



Master Thesis U.S.E

**The Impact of Government Capital Expenditure Effectiveness Including Public-Private
Partnership Involvement on Economic Growth:
Evidence in Indonesia¹**

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Abstract

The purpose of this study is to examine the effect of government capital expenditure effectiveness, including public-private partnership, on Indonesia's economic growth. This study examines the cost-effectiveness of public-private partnerships in Indonesia over a 17-year period, contrasting its efficacy before and after the implementation of public-private partnerships. On a 5% significance level, it was determined that RGCE (The ratio of government spending for the infrastructure sector to total expenditures) and RPPP (The ratio of contract value of public-private partnership project to total government spending for the infrastructure) negatively affect Gross Domestic Product growth of Indonesia but have no significant effect. However, Inflation and Foreign Direct Investment had marginally positive effects on GDP growth. In addition, there is no significant difference between the cost efficacy of government capital expenditures before and after the PPP period. In this analysis, the relatively modest cost of implementing a PPP endeavor is deemed to have a significant effect.

JEL Classification: H72, O18, O40

Key words: Public-Private Partnership; Government Capital Expenditure; Cost Effectiveness; Economic Growth

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Chapter 1

Introduction

1.1 Preface

The implementation of public infrastructure projects has always been a global government's top priority. Public infrastructure facilitates the geographic concentration of economic resources and the growth and consolidation of product and labor markets (Gu, Macdonald, 2009). The importance of an efficient infrastructure for national security, economic growth, and quality of life cannot be overstated (Baldwin, Dixon, 2008). The researchers examine the impact of infrastructure from a variety of perspectives, including regional competitiveness, economic growth, income inequality, output, labor productivity, the impact on the environment and well-being (in terms of time and cost savings, increased safety, and the development of information networks) (Bristow and Nellthorp, 2000). Commonly, public infrastructure is regarded as the basis upon which the economy is built (Macdonald, 2008). To finance and implement infrastructure projects, governments are increasingly relying on public-private partnerships (PPPs) due to limited public resources and funding.

Practitioners and academics have defined public-private partnership (PPP) in a variety of ways, with each definition varying slightly from the others (Abadie and Howcroft, 2004, Cuttaree and Mandri-Perrott, 2011). Utilizing the private sector's skill and management expertise, PPPs facilitate the delivery of public infrastructure projects (Skietrys et al., 2008). In fact, this method of procurement is an efficient means of delivering "value for money" public infrastructure, combining the benefits of competitive bidding, flexible negotiations, and risk allocation among parties (Akintoye et al., 2003).

With PPP schemes, governments can now concentrate on fostering infrastructure growth and development in other sectors of the economy (Cumming, 2007).

The private sector plays a significant role in the design, construction, financing, and operation of public infrastructure projects through public-private partnerships (PPPs). The rationale for PPPs is that they can deliver projects more efficiently and affordably than traditional public procurement, resulting in cost savings for the government.

A key significant characteristic of PPP is the allocation and sharing of risk among parties (Ke et al., 2010a, Ke et al., 2010b). Unlike other procurement methods, with PPP arrangement, risks are carefully identified and allocated to the party that has better mitigation techniques for such risks (Li et al., 2005a). Additionally, PPP is noted for its long term partnership with over 10 years of relationship between the public entity and private consortium, therefore a stable and enduring relationship is often required for its effective operation (Middleton, 2000). Furthermore, in this scheme, each participant brings on some resources that could be material or immaterial to the partnership (Akintoye et al., 2003).

Several governments have begun to invite private parties to join long-term contractual agreements based on public-private partnerships in order to address the challenges of infrastructure procurement, including legal, social, political, and financial concerns (PPPs) (Grimsey and Lewis, 2002). It has been acknowledged that PPPs are capable of leveraging the innovative capacity and financial resources of the private sector (Chou et al., 2012, Russell et al., 2006). By outsourcing risk to private entities, a PPP enables a government to benefit from the participation of the private sector in managing and financing the expansion of public services. The government can therefore concentrate on policymaking, planning, and regulation (The World Bank, 2011).

Moreover, PPPs are believed to provide a high return on infrastructure procurement investments (Bing et al., 2005a, Hwang et al., 2013, Ke et al., 2010). In fact, 139 developing nations have actively invited private organizations to participate in PPP programs (Chou et al., 2012) to accelerate infrastructure development. Numerous nations have utilized PPPs because they improve operational efficiency, permit the innovation of technological and managerial skills, and increase the participation of private entities in the provision of public services (Chowdhury et al., 2011, Hwang et al., 2013).

Budgetary constraints, high levels of national debt, and a lack of funds are frequently cited as reasons why low-income and developing nations seek alternative means to finance their infrastructure needs (Altug & Firat, 2018; Amos & Zanhoun, 2019; Arezki et al., 2017; Yang, 2008). Macroeconomic stability is frequently cited as an important factor for the implementation of PPP projects (Boyer & Scheller, 2018; Delmon, 2011; Ehrhardt & Irwin, 2004; Hammami et al., 2006; Thomsen, 2005).

Indonesia has issued Presidential Regulation No. 67 Year 2005 regarding The Cooperation Between Government and Business Entities In The Provision Of Infrastructure (PR67/2005) as the basis for conducting PPPs in the infrastructure sector. In 2015, the PR67/2005 was replaced by Presidential Regulation No.38 Year 2015 regarding The Cooperation Between Government and Business Entities Regarding the Provision of Infrastructure (PR38/2015).

It was clear from the title of the Presidential Regulation, either PR67/2005 or PR38/2015, that PPPs in Indonesia are only used for infrastructure construction. From the first consideration of PR67/2005, the first regulation issued for conducting PPP in Indonesia, it is clear that "the availability of adequate and sustainable infrastructure is an urgent need to support the implementation of national development in order to improve the economy and

public welfare, and to increase Indonesia's competitiveness in the global society." Further examination of the PR67/2005 revealed that "in order to expedite infrastructure development, comprehensive steps must be taken to create an investment climate that encourages the participation of business entities in the provision of infrastructure based on sound business principles." It was clear from these statements that PPP is only open and available for infrastructure construction.

According to Investor Relations Unit Republic of Indonesia (2022), Infrastructure development is one of the government's 2023 priorities in relation to achieving increased productivity for economic transformation towards the 2045 vision of Indonesia Moving Forward. In 2022, the Indonesian economy expanded by 5.31%, its highest annual growth rate since 2013. The Directorate General of Financing and Risk Management disclosed that the government was only able to meet 37%, or 2,385 trillion rupiah, of the total infrastructure funding needs outlined in the national medium-term development plan for 2020-2024. The 2020-2024 national medium-term development plan estimates that State Owned Enterprises will be able to fund 1,353 trillion rupiah, or 21% of the total funding requirement. The majority of funding for domestic infrastructure comes from the private sector, amounting to 2,707 trillion rupiah, or 42% of the total requirement. Innovative financing is required to bridge this gap in infrastructure financing needs, which is anticipated to be a solution for achieving the infrastructure development objective while also reducing the primary balance deficit in order to maintain a healthy state budget. Government of Indonesia has established a number of initiatives to encourage private sector participation in the infrastructure sector, particularly for National Strategic Projects, such as public-private partnerships (PPP). PPP is a type of innovative financing with a complete legal framework that has been used to finance a number of infrastructure projects.

