7922-Paper-20999-1-2-20231215

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Submission date: 23-Dec-2023 09:54AM (UTC-0500)
Submission ID: 2242783386
File name: 7922-Paper-20999-1-2-20231215_1.pdf (486.71K)
Word count: 3100
Character count: 14643

An Alternative View For Economic Growth
A Study on 15 Countries for 2 Decades

Abstract

By using data panel of 15 countries over 2 decades of sampling, this study try to elaborate the relation of Purchase Power Parity, Gross Domestic Product, and Consumer Price Index with quantitative approach. The result of the study, conclude that GDP had an unsignificat negative impact to the PPP, while CPI had a significant negative impact to PPP. This study also discovering that, on the dynamic economic movement GDP did not represent the economic power of a nation, PPP did it better.

Keywords: macroeconomic, GDP, Economic Growth, Iflation

Introduction

GDP (Gross Domestic Product) is often used as an indicator of a country's economic growth. However, not all researchers agree with this. Cobb, et al (1995) argue that GDP is only a gross measure of money circulation activities that occured in the market. It does not provide any distinction or separation between the desirable and the undesirable, or any comparison between costs and benefits. In addition, the information shown in GDP is only a representation of expected information, crucial parts of monetary, household economic activity and voluntary sectors are not taken into account at all. According to Soofi (1998) and Edwards (2006), for example, the exchange rate (currency) is one of the most important and long-lasting macroeconomic variables in the economy, because the exchange rate (currency) influences inflation, exports, imports and economic activities of a country. and between countries, so that for them the currency exchange rate actually becomes a significant macro indicator of a country's economy. This opinion is in line with Dornbusch (1988) and Kassel, (1921) who stated that deviations from PPP can trigger large volatility in trade flows, thereby encouraging policy makers to implement policies aimed at directing prices back to international channels. Meanwhile, Aggarwal et al. (2000) evaluate PPP in real exchange rates between Japan and Indonesia, Korea, Malaysia, the Philippines, Singapore, Sri Lanka, Thailand, Germany, the US, and Australia. They considered the consumer price index (CPI) and producer price index (PPI) for the period 1974 to 1997, using quarterly data. Aggarwal et al. (2000) conclude that PPP is maintained for Asian countries; However, the theory is not confirmed for non-Asian countries. In contrast to Soofi (1998), Edward (2006) and Aggarwal et al (2000), Kassel (1916) and Copeland (2005) argue that economic models that use Purchasing Power Parity (PPP) show ambiguous results, because in most tests , the theory does not support the hypothesis. Chumrusphonlert (2004) conducted an evaluation of PPP with the average nominal exchange rate and the Consumer Price Index using monthly data in the period 1973-2001, finding evidence of PPP between Japan and Indonesia, Korea, Malaysia, the Philippines and Thailand; and with the USA as a reference, PPP applies to all countries except Japan.

The concept of growth refers to the prediction of the inflation rate considering the growth rate of the exchange rate and the level of foreign prices or the prediction of the growth of the exchange rate considering two inflation rates. It is generally not seen that there is a potential for prediction error in these two concepts. Because there are differences in the concept of measuring relevant economic growth, this research was written. In the following chapters, this article will try to explain the relationship between Purchase Power Parity Index, Gross Domestic Product and Inflation (Consumer Price Index). The models and hypotheses that will be tested are as follows;

$$Y = a + bX1 + bX2 + e$$

Dimana=

Y = Variabel Dependen (Purchase Power Parity Index)
a = Konstanta
X1 = Variable Independen (Gross Domestic Bruto)
X2 = Variabel Independen (Inflasi / Consumer Price Index)

Hipothesys

H0 = GDP and inflation have a significant effect on Purchasing Power Parity
H1 = GDP and Inflation do not have a significant effect on Purchasing Power Parity

