapter XIII, Article 49, of this law, local governments must allocate a minimum of 20% of their budget to finance education.

The regression results of Model (2) also indicate that public expenditures for public services, public expenditures for economic growth, public expenditures for the environment, public expenditures for housing, and public expenditures for health have no significant influence on economic growth, as also seen in Model (1). Empirically, this finding can explain the potential for leak-

TABLE 8. SUMMARY OF PANEL REGRESSION RESULTS DEPENDENT VARIABLE IS ECONOMIC GROWTH (LRGDRP)

	Constant	LPUBLIC	LSECURITY	LECO	LENV	LHOUSE	LHEALTH	LEDU
Model 1	2.044	-0.027	1.5	-0.318	-3.423	-0.052	-2.663	1.859
(Before fiscal decentralization)	-24.7	(-0.292)	(-0.206)	(-0.141)	(-0.617)	(-0.062)	(-1.219)	(2.041)*
Adjusted R^2 = 0.275; F-statistic = 52.201; Number of Observation = 99								
Model 2	1.399	-6.289	391.439	3.294	-104.432	-16.935	33.776	32.838
(After fiscal decentralization)	-103.017	(-3.857)	(4.869)*	-0.295	(-5.740)	(-1.755)	(2.008)*	(4.410)*
Adjusted R^2 = 0.819; F-statistic = 18.872; Number of Observation = 155								

* Significance at 1% levels; Numbers in parenthesis are the t-statistics.
Source: Own calculation using EVIEWS 8.

age in government expenditures as well as market distortion, including corruption, bribes, mark-up in public acquisitions, as well as the acquisition of low-quality items; all of these lead to low returns on public-sector investments (Ghosh & Gregoriou, 2008:5). Leakage reduces[9] the efficiency of provincial economy and also distortion of the market and incentives system (Ghosh & Gregoriou, 2008; Afonso & Jalles, 2011). Furthermore, according to the findings of Devarajan et al. (1996), productive expenditures may have no significant and positive effect on economic growth because of excessive use of public funds, leading to an excessive amount of resources being allocated or misallocated.

DISCUSSION

Though imbalances in economic development between the island of Java and other islands in the Indonesian archipelago have long been subject to discussion, descriptive analysis has shown that provinces in Eastern Indonesia, including Irian Jaya, Central Sulawesi, South Sulawesi, and West Sulawesi tend to have higher economic growth rates than other provinces (Table 4). From these results, it can be assumed that the intensity of economic activity in Indonesia's eastern provinces is relatively higher than elsewhere in the country. Following the results of the study by Matsui (2005:178), since the implementation of decentralisation the GDRP and regional government earnings have increased in western Indonesia, namely in Java. However, investment and banking (such as loans and savings) have also seen sharp increases outside of Java. This increase has been followed by an increase in bank financing and business activities outside of Java. The islands in eastern Indonesia, including Papua and Sulawesi, are producers of mining, forestry, and agricultural products that are managed by large companies. Indonesian provinces that have natural resource endowment, including oil and gas, tend to have a higher GDRP per capita than provinces in Java that depend on manufacturing and labour-intensive handi-

crafts production (Nasution, 2016:16).

Comparing total provincial government expenditures before and after decentralisation, it can be seen that the Jakarta Capital Region and East Java have the highest total expenditures compared to their GDRP. One factor behind this is these provinces' large populations. As grants and subsidies are determined by provincial population, the governments in these provinces receive more grants and subsidies from the central government (Nasution, 2016:6). Since decentralisation, there has been a shift in patterns. Five provinces in eastern Indonesia are recorded as having the greatest public expenditures as a percentage of their GDRPs. This can be linked to fiscal decentralisation policy, in which the central government allocates large intergovernmental transfers in the form of general and special operations funds for areas with high levels of poverty, including Papua and other parts of eastern Indonesia (World Bank, 2007).