This study will investigate the impact of government capital expenditure effectiveness on infrastructure sector with contribution of implementation of PPPs in infrastructure project in Indonesia particularly on economic growth indicator, which will be the Gross Domestic Product (GDP). Furthermore, this study will be followed by a discussion of the study's methodology and data sources. This research will conclude with a discussion of the study's implications for infrastructure development policymakers and stakeholder, as well as recommendations for future research.

1.2 Research Gap

The gap being addressed is the absence of explicit research on the effectiveness of government spending in the infrastructure sector in Indonesia involving Public-Private Partnership schemes, which can have any impact to the economic growth.

1.3 Research Objective

This study objective is to analyze the level of effectiveness of government capital expenditure through indicators of implementation of Public-Private Partnership with participation of private sector in order to achieve value-for-money public infrastructure, which can have any impact to the Gross Domestic Product as the indicator of economic growth.

1.4 Research Questions

- a. How the effectiveness of government capital expenditure in the infrastructure sector in Indonesia involving Public-Private Partnership model can have any impact to the Gross Domestic Product?
- b. Are there any differences between the cost-effectiveness of government capital expenditure before and after PPP implementation?

Chapter 2

Literature Review and Theoretical Framework

2.1 Infrastructure Projects

The term infrastructure typically refers to the physical assets, equipment, and facilities of interconnected transport and energy systems, as well as the necessary service providers, as well as the underlying structures and accompanying organizations, business models, rules, and regulations that are used to provide particular goods and services (Weber et al., 2011; Leendertse & Arts, 2020).

Infrastructure projects, including high-speed railways, port construction, long-span bridges, tunnels, and hydropower projects, provide vital public services for social development and the lives of citizens (Morris et al., 2011). Financially and socially, infrastructure projects are substantial, and it is anticipated that they will continue to benefit society for decades (Vuorinen and Martinsuo, 2019).

Government plays the leading role in infrastructure projects, acting as a decision-maker, investor, and server, and attempting to stimulate demand and maintain stable economic growth through the construction of infrastructure projects (Chen et al., 2013). The government must combine its social obligation and political function (Scherer and Palazzo, 2011) and make socially responsible decisions regarding whether infrastructure projects should be approved, funded, or implemented (Cairns, 2004; Garriga and Melé, 2004). It must consider not only economic criteria, but also whether the project is for political achievement or the people's best interests, and whether it can achieve value for money through risk management and cost control measures (Li et al., 2012a).

2.2 Infrastructure Projects in Indonesia

In Indonesia, the Government divides the budget of infrastructure into 3 segments: Economic Infrastructure, Social Infrastructure and Support of Infrastructure. This study will focus on Economic Infrastructure. According to Presidential Regulation No. 18 Year 2020 regarding The Medium-Term National Development Plan 2020-2024, the target highlights for economic infrastructure in 2024 are High Speed Train in Java (connecting Jakarta – Semarang and Jakarta – Bandung), Train connecting Makassar and Pare-Pare, Integrated Main Port Network, 43 Routes of Air Bridge, 2,500 km New Build and/or Operations of Toll Roads, 3,000 km New Build of National, 97% great condition National Road, Traveling time on the Road Main Cross Island reached 1.9 hour/kilometres and 27% Connected Shipping Routes (loops).

In The Medium-Term National Development Plan 2020-2024, it also mentioned that Indonesia still faces economic challenges to achieve the goals. One of the challenges is to fulfil investment and financing needs. During the period 2020-2024, an investment of 35,212.4 – 35,455.6 trillion IDR will be required to achieve the desired economic growth rate of 5.7% - 6% annually.

The government and BUMN will contribute 8.4% - 10.1% and 8.5% - 8.8%, respectively, of the total needs, while the remainder will be met by the public or private sector. The financing of investment needs in 2020-2024 is pursued by strengthening the financial sector, including banks and non-banks, by increasing financial inclusion, expanding financial product innovation, developing service sector infrastructure financing, and optimizing financing alternatives.

2.3 Public Private Partnership

Many definitions exist for public-private partnerships (PPP). According to Hodge and Grave (2007) PPPs are defined as “cooperative institutional arrangements between public and private sectors”. They also note that there is a lack of consensus regarding the role of PPPs in economic development. Some contend that PPPs offer a novel approach to managing infrastructure projects like highways (Savas, 2000). Others note that PPPs represent a novel model for private participation in traditionally public projects (Linder, 1999).

Public and private partnership (PPP) is defined as "a long-term contract between a private party and a government entity for the provision of a public asset or service, in which the private party bears significant risk and management responsibility, and compensation is performance-based" (The World Bank, 2019). Leibenstein (1966), who introduced the concept of "X-efficiency", explained the productivity differences between public and private firms with intangible "X-factors" such as labor management relations, organizational structures, incentive systems, and selection of workers as the origins of PPP. In accordance with Leibenstein's (1966) recommendations, PPP may be required for governments and public organizations to reduce organizational inefficiencies. In fact, PPPs can increase both the amount of capital for infrastructure investments and the operational efficiency through the transfer of private sector expertise, though these benefits are not always automatically realized in every project (Ahwireng-Obeng & Mokgohlwa, 2002; Bajwa et al., 2018). While there are numerous potential benefits of PPP in several areas of economic and social life, the probability of failure may be greater than the probability of success in the absence of a well-organized and timely PPP system.

Greve (2003) suggests that PPPs is “just another catchy piece of terminology that governments would like to promote to keep off the attention of the more mundane contracting for public services arrangements” (p. 60). PPPs may contribute significantly to both the firms involved and the economy as a whole. Effective PPPs recognize that the public and private sectors each have certain advantages over the other in performing particular tasks, whereas a strong PPP allocates tasks, obligations, and risks among the public and private partners in the most optimal manner (Altug & Firat, 2018; Hammami et al., 2006).

According to the European Commission Green Book, published by the Commission of the European Communities (2004), PPP is a form of cooperation between the public and private sectors designed to ensure the financing, building, construction, operation, and maintenance of a specific infrastructure or the provision of services. The objective of signing the PPP contract was to assure the private sector that it will receive incentives from the government (public sector) for supporting the economy and economic growth and enhancing the development of infrastructure and public services to meet public needs. The primary characteristics of PPP are (Rakiae and Raenovi, 2011):

- a. A contractual partnership lasting between 25 and 30 years over the long term;
- b. The PPP's contract must define the integration of all phases of the project, the allocation of contributions, investments, responsibilities, and credits for the duration of the contract's validity;
- c. The PPP's contract must specify the required outputs and output specifications as the desired end result;

- d. The public partner will be responsible for defining the PPP's purpose in the public interest and establishing the necessary terms for construction, maintenance, and service in order to meet quality standards;
- e. The private partner assumed the risk that would have otherwise been borne by the public sector, although risk allocation may vary from case to case;
- f. The public partner may pay a "fee" to the private partner for the construction and operation of the PPP's project and agrees that it must be used in accordance with the contract's intent;
- g. At the conclusion of the contractual period, the public partner should receive ownership of the project's assets.