Research Methodology

This research uses a quantitative approach in the analysis process. The method used in this research is multiple regression analysis on panel data. This type of multiple panel data regression is a prediction that has complexity because it involves time series and cross section data. The panel data regression analysis method is processed using the Eviews 9.0 application. In the regression approach with panel data, there are three data analysis techniques used, namely; Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). The Common Effect Model is a panel data regression model that takes into account that the behavior of all data is the same at all time periods. Influences on individuals are ignored in this model. There is a weakness in this model, namely the model's dissimilarity to the actual situation, because the situation of each object in the given time period is different. This model is known as Ordinary Least Square. The Fixed Effect Model is a panel data regression model that assumes differences in individuals can be accommodated from differences in intercepts. To capture differences in intercepts, dummy variables are used. However, the slope between individuals remains the same. This model is known as the Least Square Dummy Variable. The Random Effect Model is a panel data regression model that estimates disturbance variables that have a time series and cross section relationship. The difference in the intercept of this model is accommodated by the error terms of each individual. This model is known as Generalized Least Square.

Research data

The research data used in this research is data on economic conditions represented by Purchasing Power Parity (PPP), Gross Domestic Product (GDP, and Inflation (Consumer Price Index) during the period 2000 - 2020. There are 15 countries sampled in this research country.

Table 1. Sample

No	Country's Name
1	Austria
2	Belgium
3	Canada
4	Swiss
5	Chile
6	China
7	Colombia
8	Costa Rica
9	Czech
10	Germany
11	Denmark
12	Spain
13	Estonia
14	Finland
15	France

4. Analysis and Discussion

The panel data regression model that was described previously must be chosen as the best model in a study. To select the best model, a regression model was selected using 3 tests, namely the Chow test, Hausman test and Breuch Pagan test.

a. Test Chow

The Chow test is a test carried out to choose between the common effect model and the fixed effect model in a study. Hypothesis in the chow test (Widarjono, 2009):

HO: Common Effect Model
Ha: Fixed Effect Model

If the value of Prob. Chi-square is greater than 0.05, it can be said that the common effect model is the best model for this regression method. Meanwhile, if the value of Prob. Chi-square is smaller than 0.05, it can be said that the fixed effect model is better used in this research.

b. Hausman test

The Hausman test is a test carried out to choose between a fixed effect model and a random effect model in a study. Hypothesis in the Hausman test (Widarjono, 2009):

HO: Random Effect Model
Ha: Fixed Effect Model

If the value of Prob. Chi-square greater than 0.05 can be said to be random
The effect model is the best model in this regression method. Meanwhile, if the value of Prob. Chi-square is smaller than 0.05, it can be said that the fixed effect model is the best model in this regression method.

Below is a table of Common Effect Model Test results

Table 2. Common Effect Model

CEM
Dependent Variable: Y
Method: Panel Least Squares
Date: 11/19/23 Time: 21:38
Sample: 2000 2020
Periods included: 21
Cross-sections included: 15
Total panel (balanced) observations: 315

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	139.4425	18.92938	7.366460	0.0000
X1	-1.13E-05	4.57E-06	-2.476555	0.0138
X2	-3.85E-06	7.28E-06	-0.529220	0.5970

Root MSE	285.6924	R-squared	0.019665
Mean dependent var	117.7122	Adjusted R-squared	0.013381
S.D. dependent var	289.0027	S.E. of regression	287.0626
Akaike info criterion	14.16676	Sum squared resid	25710349
Schwarz criterion	14.20249	Log likelihood	-2228.264
Hannan-Quinn criter.	14.18104	F-statistic	3.129242
Durbin-Watson stat	0.002360	Prob(F-statistic)	0.045127

Table 3. Fixed Effect Model

FEM
Dependent Variable: Y
Method: Panel Least Squares
Date: 11/19/23 Time: 21:43
Sample: 2000 2020
Periods included: 21
Cross-sections included: 15
Total panel (balanced) observations: 315

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	121.9293	4.482668	27.20017	0.0000
X1	-1.06E-07	1.78E-06	-0.059235	0.9528
X2	-5.07E-06	1.42E-06	-3.557873	0.0004

