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The Economics Optimization with Demography Bonuses (Empirical Study in Bali Province 2010-2017)

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Abstract

Bali has economic potential and experiences a demographic bonus earlier with a duration longer than the national one. However, the requirements for utilizing the demographic's bonuses as an engine of economic growth do not carry out optimally. This condition is due to the unpreparedness of the community to provide skilled, educated, and technologically skilled workers. Though Human investment is long-term, the bonus demographics are not yet ready to be optimized. This research model uses multiple linear regression analysis with four independent variables, population growth rate, number of unemployed, dependency ratio, and Gini Ratio. The regression results show that all independent variables are related to the hypothesis. The relationship and level of significance concluded that the demographic transition in Bali provided a bonus for economic growth in the region.

Keywords: *Productive Age Population, Dependency Ratio, Economic Growth Rate, Unemployment, Gini Ratio*

INTRODUCTION

Bali is one of 33 provinces in Indonesia. Bali has a relatively small size (around 5636,66 km^2), which made Bali only contribute less than 1 % of Indonesia's aggregate space of regions (0,29 %). Bali has a 4.5 million population (Survey of 2017) with have high density (around 690 person/Km).

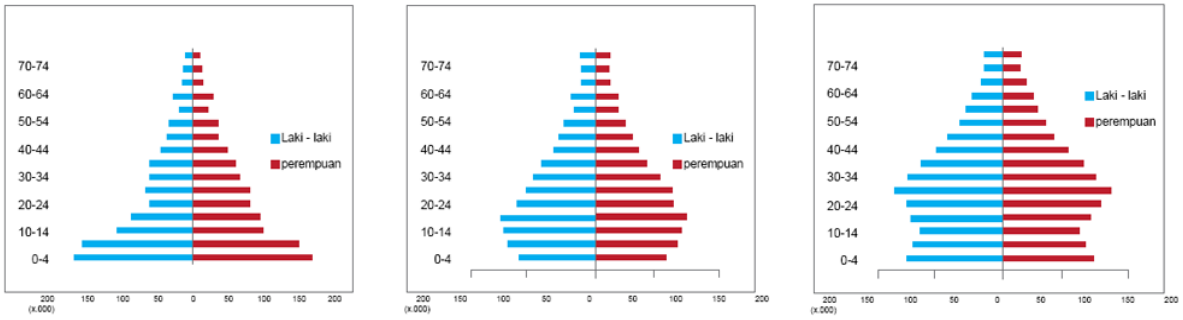

Figure 1 Structure Demography in Bali 1971-2000

Source : BPS Bali

Figure 1 illustrates the Bali population proportion based on productive-age and non-productive age classification. In 29 years, Bali has transformed into a province that has a productive-age population more than non-productive age. The condition indicates the central and regional government has done their job to prevent *boom-blast population* with many programs in certain circumstances.