Public-private partnerships enable the public sector to leverage the private sector's discipline and expertise in investment, innovation, and risk management, thereby creating value from a public policy standpoint (HM Treasury, 2012). In general, the private sector has greater economic incentives and efficiencies in organizing financial capital to fund the investment, as well as a more business-minded approach to managing market risks (Chung et al., 2010, Kivleniece and Quelin, 2012). Under this governance model, the role of the private sector has been extended to the provision of what are generally considered public services such as the design, financing, building, maintaining, and operating of infrastructure assets, and the delivery of associated services including the associated risk management (Agyenim-Boateng et al., 2017; Van den Hurk & Heuskes, 2017).

2.4 Public Private Partnership Projects in Developing Countries

Budgetary constraints, high levels of national debt, and insufficiency of funds are frequently cited as reasons why low-income and developing nations seek alternative means to finance their infrastructure requirements (Altug & Firat, 2018; Amos & Zanhoun, 2019;

Arezki et al., 2017; Yang, 2008). In recent decades, the Public Private Partnership (PPP) model has grown in popularity as an alternative source of funding to support infrastructure-related investment activities in low-income and developing countries (Andrews & Entwistle, 2015; Boyer & Scheller, 2018; Maurya & Srivastava, 2019; Sharma, 2012; Yurdakul & Kamasak, 2021).

In dynamic environments where firm perceptions of economic and political risk are high (Jermias & Yigit, 2019; Kamasak, 2017), it can be difficult for public and private partners to make a sound decision regarding whether to engage in a PPP project. Frequently, macroeconomic stability is cited as an important factor for the implementation of PPP projects (Boyer & Scheller, 2018; Delmon, 2011; Ehrhardt & Irwin, 2004; Hammami et al., 2006; Thomsen, 2005).

2.5 Public Private Partnership in Indonesia

Financing alternative that has been established in Indonesia, in order to support the infrastructure development, is Public-Private Partnership scheme. According to the data that was released in Ministry of Finance website, there are 36 projects carried out under the Public-Private Partnership Scheme which varies from planning to project completion, with details as follow:

No.	Stage of Project	Number of Project
1	Planning	2
2	Preliminary	10
3	Auction	3
4	Contract Signing and Financial Close	5
5	Construction	4
6	Operation	7
7	End of Project	0
Total		36

(Source: <https://kpbu.kemenkeu.go.id/read/67-208/umum/kajian-opini-publik/meningkatkan-kualitas-apbn-dengan-skema-kpbu>)

In the provision of infrastructure through PPPs, government and business entities can collaborate in a variety of model structures, depending on the scope of services to be

provided in collaboration with the private sector, which may include design, construction, financing, operation, and maintenance. The variation in mode depends on the characteristics of the infrastructure services to be collaborated with and the sector-specific the government planning.

Different types of PPP schemes can also occur due to disparities in funding sources or return on investment from the collaborative projects. In this instance, the PPP project can be funded by user payments based on user fees or government payments based on service availability (availability payments).

The user charge scheme or user fee payment scheme is a scheme in a public-private partnership (PPP) project in which the project receives funding and returns on investment from user fees for services provided by business entities. Infrastructure projects that are typically implemented using a user charge scheme are projects that can generate revenue more easily and transparently, including due to high user estimates that allow private business entities to manage demand risks.

The availability payment scheme (or AP scheme) is a scheme in a public-private partnership (PPP) project in which the return on business entity investment comes from periodic payments made by the Government (in this case ministers/heads of institutions/heads of regions) to business entities based on the availability of infrastructure services. This AP is provided to include capital expenditures, operational expenditures, and the rate of return on investment. Private sector procurement of infrastructure through the AP scheme is anticipated to be more attractive because the private sector's return on investment is more certain due to the absence of demand risk.

2.6 PPPs and Economic Growth

In Europe, Jasiukevicius and Vasiliauskaitė (2013, p. 226) use PPP and GDP data for 10 identified European countries for the 16-year period 1995-2011 and adopt correlation as a single quantitative method. They conclude that the results of their research on the relationship between PPPs and GDP were mixed. In Belgium, Ireland, and France, for instance, relationships between PPPs and economic growth were found to be statistically significant, whereas in the United Kingdom, the results were less significant.

However, case studies analyzed by Gondard, Romero, and Ravenscroft (2018, p. 4) across four continents – Africa (Liberia, Lesotho), Asia (India, Indonesia), Europe (Spain, Sweden, France), and South America (Peru, Colombia) – revealed that: PPP projects involve huge capital injections, causing a burden on the public purse; PPPs negatively impacted the poor and exacerbated income disparities; all the PPPs It is evident that PPP projects with a high cost to the public purse would have a negative impact on economic growth. In these 10 nations, it was determined that PPPs negatively affected economic growth (Gondard et al, 2018, p. 4).

Sharma (2011, p. 154) found in an early study that a sound macroeconomic environment can significantly reduce the commercial risk of private firms and increase their profitability prospects. Hammami et al. (2006, p. Stable macroeconomic conditions regarding interest, exchange, and inflation rates are essential for the success of PPP projects, especially in terms of cost-effectiveness for governments.

2.7 Government Expenditure

The state budget is a crucial component of the national financial system and a necessary resource for carrying out the state's duties. In the past two decades, there has been a global trend toward reforming and enhancing the efficiency of state budget management in

developed nations countries including developing nations (Shah, 2007). Effective state budget management is regarded as having numerous potential advantages for governments: Assuming a clear relationship between public funding allocations, government priorities, and the capacity to reduce basic expenditures to improve budget management efficiency (Curristine et al., 2007).

State budget expenditure refers to the distribution and use of government funds to ensure the execution of state functions in accordance with certain tenets (Wildavsky, 1964). According to Hoang et al. (2010), state budget expenditure is comprised of a multitude of distinct components, each of which has a unique effect on economic growth. Nevertheless, countries frequently divide state budget expenditures into three major categories: development investment expenditures, recurrent expenditures, and other expenditures.

Government expenditure can be understood as the use of a nation's resources to finance a state activity, in the context of carrying out the government's responsibilities for sustaining and achieving prosperity (Mangkoesoebroto., 2001). Government expenditures in Indonesia are compiled in the State Budget and Regional Government Budget. Government expenditures are a component of total demand. The calculation of national income using the public expenditure method is based on Keynes Theory:

$$Y = C + I + G + (X - M)$$

This formula is known as national income identity, and Keynes was the first to propose it. The variable on the right side of the equation is aggregate demand. G variable is government expenditure. By comparing the value of Y , the contribution of government spending to determining aggregate demand or national income can be determined. With this formula, the impact of government spending, particularly in the state expenditure sector, on the economy can be analysed.

Budget expenditures must be aligned with an economic strategy for medium and long-term economic growth. The expenditures of all levels of government must be considered in order to promote growth. Fiscal decentralization, which transfers power from upper-level to lower-level government, is one of several solutions to reform the public sector, increasing the competitiveness of lower-level governments in the provision of public goods and services and accelerating economic growth (Bahl & Linn, 1992).

In the context of local government expenditures, efficiency is the condition in which it is no longer possible to reallocate funds to improve the community's welfare (Stiglitz, 2000).

