Causal Relationships GDP per Capita, Human Development Index and Corruption Perceptions Index in Indonesia

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Abstract: The purpose of this study is to explain the causal relationship of GDP per capita, CPI and HDI Indonesia which is broken down into three hypotheses. The research variables were collected from the World Bank, Transparency International and United Nations Development Program documentation from 1995 to 2018. Results of the study: first, based on unit root test on each variable using Augmented Dickey-Fuller (ADF) at the 1st level difference in value absolute statistic t is greater than critical value according to MacKinnon table. Similarly, the Prob value is smaller than 0.05, therefore, the research variable data are stationary. Second, the granger causality test is by comparing the probability values of each hypothesis with a 5% error rate. Based on the data analysis not a single hypothesis was tested, however, it is found that the one-way relationship is that HDI drives GDP per Capita with a probability of 0.0161 <0.05 using lag length 4.

Keywords: *GDP per Capita, Human Development Index, Corruption Perceptions Index*

1. Introduction

Interstate competition in the recent decades has shifted quite a lot from military strength to trade and economic strength. Meanwhile, trade and economic competition was preceded by the occurrence of free trade in the world, as well as free trade in certain areas such as the Association of Southeast Asian Nations (ASEAN) free trade under the AFTA and the ASEAN Economic Community (AEC).

Responding to the AFTA and AEC above, only strong countries in the trade and economic sectors are able to win the competition while maintaining the integrity of their country. Cojanu and Popescu (2007) stated that the collapse of some countries is due to economic inequalities such as Somalia, Rwanda, Haiti, Liberia, Congo and Afghanistan. Meanwhile Root (2001) stated that strong countries are not related to territoriality but to the ability of countries to manage their economic potential, such as

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Western European countries, North America, Japan, South Korea, Singapore. Cojanu and Popescu (2007) and Radygin and Entov (2012) noted that strong national characteristics are reviewed in terms of economic and corruption levels. Rotbertg (2003) indicators for assessing a country's performance are GDP per capita, Human Development Index (HDI) and corruption level.

Based on the facts and thoughts of Cojanu and Popescu (2007), Radygin and Entov (2012) and Rotbertg (2003), this study aims to delve deeper into GDP per Capita, HDI and corruption levels as measured by the Corruption Perceptions Index (CPI) in particular Indonesia. GDP per Capita is calculated by comparing the value of GDP to the population of a country in a given year. The higher the GDP per capita the stronger a country is because its people are prosperous. According to the World Bank (2018) GDP per Capita is classified into four groups: (1) low-income economies, if GDP per Capita is $ 995 or less; (2) lower middle-income economies, if GDP per Capita is $ 996– $ 3,895; (3) upper middle-income economies, if GDP per Capita is $ 3,896– $ 12,055 and (4) high-income economies, if GDP per Capita is $ 12,055 or more.

Besides GDP per Capita, HDI and CPI are also key macroeconomic indicators and are important variables to improve a country's economic performance. Based on UNDP data (2018) the number of countries included in the following groups: (1) Very High Human Development of 58 countries; (2) High Human Development of 53 countries; (3) Medium Human Development in 39 countries including Indonesia along with the Philippines, Viet Nam, Myanmar, Cambodia and Timor-Leste and (4) Low Human Development in 38 countries. The continuous increase in GDP per capita and HDI can be achieved when supported by corruption-free governance, which in this study was measured by CPI as reported by Transparency International.

Thus, this study aims to address some of the following issues: (1) how is the relationship of GDP per capita with HDI; (2) how is the relationship of GDP per capita to CPI related; (3) how is HDI causality related to CPI?. The purpose of this study is to: (1) analyze relationships correlates of GDP per Capita with HDI; (2)

analyze the relationship of GDP per capita GDP with CPI and (3) analyze the relationship of HDI causality with CPI.

2. Theoretical Framework and Hypothesis Development

GDP per Capita

As one of the common variables used to measure a country's economic performance, GDP per Capita is important to study as it can measure the real state of a country's income in a given year. GDP per capita is very useful for a country to measure the level of prosperity and thus measure the average income of its population. GDP per Capita is calculated using two approaches: based on constant prices (this approach is relevant to measuring the growth of a country's prosperity) and prevailing prices (relevant in measuring the average person's ability to spend).

GDP per Capita is also referred to as GDP per person as Mankiw (2010) points out that GDP per person is the ratio between GDP and population, where this value measures the average income of an individual in an economy. GDP figures per person do not always increase, because at a time when the country is experiencing recession or economic depression it will have a decline in national income and a decline in GDP per person.