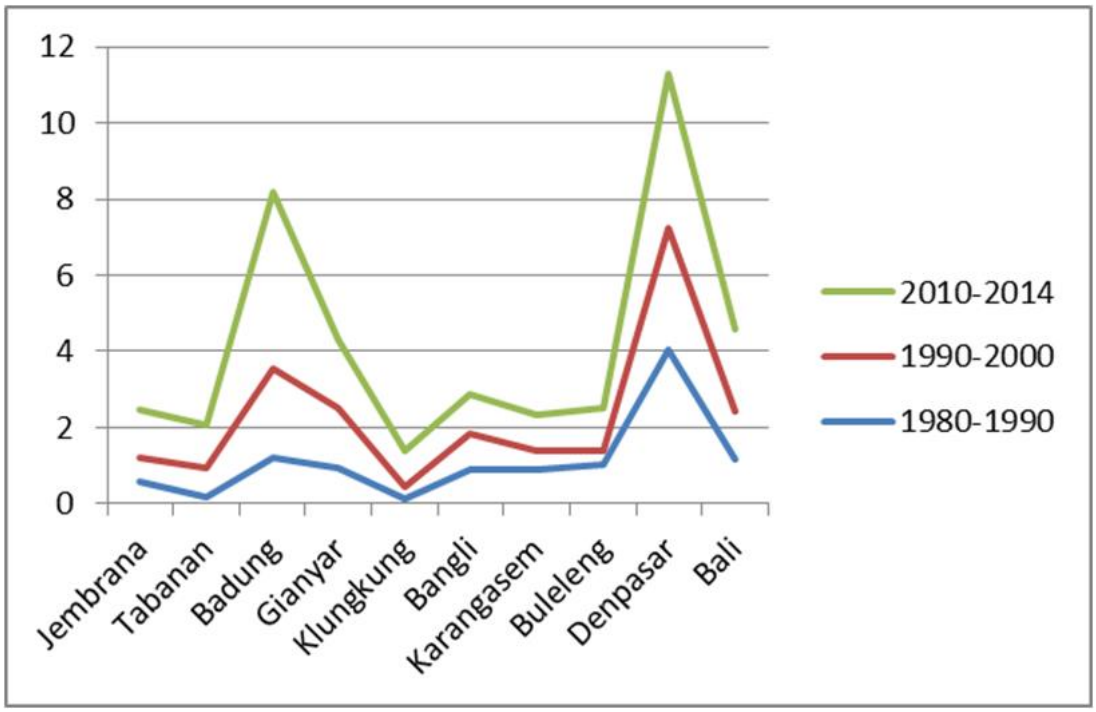

Figure 2 Distribution of Bali population for each regency/city on 1980-2014

Bali province, like any other region in Java Island and Sumatera, has distribution of citizens in many regencies/districts/sub-district. We can see the most places with high density of citizens is placed by Badung Regency and Denpasar City for the last 34 years. Since 1961 to 2000, population growth in Bali always left behind than population

growth in national scale. It means an achievement, because in java island the number of population growth always overtaking national growth. However, since 2000, the number of population growth in Bali is rose and precede national scale like Java island. This thing could be worse because the rise of population without right implication of government policy would cause bad shape development for bali province in the next years.