In other words, the efficiency of local government expenditures is the condition in which each rupiah spent by the government generates the maximum amount of social welfare.

When these conditions are met, government spending is at its optimal level.

2.8 Previous Research

a. Effectiveness of Government Spending

Solihin et., al (2017) measured efficiency and effectiveness of government expenditure on education at districts/cities level in East Java Indonesia. The study revealed that the government's expenditures in the education sector continue to have no effect on the improvement of the education index, or in other words, the government's expenditures are ineffective in improving the quality of human resources and city districts in East Java Province. These findings bolster the conclusions regarding the effectiveness of government spending in the education sector. Government spending in the education sector is inefficient in the majority of districts and the capital of East Java Province.

Based on the prior study, in order to find the efficiency and effectiveness of the government expenditure, the researchers were using Data Envelopment Analysis

(DEA) models to analyse efficiency and performed panel regression technique to measure effectiveness

b. Impact of PPP on Economic Growth

There was research conducted by Banda and Jeke (2021) regarding The Impact of Public Private Partnerships on Zambia's Economic Growth and Development. One of the results was PPPs affect GDP positively. During the review period, PPPs stimulated economic activity by fostering the formation of businesses. As PPPs have a positive impact on GDP, the Zambian government should continue to leverage PPP investments as a pro-poor model that stimulates economic activity and promotes economic growth. The researcher conducted normality, serial correlation, and heteroscedasticity tests to improve the validity of the autoregressive distributed lag (ARDL) model for determining the long-term relationship between the variables. Due to limited observations, the study used a maximum of one lag (biannual data for 17 translated to 34 observations). This research employed inflation, government expenditure on health and trade openness as the control variables.

c. Factors that affect GDP

According to the study conducted by Aziz and Azmi (2017) about Factor Affecting Gross Domestic Product (GDP) Growth in Malaysia, it resulted that Foreign Direct Investment was found to be the only significant factor and positive relationship towards GDP. On the other hand, inflation and female labour force as other control variables had insignificant impact towards GDP, however, female labour force had positive relationship towards GDP.

The researcher used annual time series data for the 1982 to 2013 periods, the Ordinary Least Square Method (OLS) and Augmented Dicky Fuller (ADF) for the analysis.

2.9 Hypotheses

- a. The researcher's hypothesis for this study is that the government capital expenditure effectiveness, including public-private partnership participation, has an effect on economic growth, as measured by Gross Domestic Product.

H0 : The government capital expenditure effectiveness, including public-private partnership participation, has no effect on economic growth, as measured by Gross Domestic Product

H1 : The government capital expenditure effectiveness, including public-private partnership participation, has an effect on economic growth, as measured by Gross Domestic Product

- b. In addition, this research investigates the comparison between cost-effectiveness of government capital expenditure before and after PPP implementation.

H0 : The implementation of PPP does not have a positive impact on cost-effectiveness of government capital expenditure compared to before implementation of PPP

H1 : The implementation of PPP has a positive impact on cost-effectiveness of government capital expenditure compared to before implementation of PPP

Chapter 3

Research Methodology

3.1 General Research Strategy

- a. The effectiveness of government spending in the infrastructure sector is measured with how to perform multiple regression from the input variables to the outcome variable which in this case is defined as infrastructure outcome. Panel data regression technique is used as main analysis because the study focuses on infrastructure outcome in Indonesia for the last several years. With the assumption that independent variables will not have impact on the same year the dependent variables, but it will affect minimal one period after the spending is allocated (Solihin, et., al., 2017). The measurement or estimation of the effectiveness of government spending in the infrastructure sector started with the time series data regression on the input variables (independent/control variables) and outcome variable (dependent variable).
- b. The comparison between cost-effectiveness of government capital expenditure before and after PPP implementation is measured with paired samples t-test. When there is a one-to-one correspondence (or pairing) between two samples, the paired t-test is used to compare their means. It is suitable for interval-scale variables when the distribution (of within-pair differences) is approximately normal (McCrum-Gardner, 2008).

3.2 Model Variables

- a. The regression model used for infrastructure regression is adapted from previous research conducted by Solihin et., al (2017) and Aziz and Azmi (2017), with detail as follows:

$$Y_{pt} = \alpha_0 + \alpha_1 RGCE_{t-1} + \alpha_2 RPPP_{t-1} + \alpha_3 INF_{t-1} + \alpha_4 FDI_{t-1} + u_t \dots \dots \dots (3.1)$$

Description:

Y_{pt}	:	Infrastructure Outcome / Gross Domestic Product
$RGCE_{t-1}$:	The ratio of government spending for the infrastructure sector towards total expenditures
$RPPP_{t-1}$:	The ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector
INF_{t-1}	:	Inflation
FDI_{t-1}	:	Foreign Direct Investment
t	:	Annually (2007 to 2022)
u	:	error term

Determination of independent variables based on the previous studies which have the similarity with the purpose of this study. RGCE and RPPP are the control variables that reflect the government expenditure effectiveness, INF and FDI are the control variables that expected to have impact on economic growth ((Banda and Jeke, 2021) and (Aziz and Azmi, 2017)).

- b. In order to find out another perspective that how well the independent variables affected dependent variables without including inflation as independent variable, this research will also use another regression model that has been modified from the previous one, with detail as follows:

$$Y_{pt} = \alpha_0 + \alpha_1 RGCE_{t-1} + \alpha_2 RPPP_{t-1} + \alpha_3 FDI_{t-1} + u_t \dots \dots \dots (3.2)$$

Experimenting without including inflation in the model is a continuance of the prior model, which was omitted from the current study. In the previous model, inflation was the only variable with a significant effect on economic growth, and public-private partnership data did not begin until 2016 (when the project was initiated).

- c. For the comparative study, data used for the statistical test derived from independent variable RGCE (The ratio of government spending for the infrastructure sector towards

total expenditures) annually for the last 16 years (Q1 2007 to Q4 2022). The rationale is to find out how is the ratio develop each year after a decade and after the first payment of PPP contract implementation in 2018.

3.3 Expected Outcome

- a. According to the study, the purpose is to provide an explanation for a particular phenomenon, that is the government capital expenditure effectiveness, including public-private partnership participation, has an effect on economic growth, as measured by Gross Domestic Product. Therefore, the expected type of outcome will be explanatory outcome, with details of expected impact as follow:

Independent Variables	Expected Type of Outcome
Ratio of government spending for the infrastructure sector towards total expenditure	Positive Effect
Ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector	Positive Effect
Inflation	Positive Effect
Foreign Direct Investment	Positive Effect

- b. For the comparative study, the result expected is the implementation of PPP has a positive effect to the cost-effectiveness of government capital expenditure.

3.4 Data Collection

Data that used for this research derived from data that available in Indonesia, with details as follow:

Data	Period of Time	Source
GDP	Annually from 2007 to 2022	World Bank
GDP Growth	Annually from 2007 to 2022	World Bank
Government Spending for the Infrastructure Sector	Annually from 2007 to 2022	Indonesia's Ministry of Finance
Contract Value of PPP Project	Annually from 2018 to 2022	Indonesia's Ministry of Finance
Total Government Expenditure	Annually from 2007 to 2022	World Bank
Inflation	Annually from 2007 to 2022	Central Bank of Indonesia
Foreign Direct Investment	Annually from 2007 to 2022	World Bank

Chapter 4

Empirical Results

4.1 Descriptive Statistic Analysis

Descriptive statistical analysis (Fisher & Marshall, 2009) in this study aims to find out how RGCE (The ratio of government spending for the infrastructure sector towards total expenditures), RPPP (The ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector), INF (inflation), FDI (Foreign Direct Investment), and GDP (Gross Domestic Product) growth in Indonesia from 2007 to 2022.