Effects Specification			
Cross-section fixed (dummy variables)			
Root MSE	52.01832	R-squared	0.967500
Mean dependent var	117.7122	Adjusted R-squared	0.965755
S.D. dependent var	289.0027	S.E. of regression	53.48149
Akaike info criterion	10.84901	Sum squared resid	852360.4
Schwarz criterion	11.05153	Log likelihood	-1691.718
Hannan-Quinn criter.	10.92992	F-statistic	554.4433
Durbin-Watson stat	0.088543	Prob(F-statistic)	0.000000

Table 4. Chow Test

UJI CHOW
Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	620.770344	(14,298)	0.0000
Cross-section Chi-square	1073.091430	14	0.0000

Cross-section fixed effects test equation:
Dependent Variable: Y
Method: Panel Least Squares
Date: 11/19/23 Time: 21:47
Sample: 2000 2020
Periods included: 21
Cross-sections included: 15
Total panel (balanced) observations: 315

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	139.4425	18.92938	7.366460	0.0000
X1	-1.13E-05	4.57E-06	-2.476555	0.0138
X2	-3.85E-06	7.28E-06	-0.529220	0.5970
Root MSE	285.6924	R-squared		0.019665
Mean dependent var	117.7122	Adjusted R-squared		0.013381
S.D. dependent var	289.0027	S.E. of regression		287.0626
Akaike info criterion	14.16676	Sum squared resid		25710349
Schwarz criterion	14.20249	Log likelihood		-2228.264
Hannan-Quinn criter.	14.18104	F-statistic		3.129242
Durbin-Watson stat	0.002360	Prob(F-statistic)		0.045127

Chi-square is greater than 0.05, it can be said that the common effect model is the best model for this regression method. Meanwhile, if the value of Prob. Chi-square is smaller than 0.05, it can be said that the fixed effect model is better used in this research. In this study it can be seen that Sig 0.45 < 0.05. Therefore, the model used is a fixed effect model.

Table 5. Random Effect Model

RANDOM EFFECT

Dependent Variable: Y
Method: Panel EGLS (Cross-section random effects)
Date: 11/19/23 Time: 21:51
Sample: 2000 2020
Periods included: 21
Cross-sections included: 15
Total panel (balanced) observations: 315
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	122.0460	80.68304	1.512660	0.1314
X1	-1.74E-07	1.78E-06	-0.097767	0.9222
X2	-5.07E-06	1.42E-06	-3.561877	0.0004

Effects Specification	S.D.	Rho
Cross-section random	312.0025	0.9715
Idiosyncratic random	53.48149	0.0285

Weighted Statistics

Root MSE	53.08857	R-squared	0.039967
Mean dependent var	4.400010	Adjusted R-squared	0.033813
S.D. dependent var	54.26856	S.E. of regression	53.34319
Sum squared resid	887794.7	F-statistic	6.494358
Durbin-Watson stat	0.085103	Prob(F-statistic)	0.001725

Unweighted Statistics

R-squared	0.000613	Mean dependent var	117.7122
Sum squared resid	26209991	Durbin-Watson stat	0.002883

Table 6. Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.388465	2	0.8235

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
X1	-0.000000	-0.000000	0.000000	0.5768
X2	-0.000005	-0.000005	0.000000	0.8180

Cross-section random effects test equation:

Dependent Variable: Y
Method: Panel Least Squares
Date: 11/19/23 Time: 21:52
Sample: 2000 2020
Periods included: 21
Cross-sections included: 15
Total panel (balanced) observations: 315

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	121.9293	4.482668	27.20017	0.0000
X1	-1.06E-07	1.78E-06	-0.059235	0.9528
X2	-5.07E-06	1.42E-06	-3.557873	0.0004