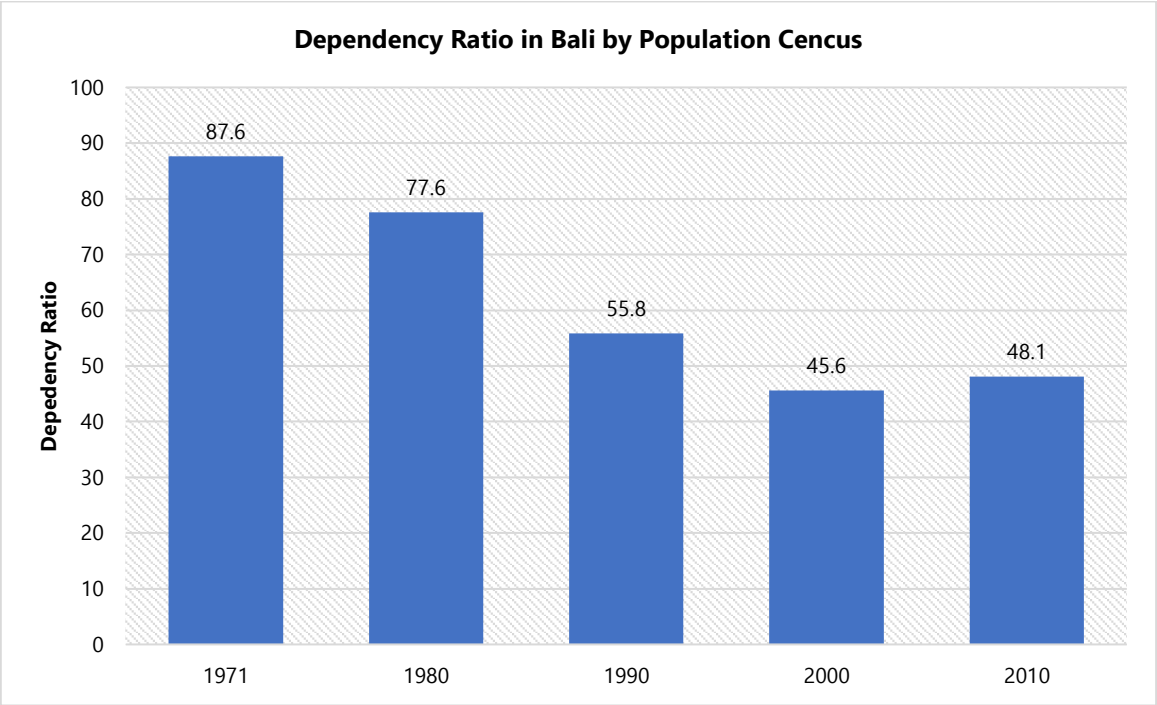

Figure 3 *Dependency ratio rate* in Bali Province, 1971-2010

From 1971-2000, the *Dependency ratio rate* in Bali is getting to shrink but was still above 50 %. According to Survey in 1971, the number was 87,6 %. It means every 100 people of productive age is feeding around 88 people of non-productive age. In 1990, the productive-age population burden was getting smaller. The dependency ratio in this period showed that every 100 productive-age people bear 56 non-productive-age people. In 2010, we could be happier because the *dependency ratio* decreased to 45,6 %. The decrease is an achievement. After all, the value is less than 50 %, and Bali is on the way to getting *Demography Bonuses*.

As the government had spoken in every year of dissemination, that development in each region must have complement indicators of macroeconomics, such as labor force, income regional per capita, infrastructure expenditure, income redistribution, and social guarantee to make sure social welfare is committed. The combination between

government, society, and economic agents in the whole market must be harmonized with Region's long-term goal.

Similar with Bali Province, as a relative potential province which more than 50 % regional income is gained from tourism sector, Small and medium entreprises, hotel, and trade. Bali should have bigger and better chance to compete with any other region who have free autonomy and good governance. Besides regional development issues, Bali also has a high number of population growth and it is overtaking national growth. BPS Data showed us in past 20 years, Bali's population growth (in %) is rise from 1,5-2 % and this trend still rose as the time goes by.

In 2018, Indonesia was in 4th place with the most populated country in the world. The number is 260 million people. Most populations surely reflected economic power that can be optimized because more people will rose consumption rate, saving rate, and labor force can drive the national income to better quantity. But, is that assumption is corrected ? is terms "more than 50 % Indonesian people already have steady household purposes condition ?". That question is profound to give a demography bonuses analysis and its relation with economic growth. In Common, we can define that demography bonuses is condition that productive age population is overtaking non-productive age population. The comparison between 2 things is called dependency ratio. If the ratio is less than 50 %, it means productive age population is bigger than non productive age.

More even far, demography bonuses is like dual-pole sword. In other side can be an opportunity because if productive age population have an ability and proper education to compete with other human resources and causing aggregate productivity would rose and increasing national income. But the opposite, more productive age population could be a *Threat* if government cannot utilize the society in order to stay "productive" as Prof. Armida said (2012) in her research about Indonesian demography bonuses. She explained demography bonuses could be misleading if government only waits that time to come without doing valuable things that can reduce the *risk* of risen productive age population and non-productive age population.

With bigger contexts, demography bonuses is reflection of available labor force in current time. In microeconomics theory, labor force is one of main component that have responsibility to produce goods and services. The other is a capital, for example : land, machine, building, and any other things that can be input for production

purposes. There's a positive relations between the number of input production with output production. This relations is proofed by Cobb-Douglass Equation, Solow Model, and Harrold Domar Model. Every country are expect to optimize economy growth with using as many as possible labor force. But the reality is, not every country and region can give enough jobs to labor force. The disparity between 2 things is called *Unemployment*. This concept could go further with many disadvantages like the risen of poverty, criminality, bad sanitation and bad environment.

Because Indonesia has many island, province and sub-region with many administrative law. Then, social economy issue is getting complicated. More than that, demography bonuses that each region can gained is different too. The description above just summarized demography bonuses in Bali. Is it opportunity ? or is it a Threat ?. We could not just sit and doing nothing to face the time. Many things can be prepared and must be prepared, So that, when demography bonuses came, we can optimizing our potential and get so much benefit for all of society.

METHOD

This research conduction is using quantitative method (Ordinary Least Square/OLS regression). Researcher using economic growth theorem with assumption that economic growth are affected with many factors (*independent variable)* like dependency ratio, unemployment rate, population growth, and gini ratio and all of them are *exogenous.* Inputting demography bonuses representation with theses 4 variables, So, the equation follows below :

$$EG = \beta_0 + \beta_1 Unemployment + \beta_2 Pop.Growth + \beta_3 Dep.Ratio + \beta_4 Gini\ Ratio + \varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Note :

- Economy growth (%)
- Unemployment Rate (%)
- Population Growth (%)
- Dependency Ratio (Ratio)
- Gini Ratio (Scale 0 to 1)

Within equation above, we knew that besides any variable could affected structure of demography and drive economy growth. Poverty aspect which indicated by gini ratio

are also affects. Like we knew before in background 1.1 section, gini ratio are measure the value between 0 to 1. Normatively, Gini ratio also has negative terms with economy growth. It means, as gini ratio goes shrink income redistribution would be better, in opposite, when gini ratio is getting closer to value 1 (avoid 0 value), so income distribution would getting disported, and society would suffer from development disparity in each region.

