

An Analysis of the Construction Sector and GDP of Indonesia

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The construction industry is often regarded specifically in developing economies, as an engine of economic growth. Analysis of the construction sector analysis therefore is imperative. This study examined share of construction sector in Indonesia's GDP, to estimate linear trend model for Indonesia's GDP by construction sector and to examine the relationship between GDP growth and growth of GDP by the construction sector in Indonesia. The data series used consists of tax revenue, domestic tax revenue, revenue and added value from 2005 to 2017. Data analysis included a descriptive analysis and a linear trend model analysis. The annual data series in Indonesia's construction sector, growth and GDP are obtained from the publications of Bank Indonesia and BPS-Statistics Indonesia. Data analysis included a descriptive analysis, a linear trend model analysis and correlation analysis. The results suggest that a linear trend model can be used to forecast Indonesia's GDP by construction sector. GDP growth rate from the data obtained is 5.38 percent per year, while GDP growth in the construction sector is 6.81 percent higher per year. The construction sector's GDP-to-GDP ratio increased by 6.12% per year. The linear trend model indicated that the average annual increase in Indonesia's GDP by construction sector is IDR 8318,567 IDR billion. In the model it can be explained that 98.2% of the variance in Indonesia's GDP by construction sector can be explained by the variance in time variable. The results of this study also showed a strong positive correlation between Indonesia's GDP growth and construction industry GDP development as demonstrated by a correlation coefficient.

Key words: *Construction sector, GDP, linear trend, correlation, Indonesia.*

Introduction

The construction industry is often regarded specifically in developing economies, as an engine of economic growth (Anaman, 2007). The opinion is in line with what Giang and Pheng (2011) have stated that the construction industry is a major economic sector and plays a major role in national financial and social development. It is also linked to many other sectors. The construction sector is therefore called the driver of economic growth. In line with this, Khan et al., (2014) state that the construction sector plays a significant role in producing wealth and providing a better quality of life to the nation that is essential for development of the nation.

BPS (2018) states that the results of construction in Indonesia include buildings, roads, bridges, railways and railroad bridges, tunnels, water and drainage buildings, sanitation buildings, airstrips, docks, power plant buildings, transmission, distribution and building communication networks. The role of the construction sector can be seen from a point of view of labor absorption, investment, the number of infrastructure and construction projects, reciprocal relations with supporting sectors and even as a facilitator in the movement and growth of goods and services.

The construction sector is one of the sectors which makes considerable contribution to Indonesia's Gross Domestic Product (GDP). Based on data on Gross Domestic Product (GDP), in the past 7 years (2011-2017), the construction business category has a large share of the GDP structure Indonesia, which averages 9.82%, or ranks 4th in the Indonesian economy. The share of the construction business category has a tendency to increase (Bank Indonesia, 2018; Yusuf & Ali, 2018).

In line with the growth performance which on average increased, the contribution of the construction sector to economic growth for the period of 201-2017 was recorded at 0.64% per year with a tendency to increase. In this period, the construction sector was in the third place with the highest average contribution Indonesia's economic growth, after the Manufacturing and Industry sectors Big Trade & Retail, and Car & Motorcycle Repair (Bank Indonesia, 2018)

This study is essential, given the significant role of the contribution sector in the GDP of Indonesia. The following objectives were formulated in order to achieve the study objectives:

1. To show the contribution of construction sector to Indonesia's GDP.
2. To estimate linear trend model for Indonesia's GDP by construction sector.
3. To examine relationship between GDP growth and growth of GDP by construction sector in Indonesia.

Literature review

The World Bank Report (2009) proposed that developing nations need to focus efforts to diversify their economies from mono-product and natural resource-based to more sustainable human resources that can also generate employment for the rapidly growing population. To accomplish this, development of human and infrastructure needs to be improved in order to grow and develop small-scale sectors and inner microeconomic development. The construction industry is one of the top five industries used to measure any country's Gross Domestic Product (GDP) and its impact on all other industries makes it an important front for sustainable growth. (Mosaku et al., 2006).