Effects Specification

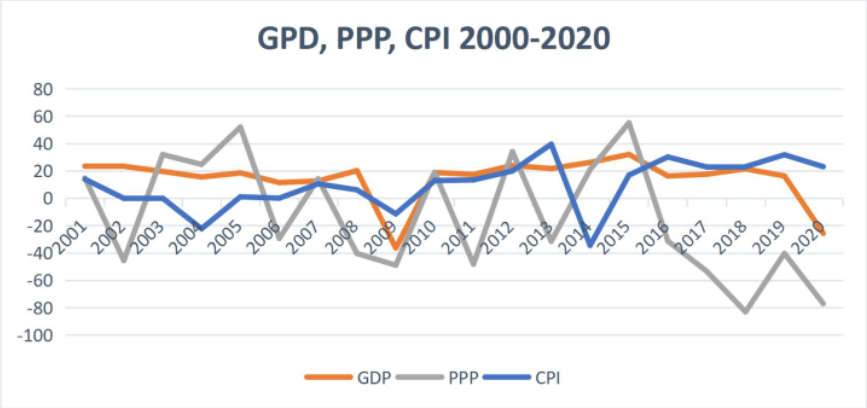
Cross-section fixed (dummy variables)

Root MSE	52.01832	R-squared	0.967500
Mean dependent var	117.7122	Adjusted R-squared	0.965755
S.D. dependent var	289.0027	S.E. of regression	53.48149
Akaike info criterion	10.84901	Sum squared resid	852360.4
Schwarz criterion	11.05153	Log likelihood	-1691.718
Hannan-Quinn criter.	10.92992	F-statistic	554.4433
Durbin-Watson stat	0.088543	Prob(F-statistic)	0.000000

Chi-square is greater than 0.05, it can be said that the random effect model is the best model in this regression method. Meanwhile, if the value of Prob. Chi-square is smaller than 0.05, it can be said that the fixed effect model is the best model in this regression method. The results of the Hausman Sig test are 0.00 < 0.05. So the model chosen is the Fixed Effect Model. Thus, the results of the regression test on panel data in this analysis are as follows;

$$\mathbf{Y = 121.92 - 1.06X1 - 5.07X2 + a}$$

Based on the results of the Hausman test, with sig 0.005 < 0.05, the fixed effect model is used. The fixed effects model shows that X1 sig. 0.952 > 0.05. This shows that GDP does not have a significant effect on the PPP index, the coefficient of variable This shows that an increase in GDP tends to have a negative effect on purchasing power, although it should be noted that this effect is not significant.



From the diagram above we can also see that the movement of GPD and PPP is not linear, this also indicates that there is no significant relationship between GDP and people's ability or purchasing power. So the assumption that a country's economic growth is expressed in GDP units/indicators becomes less relevant. The same thing was also conveyed by Cobb, et al (1995) who stated that consumption is the main driver of welfare, furthermore in the GDP concept the phenomenon shown is only the output of goods and services, this indicator does not show the level of costs and benefits (Cobb , et al (1995), the same thing is also found by Henderson (2011), who states that GDP is no longer relevant because GDP cannot represent other macroeconomic indicators such as environmental, social and health. GDP cannot represent economic conditions What is relevant is that GDP only assesses the dynamics of production, not welfare. Apart from that, GDP also has the potential for errors in measuring its value, that the increase in GDP value does not always represent real output but could also be excess stock from the previous period (Grishin et al, 2019)

The test results between variable This finding is relevant to Darius and William (2000) who state that PPP tends to remain at low inflation values. Chiaraah and Nkegbe (2014) in their study in Ghana found the opposite, there was no significant evidence between PPP and inflation, but in the same research they also stated that inflation had a negative effect on real income and price levels in the international market. These findings show that using PPP and Inflation (CPI) as indicators of a country's economic progress is more relevant than GDP, because the price level (PPP) and inflation can more comprehensively reflect economic conditions, compared to GDP.

Conclusion

Based on the results of the Fixed Effect Model test, it was found that GDP (Gross Domestic Product) has a negative, although not significant, relationship with PPP, thus H0 in this study was rejected. This finding is in line with Cobb, et al (1995) and Henderson (2011), . On the other hand, there is a negative and significant relationship on the PPP and CPI variables, both of which are relevant to several previous studies in the research results of William (2000) and Chiaraah and

Nkegbe (2014). This research also confirms that PPP is more relevant to use as an indicator for assessing a country's economic growth compared to GDP.

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