These data below are used for regression model gained from many resources such as Bureau Stastistics of Indonesia, Scientific journal, and many references. Many data categories are classify based on kinds of data, also with proper circumstances between dependent and independent variable. Follows :

Table 1 Research Variable Operational

Variable	Operational Variable	Unit Measurement	Hipotesis with dependent variable
EG	Economy growth measured by: $\frac{PDB\ t - PDB\ t-1}{PDBt-1}$	%	Positive
UNEM	Unemployment Rate in followed years	%	Negative
PopGro	Population growth in following year	%	Positive
DR	*Dependency ratio* measured by: $\frac{Non-Productive\ Age\ Population}{Productive\ Age\ Population}\ x\ 100$	Per 100 productive age person	Negative
GR	Gini ratio per year measured by : $GR = 1 - \sum_{i=1}^{n} P_i(F_i + F_{i-1})$	Non-Dimensional	Negative

RESULT

The following are the results of the model estimation using the STATA 14.1 software, which is as follows:

Table 2 Estimated Regression Results

Variable	Bali's Economy Growth as dependent Variable		
	Coefficient	t-statistic	Prob.
C	-134.76	3.85	0.06
Unem	-9.303	3.92	0.04

Variable	Bali's Economy Growth as dependent Variable		
	Coefficient	**t-statistic**	**Prob.**
DR	-96.3789	5.77	0.02
GR	-47.4723	6.87	0.00
Pop	35.5674	4.54	0.00
R-Squared	0.967		
F-statistic	31.75		
Prob (F-statistic)	0.03		

Sources : Data has been processed

Normality Test

Figure two below is a regression model that has been interpreted to have a data distribution that is relevant to statistical rules, which is normally distributed. The normality test used is using a scatterplot.

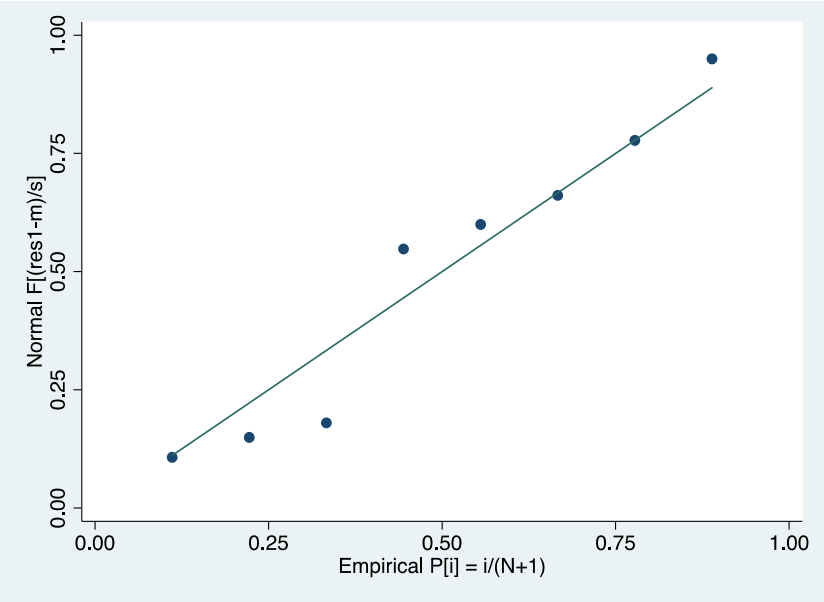

Figure 4 Normality test using *Scatterplot*

Sources : Data has been processed

If viewed based on the image below, it can be seen that the data in the regression model has a linear trend along the transverse line. This indicates that the data is normally and symmetrically distributed.

Multicollinearity Test

The table below is the interpretation of the multicollinearity test on the regression model that has been carried out. This test aims to determine whether there is a linear relationship between the independent variables, such as unemployment rate, dependency ratio, population Growth, and Gini Ratio.

