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Consumption in Indonesia: an application of ARDL panel data

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Abstract

This study aims to analyze the influence of income, inflation, and population towards consumption in Indonesia by using panel ARDL panel. Panel data in this study is from 2008 to 2017 and covers 34 provinces, with a total of 340 samples. The results showed that income, inflation, and population affect the consumption of both the short and long run. Short-term influence is better rather than long-term. In conclusion, the income has an influence on long and short-run investments, this is because future income expected received higher in the future, compare to current consumption, more income, the larger consumption.

Keywords: Income, inflation, population, consumption, panel.

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Consumo en Indonesia: una aplicación de datos del panel ARDL

Resumen

Este estudio tiene como objetivo analizar la influencia del ingreso, la inflación y la población hacia el consumo en Indonesia mediante el uso del panel ARDL. Los datos del panel en este estudio son de 2008 a 2017 y cubren 34 provincias, con un total de 340 muestras. Los resultados mostraron que el ingreso, la inflación y la población afectan el consumo tanto a corto como a largo plazo. La influencia a corto plazo es mejor que a largo plazo. En conclusión, los ingresos influyen en las inversiones a corto y largo plazo, esto se debe a que los ingresos futuros esperados se recibirán más en el futuro, en comparación con el consumo actual, más ingresos, el mayor consumo.

Palabras clave: Ingresos, inflación, población, consumo, panel.

1. INTRODUCTION

DRECHSEL-GRAU & SCHMID (2014) says that the influence of consumption influence of aggregate household consumption, which is considered to have an increasing income. When controlling a person's income, so does with individual and local differences in consumption, which will cause the household to raise consumption level. The growth rate of consumption is strongly related to the adjustment of income changes (KIM, 2017). Thus household consumption is mainly determined by long-run income.

Consumption decisions influenced by the inflation rate. The increasing price will affect community real income growth. The

monetary policy role is to control prices to remain stable (KAPLAN & SCHULHOFER-WOHL, 2017). But KOIVU (2012) conclude that the monetary authority should not depend on welfare during estimating monetary policy on household consumption.

Consumption should not be taken apart from population growth because a large population requires a larger amount. In worldwide the population growth is showing economic development is having an impact on the improvement of purchasing power (KIM, 2017). Household consumption decisions influence economic behavior both in the short and long run. In short-run consumption fluctuation shows significant influence towards economic fluctuation and in long run household consumption decisions stimulating other macro-economic variables (ZHAO & HSU, 2012).

BUSSOLO, M., SCHOTTE, S., & MATYTSIN (2017) use life cycle theory to see the connection between ages structure to consumption, and young generations to earn and save money more than the older. Therefore, the amount of aggregate savings is affected by population age, and the age negatively the aggregate savings. While CHAO, LAFFARGUE, & YU (2011) based on the theory of China's economic life cycle only explain 35 percent of the household savings increasing, and assume that people save money for their retirement period. Therefore, people work and tend to do savings for retirement.

2. THEORETICAL REVIEW

The main implication of the permanent income hypothesis is that maximal consumption use does not respond to anticipated income changes. While ETHERIDGE's (2015) research showing that in the long run income outrage is transmitted into consumption, and in particular for new. Different from the research of ALVAREZ-CUADRADO & LONG (2011) stated that households which have high incomes would save more than the permanent income compared with poor households.

Inflation expectations will affect the decision of consumption and investment, and hold an important role in determining the nominal interest rate. Explicitly consider the medium-term inflation targetable to determine the expectations with inflation target as part of the long-run dynamics of household formation. Every country or community will face different inflation rates, even with different price stability (JUNIOR & TEIXEIRA, 2018). During inflation then the value of goods will decrease and losing community purchasing power.

According to the ADDESSI (2018) age becomes a factor that affects the amount of population, and as evidence of microeconomics which indicates choices of consumption (in terms of amount and composition) depending on age. This means that consumption is an important factor in consumption. While RAPPAPORT (2008) explain population density varies greatly among the region's metro A. S. The empirical result shows that the facility will affect the high-density population and become very important in choosing houses. But U.S.

monetary policy set by the Federal Reserve directly affects economic inequality by the different income of each group.

But research carried out by HASAN (2010) shows evidence stochastic common trend among the population and income per capita which is an indication of a long-term relationship. The empirical result shows that the relationship of cause and effect which is negative in the long-term flows of income per capita to the population while the short-term relationship between population growth and income growth per capita is the variance at the entire model specification.