GDP per Capita is calculated using the following formula: $\frac{GDP}{TP}$, where GDP is Gross Domestic Product and TP is Total Population. Thus, this calculation of GDP per Capita is useful for a country to: (1) provide a basis for economic policy-making; (2) measuring the well-being of the community; (3) comparing the well-being of one nation to another and (4) comparing the standard of living of one country with another. Kuncoro (2015) explained that a country often uses this GDP per Capita to measure prosperity and development rate. The criterion used is that the larger the GDP per Capita the better the economy of a country as citizens become more prosperous and able to meet their living needs.

Human Development Index (HDI)

HDI is a composite index that measures the average achievement in three basic dimensions of human development such as long and healthy life, knowledge, and

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decent living standards (UNDP, 2018). This thinking has the meaning that to measure the level of well-being of the people is not only using the economic approach, but also focusing on the non-economic aspects of education and health. It is relevant to the enactment of the Constitution (1945) that the government of the Republic of Indonesia was formed not only to protect the whole Indonesian nation and the whole unity of Indonesia but also to promote the general welfare and enrich the life of the nation.

HDI is a strategic dimension for a nation to build its people created by the improvement of people's well-being. Even HDI has become an international standard for assessing one country's progress compared to other countries. According to UNDP (2018), HDI is classified into four groups: (1) Very high (0.800 or greater); (2) High (0.700–0,799); (3) Medium (0.550–0.699) and (4) Low (Less than 0.550).

Corruption Perceptions Index

Corruption is a misuse of public facilities by a person for personal gain (Li, et al; 2011). According to Kuncoro (2015) corruption is unethical behavior by state organizers through enriching themselves or those close to themselves by abusing trusted public authority. Whereas, Actan (2015) explained that corruption is an act and act of abuse of public office for personal gain in the form of embezzlement and bribery. Corruption will lower the country's competitiveness as Tsygankov (2015) points out that Russia's economic competitiveness was relatively low in the early 2000s marked by escalating corruption. Corruption in this study refers to data published by Transparency International. While the result of corruption acts as presented by Šumah (2018), that corruption occurs in any country of the world due to economic needs, environment, customs, traditions, demographics and customs. The negative effects of these corrupt behaviors are that they hinder investment climate, job opportunities and economic growth. As a result of this, the country's financial aid to education, infrastructure and health has diminished its reliance on legal supremacy and the decline in taxation.

Empirical studies in relation to the relation of GDP per capita, HDI and CPI were conducted by Sušnik and Zaag (2017) and Mahdiloo (2016) that there is a GDP-per capita GDP relationship with HDI. The study of Maqin and Sidharta (2017) also

explains the positive correlation between GDP and human development in Indonesia. In relation to GDP correlations per Capita and CPI according to Lučić et al (2016) study that GDP and CPI causality occur in the medium term. Pradhan (2012) in his study found that there is a causal relationship between HDI and CPI.

The results of one-way causality studies by Ezkirianto and Alexandi (2013) suggested that increasing GDP per capita will drive the growth of other macroeconomic indicators such as HDI. Khodabakhshi (2011) HDI affects GDP. While the CPI's one-way relationship to GDP per capita is in line with Hassaballa's (2017) study, corruption affects its own per capita income in developing countries over the period 1996-2013 with a negative relationship pattern. Lambsdorff's (1999) study, in poor countries with limited resources in eradicating corruption, will reduce GDP per capita. And according to Waluyo (2010) economic growth has a bearing on corruption. Based on theoretical and empirical research, the research hypothesis can be presented as: (1) there is a causal relationship of CPI and GDP per Capita; (2) there is a relation of HDI and GDP per capita and (3) there is a relation of HDI and CPI.

3. Research Method

This study uses a quantitative approach with the following in mind: (1) numerical research data that is GDP per Capita, HDI and CPI; (2) data collection techniques using documentation; (3) hypotheses and (4) research data analysis using economic or econometric statistical methods. Research data sources come from the World Bank (for GDP per Capita), UNDP (for HDI) and Transparency International (for CPI). The type of research data is the time series from 1995 to 2018. Considering the unit of study variables are not the same it is necessary to run a log to compare the units before further data analysis.

Data analysis uses EViews software with the following stages: (1) unit root test with Augmented Dickey Fuller to test the data stationary of each variable based on the hypothesis, Ho = data contains unit root or non-stationary data and Ha = data does not contain unit root which means stationary data. The criterion is used if Prob> α (0.05) then the decision accept Ho rejects Ha, and if Prob <α (0.05) the decision rejects H0 and accepts Ha; (2) Lag Length Test, length determination is done by selecting the

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most marked star in Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ). and (3) Granger Causality Tests. This Granger Causality was used to test the hypothesis of the study with a predetermined, if Prob value $<\alpha$ (0.05) then the research variable has a one-way relationship.