Table 3 Multicoliniarity test using *Variance Inflation Factor*

Variable	VIF
Unem	1.63
DR	1.63
Pop	1.63
GR	1.63

Sources : Data has been processed

Based on the multicollinearity test using the VIF method above, it can be seen that the two independent variables are independent of the heteroscedasticity problem because the VIF value is < 5. So it can be concluded that there is no relationship between the independent variables, namely labor and local government spending. Table three below illustrates the heteroscedasticity test in the regression model. The heteroscedasticity test aims to determine whether the existing variance is consistent or not.

Heteroskedasticity Test

Table 4 Heteroskesdasticity Test using *Glejser*

Variable	*p-value*
Unem	0.169
DR	0.128
Pop	0.24
GR	0.53

Sources : Data has been processed

Based on table 4 regarding the heteroscedasticity test above, it can be seen that the p-value of the independent variable is > 0.05 which indicates that there is no heteroscedasticity or in other words the regression of this study is homoscedastic, i.e. in the regression model there is no inconsistency of variance from various residuals.

Autocorrelation Test

Table 5 Estimated Autocorrelation Results

Variable	*P-value*
Unem	0.12

Variable	*P-value*
DR	0.12
Pop	0.12
GR	0.12

Sources : Data has been processed

It is known that based on the results of the runtest for the autocorrelation test it has a p-value above 0.05 which is equal to 1. So it can be concluded that the regression model does not have a correlation between error terms or residuals between periods t and period t-1 (previous).

T-tests

Table 6 Estimated T-Tests Results

Variable	t-statistic	Prob.
Unem	3.92	0.04
DR	5.77	0.02
Pop	6.87	0.00
GR	4.54	0.00

Sources : Data has been processed

Based on the table above, it can be seen that in equation 1, the labor and capital investment variables have t-statistic values of 3.92 and 5.77, respectively, which are greater than the T-table of 2.38. While in equation 2 it is known that the value of t-statistics is smaller than t-table, which is 2.08 and 0.15, respectively, smaller than 2.38. So it can be concluded that:

Coefficient of Determinant (R^2)

Table 7 Estimated R-Squared Results

Variable	R-Squared
Econ Growth = f(Pop, DR, GR, Unem)	0.96

Sources : Data has been processed

Based on the results of the regression model data processing above, it is known that the coefficient of determination in the two regression equations above is worth 0.96 and 0.69 which means that 96% and 69% of variations in Economy growth changes in all are influenced by Those Variable while respectively, the remaining 4% and 31% have

the meaning that the dependence variable is explained by other independent variables outside the model studied.

DISCUSSION

Influence of Population Growth to Economy Growth

Based on the estimation results of the first model above, it can be seen that the all independence Variable has a significance value below 5% which indicates a significant influence on the Bali's Economy Growth. It means if Population Growth has 1% level increasing, Bali's Economy Growth will rise by 0.35 %. The R-Squared value is 0.96 which means that the independent variable studied can explain 96% of the variation in the dependent variable change, while the remaining coefficient of 0.04 or 4 % is another variable outside the model that can explain changes in the dependent variable. This research is in line with research conducted by Wanodyatama Islami et al., (2021) and Prasetyo, 2020) on the effect of productivity and performance of Bali Economy in Indonesia

Influence of Dependency Ratio, Gini Ratio and Unemployment to Economy Growth

Based on the estimation results of the first model above, it can be seen that the all of three independence variable of Bali's Demography has a significance value above 5% which indicates a insignificant influence on the Bali's Economy Growth as dependence variable. It means if dependency ratio, gini ratio and unemployment has fallen 1%, Bali's Economy Growth will rise more than 1 %. The results of this study are in line with research conducted by Triharjanto et al., (2022), and Wibowo et al., (2021) regarding the development of Bali's Economy Growth

CONCLUSION

Bali as a province with economic potential should have gained demography bonuses earlier and with longer duration than any other region or national scale. But, there are certain conditions and terms to make it happen. To give Bali demography as an *economy growth engine*. This reason is caused by society not being ready to supply high-skilled labourlabor, educated, and technology literation.

Meanwhile, Human investment is measured in long the term term. But demography bonuses are not yet ready to optimize. On the other side, government investment is realized by each region's administration. But, it is not yet good enough. Because we still have an issue with complicated bureaucracy and many corruption conducted by policymakers. We knew from the beginning, this obstacle must've been passed to fulfill social welfare inclusively. Because each region has each issue specifically. More than that, we condensing that ecoeconomicowth is not separatedbydemography aspects and income distribution by the Bali government or regional advisors.

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