3. RESEARCH METHODS

Secondary data from 2008 to 2017 and covers 34 provinces are used in this study, a total of 340 samples. This research model using Panel Autoregressive Distributed Lag (ARDL). Use the model panel ARDL with the assumption that the variables used in this research are dynamic, so the model ARDL suitable in this study. Model panel ARDL is stated:

$$\Delta lnC_{j,t} = \alpha_{0i} + \sum_{i=1}^{n} \alpha_{1i}\, \Delta lnC_{i,t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta lnY_{i,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta lnINF_{i,t-1} + \sum_{i=1}^{n} \alpha_{4i} \Delta lnPOP_{i,t-1} + \beta_{11} lnC_{j,t-1} + \beta_{21} lnY_{j,t-1} + \beta_{31} lnINF_{j,t-1} + \beta_{41} lnPOP_{j,t-1} + u_{j,t} \quad (1)$$

Where C is consumption, Y is income, INF is the inflation and POP is the total population, α_1 up with α_2 is the coefficient of the short-term, β_1 up with β_2 is the long-run coefficient, t is the year ie

2008-2017, j is the territory of the 34 provinces in Indonesia, i is lag order, and u is the error term.

4. ESTIMATION AND RESULTS

4.1 Stationarity Panel Results Test

The stationarity test is a mandatory requirement before estimation model of ARDL panel is done. Stationarity result presented in Table 1. Testing stationarity in this research using four approaches namely, LLC, IPS, ADF-Fisher and PP-Fisher with individual intercept and individual intercept and trend. Results Table 1 describes that each of the variables is stationarity are different at (I(0)) level or at first difference (I(1)). Because there is difference stationarity so ARDL panel is eligible to be used in this research.

Table 1: Panel unit root. Resources: Data Processing Result, 2018 (processed)

Individual Intercept				
Variables	LLC	IPS	ADF-Fisher	PP-Fisher
Y	-0.806 (0.209)	5.453 (1.000)	14.413 (1.000)	4.354 (1.000)
INF	-5.122 (0.000)	0.913 (0.819)	38.566 (0.998)	39.546 (0.997)
POP	-11.261	-7.064	211.368	190.552

	(0.000)	(0.000)	(0.000)	(0.000)
C	0.101 (0.540)	5.635 (1.000)	9.620 (1.000)	3.543 (1.000)
ΔY	-8.450 (0.000)	-2.358 (0.009)	97.076 (0.011)	260.607 (0.000)
ΔINF	-9.663 (0.000)	-2.124 (0.016)	91.279 (0.031)	273.092 (0.000)
ΔPOP	-463.644 (0.000)	-569.912 (0.000)	483.940 (0.000)	187.114 (0.000)
ΔC	-9.047 (0.000)	-2.538 (0.005)	100.544 (0.006)	261.031 (0.000)
Individual Intercept and Trend				
Y	-6.821 (0.000)	-0.419 (0.337)	77.325 (0.205)	148.170 (0.000)
INF	-4.412 (0.000)	1.210 (0.887)	31.950 (0.999)	38.290 (0.998)
POP	-433.894 (0.000)	452.710 (0.000)	422.011 (0.000)	60.770 (0.721)
C	-.158 (0.000)	0.278 (0.390)	73.344 (0.307)	137.534 (0.000)
ΔY	-8.690 (0.000)	0.594 (0.723)	48.087 (0.967)	176.528 (0.000)
ΔINF	-9.796 (0.000)	0.730 (0.767)	44.567 (0.987)	174.674 (0.000)
ΔPOP	-248.636	-988.741	446.225	244.317

	(0.000)	(0.000)	(0.000)	(0.000)
ΔC	-8.062 (0.000)	0.945 (0.827)	39.100 (0.998)	159.512 (0.000)

4.2 Panel Cointegration ResultsTest

Cointegration test in this study using Panel Cointegration with Predoni and KAO Based which aims to see som variables integrated at different orders I(0) or I(1). Panel cointegration result test between Y, INF, POP, and C the significance at 5 and 1 percent, it is concluded that there is a relationship from short run to long run amongst those four variables.

Table 2: Cointegration Panel. Resources: Data Processing Result, 2018 (processed)

Pre-done Cointegration Test	Statistic	Weighted Statistic
Panel v-Statistic	-1.197 (0.884)	-5.801 (1.000)
Panel rho-Statistic	7.061 (1.000)	5.814 (1.000)
Panel PP-Statistic	1.183 (0.881)	-13.842 (0.000)
Panel ADF-Statistic	(-0.738) (0.230)	-5.823 (0.000)
Group rho-Statistic	7.292 (1.000)	
Group PP-Statistic	-16.029 (0.000)	
Group ADF-Statistic	(-4.291) 0.000	
KAO Cointegration Test	t-statistic	
ADF	-8.131 (0.000)	

4.3 Lag Selection

Test lag in this study using the Akaike Information Criterion (AIC). Basically, the research is to see the lowest value and explain optimal lag using the criteria of AIC and obtained the lag result as much as 1 lag. Therefore, the selection of lag which is best to see the smallest AIC value so that lag used in this study is 1.1.

5. DISCUSSIONS

ARDLregression panel result is eligible because of the error correction coefficient term is at a negative slope and significant. For its eligibility it can be used as an analysis model of income influence, inflation and population against consumption in Indonesia as shown in Table 3. The coefficient of ECTt-1 describes that if there are shocks needs 1.5 months to return to the beginning equilibrium position. These conditions show a quick effort is needed in order to balance again.