This empiric analysis, examining the effects of productive provincial government expenditures on economic growth using a model based on that of Barro (1990) and Mura (2014), has found that expenditures in the education sector promoted health before decentralisation, whereas, since decentralisation, three types of government expenditures have been positively associated with economic growth at the provincial level: education, health, and security and public order. Based on this analysis, it can be said that the implementation of fiscal decentralisation has allowed provinces to better enjoy the results of expenditure allocation. This finding can be linked to regional governments' priority in allocating public funding: regional governments have positioned the education sector as central to regional development (USAID, 2006). This finding also reflects the fact that provincial governments have positioned the education and health sectors as motors for regional development. The positioning of the education sector as a funding priority is inexorably linked to the division of authority between the central government and regional governments, in which education is considered an obliga-

tory function of the regional government under Law No. 22 of 1999 and Law No. 32 of 2004. The government's commitment to the education sector is managed specifically under Law No. 20 of 2003, which stipulates that funds for education (excluding teaching staff wages and training) must represent a minimum of 20% of the total regional budget; this establishes minimum standards to be followed by regional governments in providing education. In the early years of decentralisation, the greatest allocation of development funds from the central government was for the education sector.

Since 2003, special funds from the central government have been available to regional governments in the form of fiscal transfers to use to finance education facilities, as well as health facilities. Provincial and city/regency governments have also increased their allocation of development funds for the education sector significantly; in fact, the education sector receives the most funds after the transportation sector and the government apparatus sector. Education Offices at the regional level manage approximately 30% of total regional budgets (Toyamah & Usman, 2003). The positive association between education sector expenditures and regional economic growth is also linked to the nine years obligatory education policy, which is intended to promote an increase in human resource quality as mandated by Article 3 of Law No. 20 of 2003. In Article 34, Paragraph (2), it is stated that the central government and regional governments will ensure that such a minimum obligatory education is realized. To support this policy, the government began offering school operational aid (*Bantuan Operasional Sekolah*, BOS) in 2005 (Rosser, Joshi, & Edwin, 2011). Of the special funds allocated to regional governments between 2003 and 2006, approximately 70% were allocated for education, health, and road construction.

Similar with the education sector, the health sector is an obligatory function of each regional government. As such, the central government has pushed provincial governments to provide adequate health services to their populations, with a specific focus

on primary health services, clean water, and sanitation (USAID, 2006). This is thought to contribute to health sector expenditures' positive and significant effect on economic growth at the provincial level. As found by Heywood and Choi (2010), despite significant increase in health sector expenditures in Indonesia, the sector's performance has only increased slightly since decentralisation as various regions have numerous structural issues in their health sector management systems. Nevertheless, since decentralisation there has been a fundamental change in the management of health services. Since decentralisation, regional governments' control in managing human resources has been minimal; for example, the recruiting of civil servants for the health sector remains controlled by the central government (Heywood & Choi, 2010:10). Instead, since decentralisation regional governments have hired contract employees and had them promoted to civil servant, with their wages being paid by the regional government. As a result, much of the expenditures in the health sector are allocated for the wages of civil servants active in that area. Operational funds, thus, are lacking. Though the health sector is an obligatory function of the regional government, the central government continues to control the main policies related to health sector employment; this control has limited regional governments' capacity to develop their human resources in the health sector (Heywood & Harahap,2009).

Empirical analysis has also shown that public expenditures for the security and public order sector are significant and positively associated with provincial economic growth. Expenditures in the security and public order sector are not related to military expenditures; under Law No. 22 of 2009 and Law No. 32 of 2004, as well as Government Regulation No. 38 of 2007, defence and security are the authority and responsibility of the central government. However, the positive association between public expenditures for the security and public order sector and provincial economic growth may be understood as indicating that regional governments provide funds for other matters, such as

conflict and potential conflict management, which has commonly been required since decentralization was implemented. Conflict in Sulawesi (Poso and Donggala), for example, has been triggered by ethno-religious factors as well as other factors, including the direct elections for regional leaders (*pilkada*[10]) that have been held since decentralisation (Diprose & Ukiwo, 2008). These direct elections have frequently been coloured by violence and conflict, perpetrated by specific candidates' proponents and opponents.

Extensive diversity has also contributed to communal conflict in various regions, including that caused by radical movements based in religious and ethnic identity (Gindarsah, 2014). Furthermore, one characteristic of the conflicts that have occurred since decentralisation is said conflicts being linked to natural resources; these include, for example, land disputes as well as conflicts over elections (Bazzi & Gudgeon, 2016). This indicates that the security and public order sector requires regional government attention, particularly since decentralisation was implemented (Gindarsah, 2014).