Shittu & Shehu (2010) stated that the construction industry plays a key role in meeting a wide range of physical, economic and social needs and significantly contributes to the achievement of various major national goals. The construction sector in both developed and developing countries can be viewed as the economy sector that transforms various resources into constructed facilities through planning, design, construction, maintenance and repair and operation. The kinds of government and private equipment generated variety from residential and non-residential structures to heavy structures and they play a critical and extremely visible role in the development phase (Kheni et al., 2008).

The construction industry is often regarded specifically in developing economies as an engine of economic growth. In building and maintaining buildings and infrastructure, the sector can activate and effectively consume locally produced material and resources to motivate local jobs and enhance financial effectiveness (Anaman, 2007). The state interacts as a buyer, financier, regulator and adjudicator with the building industry. Also essential is the regulatory climate in which the construction industry works, including, for instance, building and associated codes, licensing regulations, security legislation and working regulations for financial institutions (Anonymous, 2005).

Khan (2008) explored the construction sector with information from Pakistan for the period 1950-2005 to evaluate the connection between investment in construction sector and growth level of GDP. This resulted to his conclusion that this connection from the construction industry is moving towards GDP so that economic growth is largely dependent on construction sector investment (Hussain et al., 2019). In the Hong Kong economy, time series construction data longitudinally tested the relationship between the real growth rate of construction products and the actual growth rate of GDP. Growth in GDP led to growth in construction and as the rate of growth in GDP increased the rate of growth in construction output decreased marginally (Yiu et al. 2004).

Isa et al. (2013) examined Nigeria's contribution to sustainable growth by the construction industry. Construction contribution to GDP ranges from 3% to 6% before it has crumbled to

about 1% over the past centuries. Other research, conducted by Wigren and Wilhelmsson (2007), showed that construction volume in GDP in Western Europe was 10 percent in 1980 compared to 7 percent in 2004. Results from Jiang & Qifa (2013) state that construction and GDP's value and growth rate are extremely linked and the situation in China is comparable to the United Kingdom, which depends on the nature of the construction industry and its elevated investment multiplier. Construction and economy in China, however, are growing more quickly and their coefficient of correlation is greater than in the UK.

Khan et.al (2014) reviewed Malaysia's building sector's position and performance. The time series data for Malaysia's construction sector and economic growth over the period 1991-2010 is obtained from the Government of Malaysia's Statistical Department. The findings show a powerful correlation between the sector industry and Malaysia's economic growth. Considering the significant role of the building industry in Malaysia's economic development, it is essential for the government of Malaysia to give due attention and concentrate to the building industry in order to qualify as a developed nation.

Data and Method

The annual data series for Indonesia's construction sector output, growth, and GDP over the study period from 2000 to 2013 are obtained from the publications of Bank Indonesia and BPS-Statistics Indonesia. The descriptive statistics are used to understand the data's general characteristics and to develop line chart. Linear trend analysis is used to estimate linear trend model by construction sector for Indonesia's GDP, and the Pearson correlation technique is used to investigate the relationship between the construction sector and Indonesia's GDP.

Results and Discussion

Construction Sector and Indonesia's GDP

The construction sector is one of the sectors with considerable contribution toward Indonesia's Gross Domestic Product (GDP). The share of the construction business category has a tendency to increase (Bank Indonesia, 2018). Figure 1 below shows the contributions of the industrial sector to the economic growth of the nation, so it is possible to infer the comparison of the construction and construction sector with the other major economic sectors. Figure 1 also indicates that the construction sector has a large share of the GDP structure Indonesia in the 2012-2016, which averages 9.82%, or ranks 4th in structure the Indonesian economy. Compared to other sectors, the construction sector maintained its strong growth in 2012 to 2016.