According to the outcomes of data processing, the following descriptive statistical analysis outcomes are obtained:

Table 4.1 Descriptive Statistic Analysis

	RGCE	RPPP	INF	FDI	GDP
Mean	20.45313	0.907500	4.846875	16.59000	4.880000
Median	20.84500	0.000000	4.590000	16.82000	5.120000
Maximum	31.10000	8.290000	10.31000	17.58000	6.350000
Minimum	7.120000	0.000000	1.560000	15.33000	-2.070000
Std. Dev.	7.390591	2.202140	2.163170	0.627662	1.980364
Skewness	-0.371804	2.651571	0.762609	-0.874598	-2.892505
Kurtosis	2.168512	9.130285	3.670264	2.836760	10.86231
Jarque-Bera	0.829551	43.80248	1.850362	2.057558	63.52152
Probability	0.660489	0.000000	0.396460	0.357443	0.000000
Sum	327.2500	14.52000	77.55000	265.4400	78.08000
Sum Sq. Dev.	819.3125	72.74130	70.18954	5.909400	58.82760
Observations	16	16	16	16	16

Source: Outcomes of Data Processing, 2023

During the 2007-2022 time period, the RGCE variable (The ratio of government spending on the infrastructure sector to total expenditures) had a mean value of 20.45%, a standard deviation of 7.39%, and a median value of 20.84%. The 2017 period yielded the maximum RGCE score of 31.10%, while the 2007 period yielded the lowest RGCE score of 7.12%.

During the 2007-2022 period, the RPPP (The ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector) variable had a mean value of 0.907%, a standard deviation of 2.20%, and a median value of 0.00%. The highest RPPP value was 8.29%, which corresponds to the year 2021, while the lowest RPPP value was 0.00%.

During the period from 2007 to 2022, the INF (inflation) variable had a mean value of 4.84%, a standard deviation of 2.16%, and a median value of 4.59%. The highest value of INF (inflation) was 10.31%, which occurred in 2008, while the lowest value was 1.56%, which occurred in 2021.

During the 2007-2022 time period, FDI (Foreign Direct Investment) variable had a mean value of 16.59%, a standard deviation of 0.62%, and a median value of 16.82%. The highest value of FDI (Foreign Direct Investment) was 17.58% in 2022, while the lowest value of FDI (Foreign Direct Investment) was 15.33% in 2016.

During the 2007-2022 period, the mean value of the GDP growth variable was 4.88%, with a standard deviation of 1.98%, and a median value of 5.12%. The highest GDP (growth) value was 6.35% during the 2007 period, while the lowest GDP (growth) value was -2.07% during the 2020 period.

4.2 Research Data Analysis

a. Testing for Hypothesis 1

Before conducting the regression analysis, the classical assumption test is conducted.

The classical assumption test aims to determine whether the used regression model is ordinary or not. Good data are those that pass the traditional assumption test.

1) Classic Assumption Test

In regression analysis, it is a statistical requirement to conduct the classical assumption test in order to meet the BLUE (Best Linear Unbiased Estimate) criteria (Woolridge, 2015).

(a) Normality Test

On the basis of the results of data processing, the results of the normality test are as follows:

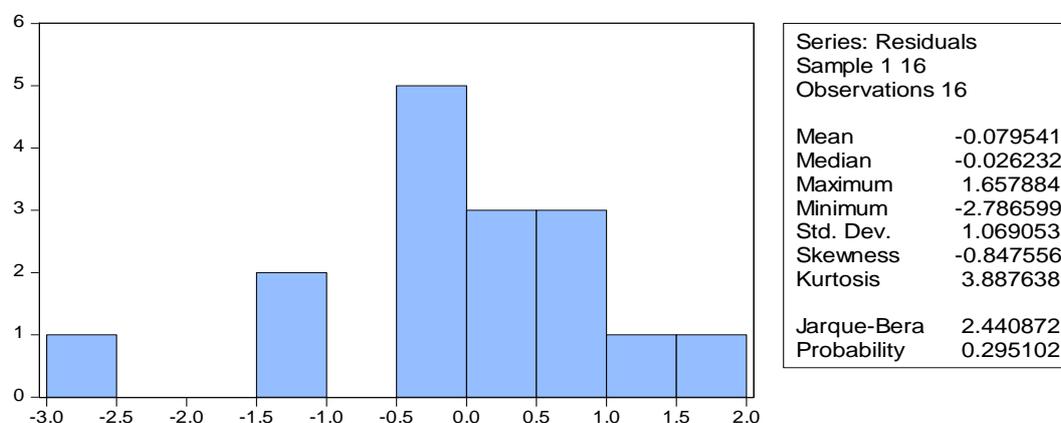


Figure 4.1 Normality Test

Source: Outcomes of Data Processing, 2023

Based on the results of the Jarque-Bera normality test (Koizumi, et.al, 2009), a probability result (p-value) of 0.295 is obtained, as the probability result (p-value) of 0.295 is greater than 0.05, indicating that the data in this study are normally distributed.

(b) Multicollinearity Test

Based on the outcomes of data processing, the following multicollinearity test outcomes are obtained:

Table 4.1 Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	172.5102	829.1858	NA
GCE	0.011221	25.32354	2.761747
PPP	0.073462	1.896127	1.605326
INF	0.154955	20.76443	3.267342
FDI	0.698040	924.6824	1.239198

Source: Outcomes of Data Processing, 2023

According to the results of the multicollinearity test (Daoud, 2017), Centered VIF results were obtained for each independent variable <10 , indicating that there is no multicollinearity or correlation between the independent variables in these research data.

(c) Heteroskedasticity Test

The following are the results of the heteroscedasticity test with the Glejser test based on the data processing outcomes.

Table 4.2 Heteroskedasticity Test

Heteroskedasticity Test: Glejser

F-statistic	1.986905	Prob. F(4,11)	0.1662
Obs*R-squared	6.711235	Prob. Chi-Square(4)	0.1520
Scaled explained SS	8.390991	Prob. Chi-Square(4)	0.0783

Source: Outcomes of Data Processing, 2023

Based on the heteroscedasticity test results with Glesjer (Obabire Akinleye, et.al, 2020), the Obs*R-squared probability results are 0.15 due to the significance results ($0.15 > 0.05$), so there is no heteroscedasticity problem with this regression model.