CONCLUSION AND IMPLICATION

This study investigated the impacts of public expenditures on economic growth. Previous empirical findings and existing literature indicated that productive government expenditures had both positive and negative associations with economic growth. Based on these previous findings, the researcher has conducted panel regression analysis on seven categories of productive expenditures using COFOG categorisation—(1) public service; (2) security and public order; (3) economy; (4) environment; (5) housing and public facilities; (6) health; and (7) education—to find their effect on economic growth in the 25 Indonesian provinces that existed before fiscal decentralization was implemented and the 33 provinces that exist after fiscal decentralization. The regression model used followed Barro (1990) and Mura (2014). Study coverage separated the sample into two periods: before

fiscal decentralization (1993–1997) and after decentralization (2011–2015). Based on the theoretical model used, the empirical results indicate that productive government expenditures' impact on economic growth is not straightforward.

Findings from this study have offered some new evidence for provinces in Indonesia on the impact of government expenditures on economic growth. In particular, the regression results for the period before fiscal decentralization revealed that only expenditures in the education sector were capable of creating economic growth in the 25 provinces analysed. Since fiscal decentralization, public expenditures in education have also had a positive association with economic growth. Furthermore, government expenditures on health sector and also expenditure on security and public order have also had a positive effect on economic growth in Indonesia's 33 provinces. These results indicate that the main driving force for economic growth before decentralization was the education sector, whereas, following fiscal decentralization, government expenditure on education, health and security and public order sectors have promoted economic growth at the provincial level.

The research results have several policy implications, particularly for provincial governments in Indonesia. First, provincial governments should promote private investment in public sectors such as public service, economic development, the environment, housing, and healthcare, as the governments' roles in all of these sectors appears to be sub-optimal. This private-sector participation may take the form of public–private partnerships, which have been shown to greatly improve public-sector performance abroad (Ahmad, Bhattacharya, Vinella, & Xiao, 2014). Second, control variables should be included into estimations. Given the findings of this study, further research could be expanded by undertaking robustness estimation, for instance, by including some control variables in the regression models. Relevant control variables may also influence the direction and magnitude of the association between specific productive expen-

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ditures and economic growth. The author leaves these for future research.

ENDNOTES

[1] Government expenditures are used interchangeably with public expenditures throughout this study.

[2] Both laws were amended into Law No. 32/2004 and Law No. 33/2004.

[3] Number of province prior to the implementation of fiscal decentralization was 26, whereas following decentralization, there are 34 provinces across in Indonesia due to proliferation *(Pemekaran). Pemekaran* is a term indicating the formation of new jurisdictions across the various levels of loca government in Indonesia as part of the decentralization law. Considering data availabity, 25 provinces before fiscal decentralization and 33 provinces after fiscal decentralization were included in the estimation.

[4] Local budget (APBD) was made on available from www.djpk.depkeu.go.id.

[5] GDRP is conceptually equivalent to Gross Domestic Product (GDP). GDRP is the number of goods and services produced by all units of economy within a jurisdiction during one fiscal year. GDRP Per Capita is calculated from total GDRP divided with the number of population in each jurisdiction.

[6] COFOG is developed by the United Nations and IMF (https://www.oecd.org/gov/48250728.pdf)

[7] The real value of expenditure is obtained by dividing nominal values by the price index for that same time period as seen in the following formula:

$$Real\ value\ of\ expenditure = \frac{Nominal\ value\ of\ expenditure}{Consumer\ Price\ Index}$$

[8] In 2015, these 33 expenditure sectors consisted of education, agriculture, forestry, health, energy and mineral resources, public works, tourism, oceans and fisheries, spatial management, trade, development planning, industry, transportation, transmigration, environment, defence, demographics and civil registry, women's empowerment and children's protection, family planning and welfare, social affairs, labour, cooperatives and micro/small industry, capital investment, culture, youth, and sports, nationalunityanddomesticpolitics, regionalautonomy,generalgovernance,regional financial administration, regional infrastructure, staff, food sustainability, social and village empowerment, statistics, archives, communication, and information, and finallylibraries

[9] Reinikka and Svensson (2001) find that leakage occurs in public expenditures because public officials allocate their expenditures to sectors with no connection to the public interest to further theirownprivateinterests.

[10] Direct elections are an implication of regional autonomy, as stipulated in Law No. 32 of 2004. Regional governments hold direct elections for regional leaders (governors/mayors/regents) within each province or city/regency.

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