Table 3 shows income is effecting both long and short-run investments. The long-term income coefficient is large (0.548138) compared to short-term. This condition illustrates that in the long run, the influence of income greater than the short run. In the long run, occurs income accumulation that turns into assets to improve income to be productive assets, in line with ETHERIDGE (2015) research.

Furthermore, inflation and residents amount show negative and significant effects during the long run. While in short-term, not

significant. Short-run inflation could manage wth using a cheaper substitute good to fulfill the needs. However, inflation, in the long run, is effecting in decreasing real income so that there is no way substituting it into cheaper goods.

Other factors that affect the population, negative effect, in the long run, indicate that the larger family member dependency ratio will decrease long-run per capita income These conditions result in regress consumption. This study confirms with HASAN (2010) results.

Table 3: ARDL Regression Panel Result

Estimate	Variable	Coefficient	t-Statistic*
	Y	0.548138	98.65074 (0.000)
Long Run	INF	-41136.69	-20.818(0.000)
	POP	-10774.89	-10.94847 (0.000)
	C	19251315	1.996712 (0.047)
Short Run	ΔY	0.27276	4.893919 (0.000)
	ΔINF	-33749.72	-1.162462 (0.246)
	ΔPOP	632.416	0.075647 (0.939)
	ECT(-1)	-0.128633	-2.473 (0.014)

Resources: Data Processing Result, 2018 (processed)

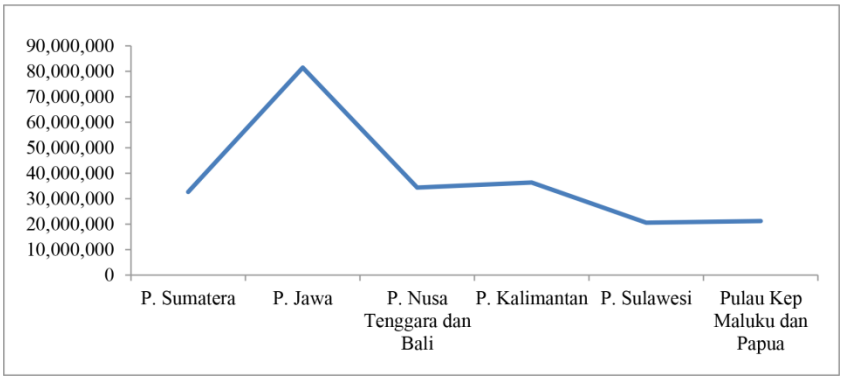
Note: *) Significant rate

5.1 Cross-Section Results

Because this study uses a panel model so that there are cross-section estimation results in each province. However, the results only present large island in Indonesia.

Picture 1 shows that Java Island has the highest cross-section short-run value compared to other islands. This condition is caused by high income and a large population, trigger in high consumption (KIM, 2017). Based on the life cycle hypothesis with the assumption that a person will attempt to do common consumption, and saving money to decide their consumption for the whole life. Therefore, people work and tend to save money to be later used at an old age. Similar to CHAO ET AL. (2011) research, and in contrary DEATON (2018) research.

Consumption depends not only on current income but also on the wealth and income expected in the foreseeable future. Household consumption is mainly determined by long-run income. According to Keynes, there is a minimum limit that does not depend on the level of income. That is the level of consumption that must be met, although the level of income equal to zero.



Picture 1: Average cross-section short-run coefficient

Sources: counting from estimated results

5. CONCLUSION

Overall the findings show that in the short and long run, income, inflation and population influence consumption in Indonesia. However, when compared to the effect of income, inflation and population on consumption in the short and long run, the effect is greater in long run rather than in the short run. It is because of the increasing population, the greater the amount of consumption needed. The high population will increase in aggregate consumption expenditure. A country's consumption expenditure will be very large if the population is large too.

It is also offset by inflation because inflation has a great influence where if the goods prices and services rise and inflation will cause a decline in real income value income thus trigger people's purchasing power, especially in domestic gives impact on lowering public consumption. Yet the income has an influence in long and short-run investments, this is because future income expected received higher in the future, compare to current consumption, more income, the larger consumption.

If further review, four categories in this study, the first influence is positive and significant, second is positive and not significant, the third is a negative influence and not significant, and the fourth is a negative influence and significant. Recommendations for policymakers is to control inflation to remain stable and giving negative effects for real community income.

The weakness of this study is the number of years is smaller compared to provinces. This occurs because many areas have no data. Quarter data is also unavailable, especially for population data.

6. SUGGESTIONS

1. As recommendations to the Government of Indonesia to conduct an intensive policy in controlling inflation rate in Indonesia, with the aim is to increase purchasing power.

2. For researchers who want to conduct the same research, it is recommended to provide more research variables, in order to obtain a better research result. Other variables for example education, level of past disposable income and so on. As well as expanding the sample such as quarter and extending the range year.

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