(d) Autocorrelation Test

In the autocorrelation test, the Durbin-Watson test is used to determine whether there is autocorrelation in the regression model, and the Durbin-Watson value obtained from the regression model's estimation results is shown below (Woolridge, 2015). The d_u and d_l values can be derived from the Durbin Watson statistical table, which is dependent upon the number of observations and explanatory variables. Based on the outcomes of data processing, the following are the autocorrelation test outcomes:

Table 4.3 Autocorrelation Test

R-squared	0.392660	Mean dependent var	4.880000
Adjusted R-squared	0.171809	S.D. dependent var	1.980364
S.E. of regression	1.802230	Akaike info criterion	4.266234
Sum squared resid	35.72838	Schwarz criterion	4.507668
Log likelihood	-29.12987	Hannan-Quinn criter.	4.278597
F-statistic	1.777938	Durbin-Watson stat	2.630897
Prob(F-statistic)	0.203476		

Source: Outcomes of Data Processing, 2023

Based on the results of the autocorrelation test, the d_w result was 2.630897. When compared with the d_l (lower limit) and d_u (upper limit) values for $n = 16$ and $k = 4$, d_l was 0.7340 and d_u was 1.9351. Since $d_u < d_w < 4 - d_u$ ($1.9351 < 2.630897 < 2.0649$), it can be concluded that there is no autocorrelation in this regression model.

2) Panel Data Regression Analysis – Model 1

The approach model employs the Common Effect Model (CEM), which is the simplest panel data model approach since it incorporates only time series and cross-sectional data (Zulfikar & STp, 2018). Due to the fact that this model disregards time and individual dimensions, it is presumed that the behaviour of company data is consistent over time. This method may use Ordinary Least Squares (OLS)

approach or the least squares technique to estimate the panel data model (Woolridge, 2015).

The first regression analysis will be carried out for the first model as follows:

$$Y_{pt} = \alpha_0 + \alpha_1 RGCE_{t-1} + \alpha_2 RPPP_{t-1} + \alpha_3 INF_{t-1} + \alpha_4 FDI_{t-1} + u_t \dots \dots \dots (3.1)$$

The following results are obtained based on data processing results:

Table 4.4 Panel Data Regression Analysis (CEM) – Model 1

Dependent Variable: GDP
 Method: Least Squares
 Date: 06/06/23 Time: 11:38
 Sample: 1 16
 Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.509921	13.03699	-0.039113	0.9695
RGCE	-0.064429	0.111386	-0.578434	0.5746
RPPP	-0.180534	0.387193	-0.466263	0.6501
INF	1.254712	2.393502	0.524216	0.6105
FDI	0.302310	0.844391	0.358021	0.7271
R-squared	0.392660	Mean dependent var		4.880000
Adjusted R-squared	0.171809	S.D. dependent var		1.980364
S.E. of regression	1.802230	Akaike info criterion		4.266234
Sum squared resid	35.72838	Schwarz criterion		4.507668
Log likelihood	-29.12987	Hannan-Quinn criterion		4.278597
F-statistic	1.777938	Durbin-Watson stat		2.630897
Prob(F-statistic)	0.203476			

Source: Outcomes of Data Processing, 2023

Based on the output, the results of the regression equation are obtained, as follows:

$$GDP = -0.509921 + (-0.064429)RGCE + (-0.180534)RPPP + 1.254712NF + 0.302310FDI + u$$

RGCE and RPPP have negative effect to dependent variables while INF and FDI are positively affected the dependent variables.

3) Coefficient Determination (R^2) – Model 1

The coefficient of determination (R^2) attempts to quantify how well the model can explain the variation in the dependent variable (Woolridge, 2015). Based on data processing, the coefficient of determination results are as follows:

Table 4.5 Coefficient Determination – Model 1

R-squared	0.392660	Mean dependent var	4.880000
Adjusted R-squared	0.171809	S.D. dependent var	1.980364
S.E. of regression	1.802230	Akaike info criterion	4.266234
Sum squared resid	35.72838	Schwarz criterion	4.507668
Log likelihood	-29.12987	Hannan-Quinn criter.	4.278597
F-statistic	1.777938	Durbin-Watson stat	2.630897
Prob(F-statistic)	0.203476		

Source: *Outcomes of Data Processing, 2023*

The R^2 value of 0.392660 indicates that 39.27% contributed to the influence of the independent variables RGCE (The ratio of government spending for the infrastructure sector to total expenditures), RPPP (public-private partnership project), INF (inflation), and FDI (Foreign Direct Investment) on the dependent variable GDP (growth) for the period 2007-2022, while the remaining 60.73% is a contribution from other variables outside this study.

4) Simultaneous Hypotheses (F-Test) – Model 1

The F statistical test determines whether or not all of the independent variables included in the model have a joint effect on the dependent variable (Woolridge, 2015). Based on the outcomes of data processing, the f-test yields the following simultaneous hypothesis results:

Table 4.6 Simultaneous Hypotheses (F-test) – Model 1

R-squared	0.392660	Mean dependent var	4.880000
Adjusted R-squared	0.171809	S.D. dependent var	1.980364
S.E. of regression	1.802230	Akaike info criterion	4.266234
Sum squared resid	35.72838	Schwarz criterion	4.507668
Log likelihood	-29.12987	Hannan-Quinn criter.	4.278597

F-statistic	1.777938	Durbin-Watson stat	2.630897
Prob(F-statistic)	0.203476		

Source: Outcomes of Data Processing, 2023

The F-statistics probability (p-value) result is 0.203, and because $0.203 > 0.05$, H_0 is accepted and H_1 is rejected based on the results of simultaneous hypothesis testing with the f-test. It can be stated that RGCE, RPPP, INF, and FDI have no significant effect on the dependent variable GDP growth over the period 2007-2022.

5) Partial Hypotheses (T-test) – Model 1

Partial testing (t-test) is used to determine whether the independent variable (X) affects the dependent variable (Y) on an individual basis. The t-test indicates the extent to which the influence of a single independent variable explains the variation of the dependent variable (Woolridge, 2015). Based on the outcomes of data processing, the t-test yields the following simultaneous hypothesis results:

Table 4.7 Partial Hypotheses (T-test) – Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.509921	13.03699	-0.039113	0.9695
RGCE	-0.064429	0.111386	-0.578434	0.5746
RPPP	-0.180534	0.387193	-0.466263	0.6501
INF	1.254712	2.393502	0.524216	0.6105
FDI	0.302310	0.844391	0.358021	0.7271

Source: Outcomes of Data Processing, 2023

Based on the above table, the following are the results of each test between the independent and dependent variables:

- a) Impact of RGCE (The ratio of Government Spending for the Infrastructure Sector towards Total Expenditures) on GDP growth

The results of testing the RGCE hypothesis on GDP yielded a t-statistics probability (p-value) of 0.574; since $0.574 > 0.05$, H_0 was not rejected and H_1

was rejected. For the period 2007-2022, it can be stated that RGCE has no significant effect on the dependent variable GDP growth.

b) Impact of RPPP (The ratio of Contract Value of Public-Private Partnership Project towards Total Contract Value of Infrastructure Project) on GDP growth

The results of testing the RPPP hypothesis on GDP growth yielded a t-statistics probability (p-value) of 0.650; since $0.650 > 0.05$, H0 was not rejected and H1 was rejected. For the period 2007-2022, it can be stated that RPPP has no significant effect on the dependent variable GDP growth.

c) Impact of INF (Inflation) on GDP growth

The results of testing the INF hypothesis on GDP growth yielded a t-statistics probability (p-value) of 0.61. Since $0.61 > 0.05$, H0 was not rejected and H1 was rejected. For the period 2007-2022, it can be stated that INF has no significant effect on the dependent variable GDP growth.

d) Impact of FDI (Foreign Direct Investment) on GDP growth

The results of testing the FDI hypothesis on GDP growth yielded a t-statistics probability (p-value) of 0.72; since $0.72 > 0.05$, H0 was rejected and H1 was not rejected. For the period of 2007 to 2022, it can be stated that FDI has no significant effect on the dependent variable GDP growth.