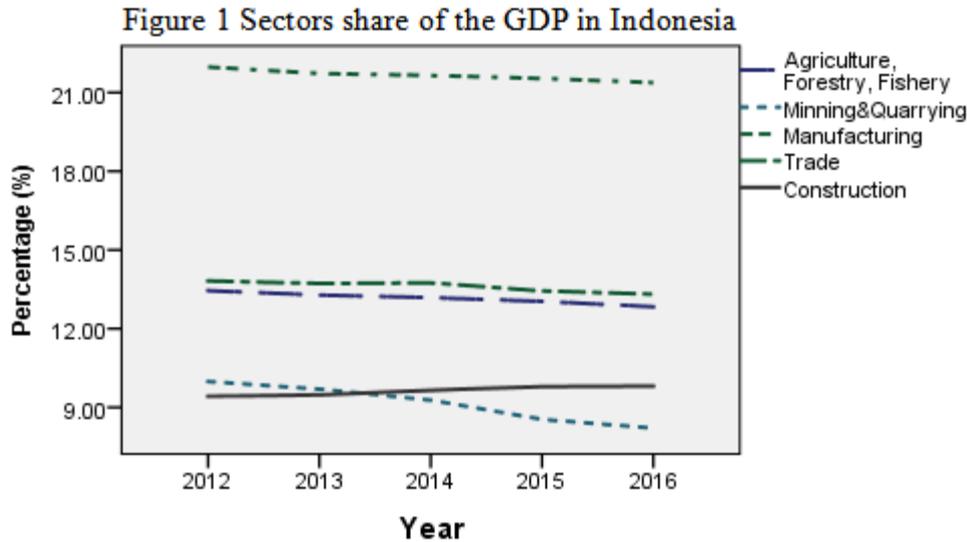


Table 1 below shows that Real GDP from construction sector in Indonesia increased to 925040 IDR Billion in 2016 from 728226 IDR Billion in 2012. In 2012, real GDP in the construction sector amounted 9.42 percent of overall real GDP, up to 9.80 percent of total real GDP in 2016.

Table 1. Construction sector contribution in Indonesia economy

Year	Real GDP (IDR Billion)	Real GDP in Construction (IDR Billion)	% Construction to GDP
2012	7727083	728226	9.42
2013	8156498	772720	9.47
2014	8564867	826616	9.65
2015	8982517	879164	9.79
2016	9434613	925040	9.80

Source: Bank Indonesia, 2018 ; GDP origin at 2000 constant price

Figure 2 below shows the real GDP and the real value added of construction sector (GDP by construction sector) in Indonesia. Figure 3 below shows the data's GDP growth rate is 5.38 percent per year, while the construction sector's GDP growth is 6.81 percent per year. The GDP ratio of the construction sector to GDP grew by 6.12% per year.

Figure 2 Indonesia's GDP and GDP by Construction Sector

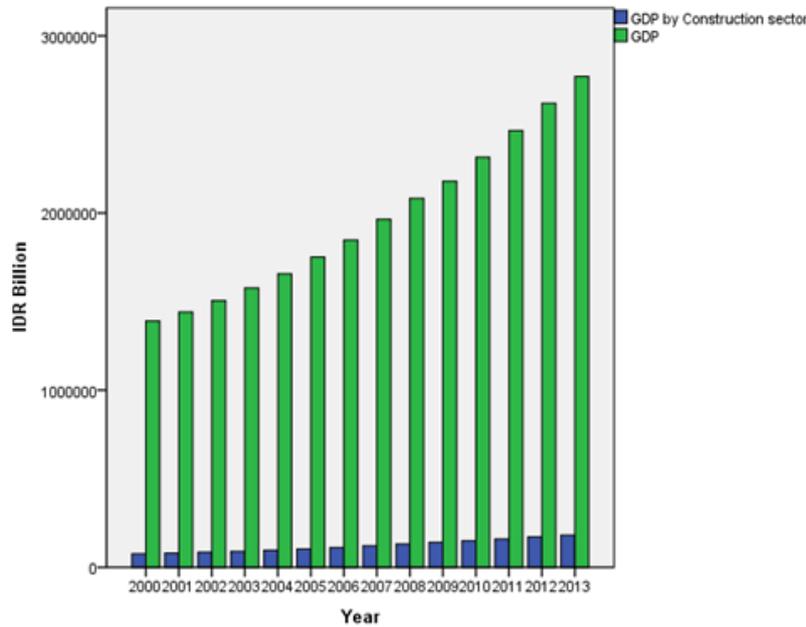
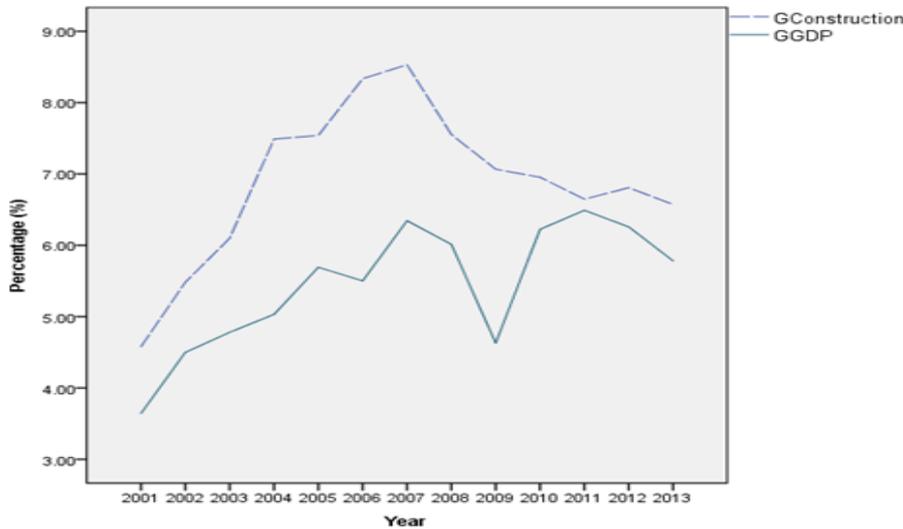