4. Results and Discussion

Results

Root Unit Testing in time series data analysis is a prerequisite for Granger Causality Tests and very useful in detecting data stationarity. Table 1 below is the result of the econometric data, where GDP per Capita, HDI and CPI are all stationary at the first difference and thus are eligible for lag length testing.

Table 1.

Unit Root Test

	ADF Test Statistic		Information
	t-Statistic	Prob	
LG10_GDP per Capita	-5.879950	0,0001	Stasioner / 1nd Difference
LG10_CPI	-4.585110	0,0016	Stasioner / 1nd Difference
LG10_HDI	-6.336397	0,0000	Stasioner / 1nd Difference

After performing the data stationery test with the Augmented Dickey Fuller unit root method, the next step is to test the lag length. The result of the data as in table 2 can be stated that the length of the selected lag is the fourth lag. The reason for choosing the fourth lag is because of the highest number of stars, namely FPE, AIC and HQ.

Table 2.

Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	103.2920	NA	8.85e-09	-10.02920	-9.879838	-10.00004
1	186.8856	133.7497*	5.18e-12	-17.48856	-16.89112*	-17.37193
2	195.5588	11.27521	5.78e-12	-17.45588	-16.41036	-17.25178
3	210.1054	14.54660	4.07e-12	-18.01054	-16.51694	-17.71897

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| 4 | 224.2940 | 9.932036 | 3.82e-12* | -18.52940* | -16.58772 | -18.15037* |

* indicates lag order selected by the criterion

Table 3 shows the results of the data with Granger Causality Tests, and is used to test the research hypotheses. The first hypothesis was that the CPI and GDP per capita causal relationships were not tested for Prob values of 0.7678 and 0.0577> α (0.05). The second hypothesis is that there is an unrelated relation between HDI and GDP per Capita because of Prob values of 0.0161 and 0.9216. However, the one-way relationship of HDI to GDP per Capita was found to be 0.0161. While the third hypothesis, the causal relationship of HDI and CPI was also not tested, based on Prob> α values (0.05).

Table 3.

Granger Causality Tests

Null Hypothesis:	Obs	F-Stat	Prob.
LG10_CPI does not Granger Cause LG10_GDP_PER_CAPITA	22	0.2683	0.7678
LG10_GDP_PER_CAPITA does not Granger Cause LG10_CPI		3.3884	0.0577
LG10_HDI does not Granger ause LG10_GDP_PER_CAPITA	22	5.3173	0.0161
LG10_GDP_PER_CAPITA does not Granger Cause LG10_HDI		0.0820	0.9216
LG10_HDI does not Granger Cause LG10_CPI	22	3.3084	0.0612
LG10_CPI does not Granger Cause LG10_HDI		0.4956	0.6177

Discussion

Based on the data analysis, it can be stated that: first, there is no relationship of GDP per capita with HDI. The results of this study are contrary to the findings of Sušnik and Zaag (2017); Mahdiloo (2016) and Maqin and Sidharta (2017). Second, there is no relationship between GDP per capita and CPI. This result is not relevant to the study of Lučić, et al (2016). Third, there is no causal relationship of HDI with CPI, which results are not relevant to Pradhan's (2012) study so it can be concluded that the whole hypothesis is not tested.

The difference between the results of this study and the previous research is due to two factors that is the study period and the locus of research. The observation period of this study was 24 years, while previous research was very varied. The locus of this

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research is in Indonesia while previous research is conducted in Nepal and Iran which have different economic fundamentals than Indonesia. However, this study found that there is a one way relationship where HDI drives GDP per Capita. This one-way relationship is relevant to the research of Ezkirianto and Findi (2013), Khodabakhshi (2011), Maqin and Sidharta (2017) and Uteubayev (2016).

5. Conclusion, Implication and Limitation

5.1. Conclusion

As the country falls into the upper middle-income economies in relation to GDP per Capita, as well as empirical evidence that HDI drives GDP per Capita, then, the Indonesia's GDP growth per Capita cannot be released from the influence of HDI. Highly educated people, healthy living and long life and having a high standard of living are essential to making Indonesia prosperous and well-living.

5.2. Implication and Limitation

The results of this study are expected to have a real impact on Indonesian people in the form of GDP growth per Capita. It is therefore advisable for the government to pay more attention to aspects related to improving HDI such as improving the quality of human resources in education, health and economy. For future researchers, it is advisable to develop the research by adding variables to the index of democracy given that the culture of corruption is strongly associated with democracy.

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