6) Panel Data Regression Analysis – Model 2

The first regression analysis will be carried out for the second model with the similar method as the first model with detail as follows:

$$Y_{pt} = \alpha_0 + \alpha_1 RGCE_{t-1} + \alpha_2 RPPP_{t-1} + \alpha_3 FDI_{t-1} + u_t \dots \dots \dots (3.2)$$

The following results are obtained based on data processing results:

Table 4.8 Panel Data Regression Analysis (CEM) – Model 2

Dependent Variable: GDP
 Method: Least Squares
 Date: 06/06/23 Time: 11:44
 Sample: 1 16
 Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.277375	12.55278	0.022097	0.9827
RGCE	-0.109027	0.069690	-1.564449	0.1437
RPPP	-0.345158	0.219540	-1.572185	0.1419
FDI	0.430729	0.783277	0.549907	0.5925
R-squared	0.377487	Mean dependent var		4.880000
Adjusted R-squared	0.221859	S.D. dependent var		1.980364
S.E. of regression	1.746925	Akaike info criterion		4.165909
Sum squared resid	36.62095	Schwarz criterion		4.359056
Log likelihood	-29.32727	Hannan-Quinn criter.		4.175799
F-statistic	2.425569	Durbin-Watson stat		2.740471
Prob(F-statistic)	0.116189			

Source: *Outcomes of Data Processing, 2023*

Following are the results of the regression equation based on the output:

$$\text{GDP} = 0.277375 + (-0.109027)\text{RGCE} + (-0.345158)\text{RPPP} + 0.430729\text{FDI} + u$$

RGCE and RPPP are negatively impacted the dependent variable while FDI has positive effect to the dependent variable.

7) Coefficient Determination (R^2) – Model 2

The following coefficient of determination values result from data processing:

Table 4.9 Coefficient Determination – Model 2

R-squared	0.377487	Mean dependent var	4.880000
Adjusted R-squared	0.221859	S.D. dependent var	1.980364
S.E. of regression	1.746925	Akaike info criterion	4.165909
Sum squared resid	36.62095	Schwarz criterion	4.359056
Log likelihood	-29.32727	Hannan-Quinn criter.	4.175799
F-statistic	2.425569	Durbin-Watson stat	2.740471
Prob(F-statistic)	0.116189		

Source: *Outcomes of Data Processing, 2023*

The R-squared value of 0.377487 indicates that 37.75% of the influence of the independent variables RGCE, RPPP, and FDI on the dependent variable GDP

growth for the period 2007-2022 is attributable to these variables, while the remaining 62.25% is attributable to other variables.

8) Simultaneous Hypotheses (F-Test) – Model 2

The f-test produces the following simultaneous hypothesis results based on the outcomes of data processing:

Table 4.10 Simultaneous Hypotheses (F-test) – Model 2

R-squared	0.377487	Mean dependent var	4.880000
Adjusted R-squared	0.221859	S.D. dependent var	1.980364
S.E. of regression	1.746925	Akaike info criterion	4.165909
Sum squared resid	36.62095	Schwarz criterion	4.359056
Log likelihood	-29.32727	Hannan-Quinn criter.	4.175799
F-statistic	2.425569	Durbin-Watson stat	2.740471
Prob(F-statistic)	0.116189		

Source: Outcomes of Data Processing, 2023

Based on the results of simultaneous hypothesis testing with the f-test, the f-statistics probability result (p-value) is 0.116189. Since the probability result (p-value) is $0.116 > 0.05$, H_0 is accepted and H_1 is rejected. Thus, it can be concluded that RGCE, RPPP, and FDI have no effect on the dependent variable GDP growth over the period 2007-2022.

b. Testing for Hypothesis 2

The second hypothesis will be tested to determine if there is a significant difference in the cost-effectiveness of government capital expenditures before and after the implementation of PPP using paired sample mean difference analysis with the assistance of E-views software, which will be preceded by a normality test and a prerequisite test, followed by the paired sample test.

1) Comparative Normality Test

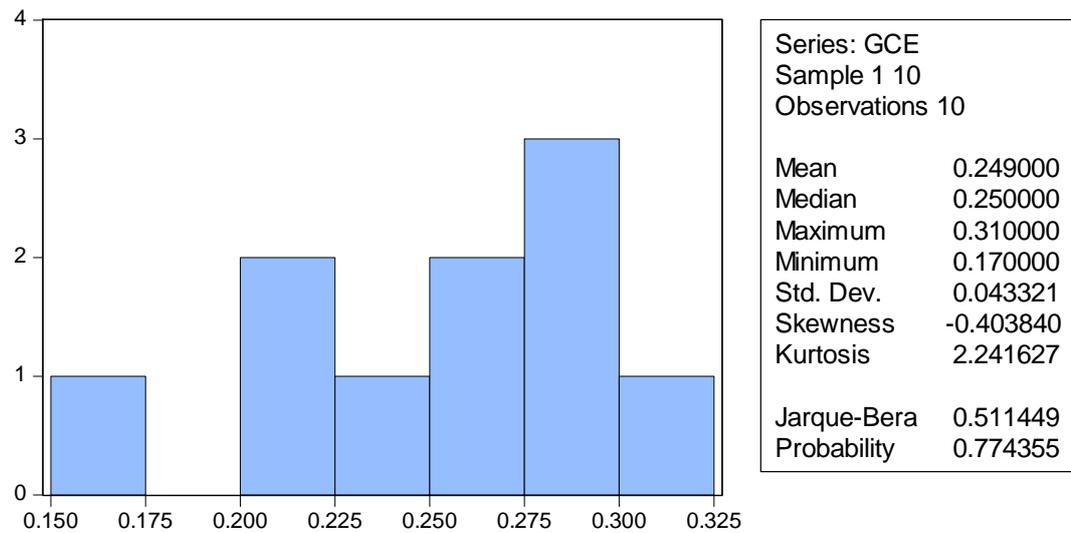


Figure 4.2 Comparative Normality Test

Source: Outcomes of Data Processing, 2023

Based on the results of the normality test with the Jarque-Bera for the comparative test, a probability result (p-value) of 0.774 is obtained, as $0.774 > 0.05$, so it can be concluded that the data in this study are normally distributed.

The subsequent comparative test is based on the results of the normality test and consists of a parametric test and a paired sample test.