Figure 3. Growth of GDP and GDP by Construction Sector



Linear Trend Model

Table 2 below shows that the adjusted determination coefficient (adjusted R Square) is 0.982. It shows that the variation in time variable explains 98.2 percent of the total GDP by contribution sector variation. The result for the models of F value calculations is shown in Table 3 below. The F value is 700.245 and the level of 1 percent is significant. From this result it is concluded that the timed Y regression line (t) is best fitted.

Table 2. Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.992	.983	.982	4741.482

The independent variable is Year.

Table 3. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	15742671827	1	15742671827	700.245	.000
Residual	269779852	12	22481654.357		
Total	16012451679	13			

The following model can be obtained from Table 4 below with the contribution of the GDP sector as the dependent variable and time (year) as independent variables: $Y_t = -16569846.323 + 8318.567t$. The model states that the average rise in GDP per construction sector is IDR 8318.567 IDR billion per year.

Table 4. Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Year	8318.567	314.357	.992	26.462	.000
(Constant)	-16569846.323	630759.025		-26.270	.000

Correlation coefficient

During the study period 2000-2013, there is a powerful positive correlation between Indonesia's GDP growth and growth of GDP by construction sector as shown by a correlation coefficient (0.647) in Table 5 below. This indicates that growth of construction sector is related to Indonesia's GDP growth. In line with the research conducted by Jiang and Qifa (2013) and Khan (2013), the study results showed a positive correlation between the two variables.

Table 5. Correlations

		<u>GConstruction</u>	<u>GGDP</u>
<u>GConstruction</u>	Pearson Correlation	1	.647*
	Sig. (2-tailed)		.017
	N	13	13
<u>GGDP</u>	Pearson Correlation	.647*	1
	Sig. (2-tailed)	.017	
	N	13	13

*. Correlation is significant at the 0.05 level (2-tailed).

Conclusion

The construction sector is one of the sectors with significant contribution to Indonesia's Gross Domestic Product (GDP). The share of the construction sector tends to increase. This sector has retained its powerful development compared to other main sectors. GDP growth rate from the data obtained is 5.38 percent per year, while GDP growth in the construction sector is 6.81 percent higher per year. The building sector's GDP-to-GDP ratio rose by 6.12% per year.

The linear trend model indicated that the average annual increase in Indonesia's GDP by construction sector is IDR 8318,567 IDR billion. Through the model 98.2% of the variance in Indonesia's GDP by construction sector can be explained by the variance in time variable. The study shows that, as demonstrated by a correlation coefficient (0.647), there is a strong positive correlation between Indonesia's GDP growth and the development of the construction sector.

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