Paired sample T-test is an alternative test for comparing two paired samples. Paired samples are of the same subject, but are treated differently. This distinct test model is used to analyse the research model prior to and after its implementation. The following test results are derived based on the outcome of data processing:

Table 4.11 Paired Sample T-test

Method	Df	Value	Probability
t-test	8	-1.108832	0.2997
Satterthwaite-Welch t-test*	6.160454	-1.108832	0.3089
Anova F-test	(1, 8)	1.229508	0.2997
Welch F-test*	(1, 6.16045)	1.229508	0.3089

Source: Outcomes of Data Processing, 2023

Based on the comparative test results with paired sample t-test, a probability result (p-value) of 0.2997 is obtained, because the probability result (p-value) is $0.2997 > 0.05$, H_0 is not rejected and H_1 is rejected, so it can be stated that there is no significant difference between cost effectiveness of government capital expenditure in the period before PPP (2013-2017 period) and after PPP implementation (2018-2022 period).

4.3 Conclusion

This research focuses on government capital expenditure effectiveness including public-private partnership involvement, therefore, the involvement of public-private partnership, which has only been implemented since 2016 and government payments to business entities, which have only occurred in 2018, are considered to have influenced this study sufficiently.

As claimed by the regression that has been done partially and simultaneously for each independent variables, it resulted that RGCE and RPPP negatively impacted GDP growth and INF and FDI have positive effect to GDP growth. However, all independent variables have no significant effect on GDP growth. Therefore, result for Hypothesis 1 is H_0 is accepted and H_1 is rejected.

It is also reflected in the results of a comparison of the cost effectiveness of government capital expenditure. There is no significant difference between cost effectiveness of government capital expenditure in the period before PPP and after PPP. In conclusion, result for Hypothesis 2 is H_0 is accepted and H_1 is rejected.

The implementation of the PPP initiative is deemed to have had a negligible effect. It can be seen that the PPP project value paid by the government to the private sector during 2018

to 2022 represents between 0.49% and 8.29% of total government expenditure on infrastructure, therefore the PPP project application is still considered to be quite low.

Chapter 5

Discussion & Limitations

5.1 Discussion

The finding showed that RGCE (The ratio of government spending for the infrastructure sector towards total expenditures), RPPP (The ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector), INF (inflation) and FDI (Foreign Direct Investment) did not have significant impact to the GDP growth in Indonesia during 2007 to 2002. This is contrast with the result of previous research that PPP project has a positive impact on GDP (Banda and Jeke, 2021) and FDI was a significant factor and has positive relationship towards GDP (Aziz and Azmi, 2017). The implementation of public-private partnerships in Indonesia has not been able to substantially affect the cost-effectiveness of government capital expenditures, according to the findings. Given that the public-private partnership project has been applied for less than a decade with total project value around USD 4 billion, which is still comparatively modest compared to Indonesia's annual average infrastructure expenditure of USD 26 billion, and has not been implemented in all infrastructure projects, it will take longer to attain the desired cost effectiveness.

This can be a factor for the Indonesian government when evaluating the financial performance of public-private partnership projects and expanding the scope of infrastructure projects that can be implemented under a public-private partnership scheme to achieve increased productivity for economic transformation toward the 2045 vision of Indonesia Moving Forward.

5.2 Limitations

The limitations of the study are data of public-private partnership projects are not details, particularly for monthly or quarterly payment data and no information showed about the feasibility of the projects. This may be due to the fact that the public-private partnership program began in 2016 and payment only started in 2018, so it is still relatively new. Recommendation for future research is the study can be conducted if the public-private partnership scheme has applied for more than 10 years to determine how its efficacy impacts government capital expenditure.

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Appendix

1. Gross Domestic Product of Indonesia

Year	GDP Indonesia (in USD)	GDP Growth
2007	432.216.737.775	6,35%
2008	510.228.634.992	6,01%
2009	539.580.085.612	4,63%
2010	755.094.160.363	6,22%
2011	892.969.107.923	6,17%
2012	917.869.910.106	6,03%
2013	912.524.136.718	5,56%
2014	890.814.755.233	5,01%
2015	860.854.235.065	4,88%
2016	931.877.364.178	5,03%
2017	1.015.618.742.566	5,07%
2018	1.042.271.531.012	5,17%
2019	1.119.099.868.265	5,02%
2020	1.058.688.935.455	-2,07%
2021	1.186.092.991.320	3,69%
2022	1.318.807.000.000	5,31%

Source: World Bank data

2. RGCE: The ratio of government spending for the infrastructure sector towards total expenditures

Year	Government Spending for The Infrastructure Sector (in USD)	Total Expenditures (in USD)	Ratio
2007	2.569.274.870	36.074.838.967	7,12%
2008	3.132.420.091	42.980.542.403	7,29%
2009	8.117.021.277	51.741.295.653	15,69%
2010	9.565.120.676	68.003.138.200	14,07%
2011	12.593.736.215	80.891.188.808	15,57%
2012	15.046.535.677	84.891.845.511	17,72%
2013	15.120.190.336	86.851.491.925	17,41%
2014	16.607.717.042	83.959.519.786	19,78%
2015	20.319.913.012	83.928.241.330	24,21%
2016	22.519.775.231	88.787.505.533	25,36%
2017	28.808.680.248	92.630.230.050	31,10%
2018	26.099.262.770	94.025.730.842	27,76%
2019	28.670.977.011	98.575.590.610	29,09%
2020	28.754.504.077	101.086.757.922	28,45%
2021	26.813.977.854	108.449.185.600	24,72%
2022	21.147.778.272	96.541.397.616	21,91%

Source: Indonesia's Ministry of Finance data and World Bank data

3. RPPP: The ratio of contract value of public-private partnership project towards total government spending for the infrastructure sector

Year	contract value of public-private partnership project (in USD)	total government spending for the infrastructure sector (in USD)	Ratio
2007	-	2.569.274.870	0,00%
2008	-	3.132.420.091	0,00%
2009	-	8.117.021.277	0,00%
2010	-	9.565.120.676	0,00%
2011	-	12.593.736.215	0,00%
2012	-	15.046.535.677	0,00%
2013	-	15.120.190.336	0,00%
2014	-	16.607.717.042	0,00%
2015	-	20.319.913.012	0,00%
2016	-	22.519.775.231	0,00%
2017	-	28.808.680.248	0,00%
2018	127.402.060	26.099.262.770	0,49%
2019	682.662.703	28.670.977.011	2,38%
2020	966.132.286	28.754.504.077	3,36%
2021	2.223.165.941	26.813.977.854	8,29%
2022	-	21.147.778.272	0,00%

Source: Indonesia's Ministry of Finance data

4. Inflation of Indonesia

Year	Average Annual Inflation
2007	6,40%
2008	10,31%
2009	4,90%
2010	5,13%
2011	5,38%
2012	4,28%
2013	6,97%
2014	6,42%
2015	6,38%
2016	3,53%
2017	3,81%
2018	3,20%
2019	3,03%
2020	2,04%
2021	1,56%
2022	4,21%

Source: Central Bank of Indonesia data

5. Foreign Direct Investment of Indonesia

Year	Foreign Direct Investment (USD)
2007	6.928.480,00
2008	9.318.453,65
2009	4.877.369,18
2010	15.292.009,41
2011	20.564.938,23
2012	21.200.778,61
2013	23.281.742,36
2014	25.120.732,06
2015	19.779.127,98
2016	4.541.713,74
2017	20.510.310,83
2018	18.909.826,04
2019	24.993.551,75
2020	19.175.077,75
2021	21.362.021,18
2022	43.000.000,00

Source: World Bank data