A Path to Equality on Wealth Distribution: Basis for Philippines Policy Reforms

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Abstract

This study examined the wealth distribution parameters towards equality. The NetLogo Wealth Distribution Model was used to determine the Gini Coefficient based on the interactions of the parameters such as population, perception in life, lifestyle, minimum life expectancy, maximum life expectancy, income opportunities, skills, and labor market. Various simulations were conducted to identify the numerical values of the parameters leading to the desired state of wealth distribution. The result showed that among the parameters used, population has the highest impact in achieving an ideal state of equality. The increase in population will affect the result of the Gini coefficient, which tends to deviate from the perfect equality curve. Based on the Gini index of the Philippines, it revealed that wealth distribution in the country is significantly unequal, influenced by growing population and poor policy implementation. This research could serve as a basis for policy reforms which would lead to the country's economic growth and stability.

Keywords and phrases: Wealth, distribution of wealth, inequality, population, policy

Introduction

The primary goal of the 2030 Agenda for Sustainable Development is to end extreme poverty by formulating sound policy frameworks at the national and local levels to support accelerated investment in poverty eradication activities. Recent decades have witnessed rapid upward trend in wealth inequality, which in turn partly is responsible for not realizing the aims of the Millennium Development Goals (Vandemoortele, 2011). Previous International Monetary Fund studies have found that income inequality negatively affects growth and its sustainability (Ostry, Berg, & Tsangarides, 2014; Winship, 2013).

Wealth is an essential dimension of a household's economic well-being which offers access to economic resources (Morissette & Zhang, 2007). According to Tan (2009), a Filipino author in finance, life would be easier and stress-free when individuals possess enough wealth because money provides a sense of security and they do not have to worry about their future. The philosophy explains that the more money you have, the more secure your future will be (Miller, 2012). Wealth is the abundance of valuable resources which include

income, land, stocks and other investments held by the richest and poorest members of the society.

It is necessary to understand the dynamics of wealth in an economy and how wealth is distributed among the population. The pattern of wealth-holdings across population reveals a great deal about the type of economy in which people operate and live (Davis, n.d.). Identifying how wealth is distributed among the population can be considered as a basis in achieving a fair and highly transformed social status between generations, a stable economic system and its capacity to respond to economic shocks.

Wealth inequality has been given perspective because of the evolution of the Gini coefficient (Morisette & Zhang, 2007). It is a determinant factor of 0-1 ranges with corresponding qualifying descriptions. It is used to measure income inequality in which 0 (zero) indicates that every member of the society has the same income; while 1 (one) is when few members have most of the income (Leubker, 2010, p.1). If the index would be lower or nearer to zero, income distribution is less unequal and it would be more unequal if the index would be higher or closer to one. In reality, perfect wealth distribution or zero (0) Gini coefficient does not exist. As people strive to increase individual income, various factors will contribute in acquiring the desired income status. These include attitudes, perceptions, lifestyle, skills and other person-related factors.

Based on the 2014 World Development Indicators, among six selected ASEAN countries namely Cambodia, Indonesia, Malaysia, Thailand, Vietnam, and the Philippines, from 1990's to the latest, it showed that in 2009, Vietnam had a Gini index of 0.356 (World Bank Group, 2014). Vietnam has a more desirable wealth distribution pattern and it is evidenced by the country's steady economic growth compared to Malaysia which had the highest index equivalent to 0.462 (2009). On the other hand, Philippines got a Gini index of 0.43 (2009) which means that income distribution is unattractive. Inequalities in income have provided barriers for individuals to participate in growth processes (Albert, Dumagan, & Martinez, 2015). Filipinos are vulnerable to key shocks such as employment, price, reproductive and health, and natural disasters.

According to Credit Suisse Group, there remains a "very high inequality" regarding wealth distribution among Filipinos, in which the 10% of the richest Filipinos owned 79% of the country's wealth (2000). International Monetary Fund's discussion of Causes and Consequences of Income Inequality mentioned that income inequality matters for growth and sustainability (Norris, Kochhar, Ricka, Suphaphiphat, & Tsounta, 2015, p. 4). The GDP growth of the country declines if income shares of the rich increases. In contrast, the increase in the income share of the poor is associated with higher GDP growth.

Government outlay is fundamental to guarantee that the basic structures of society perform smoothly enough to facilitate economic activities. Capitalizing in the people and ensuring security to ordinary citizens which represent a wider segment of the society will lead to a more efficient and vibrant economy. Thus, greater economic equality is fostered through redistribution which ensures social stability, preserves democracy, improves population and health, and acts as a spur on the economy.

Policies are formulated to address situations that could affect the economic status of a country. These can be a valuable tool for reducing inequality. It plays a crucial role in ensuring macroeconomic stability and thus a strict monitoring and evaluation of programs are highly necessary to help the disadvantaged population. Government actions can contribute to improving wealth distribution.

This research intended to generate the optimal values of the parameters to achieve the possible occurrence of equality in wealth distribution. NetLogo's Wealth Distribution Model was utilized to analyse the numerical

values for each parameter. It is identified as an appropriate tool to conduct simulations which best represents the possible behaviours significantly influencing distribution of wealth. The actual data of the Philippine Gini coefficient (2012) was used to determine the values of the parameters to arrive at the given data. The result became the basis in formulating policy reforms for the country.

Objectives

The study aimed to determine the optimal values for each parameter to achieve equitable distribution of wealth. It also established the optimal values for equitable index given the Philippine Gini Coefficient. Recommendations on policy reforms were formulated to improve the Gini index in the country.

The Model

This study utilized the Model of Wealth Distribution by Epstein and Axtell (NetLogo v. 5.2.1) in which it simulated the distribution of wealth. NetLogo is a tool for research which allows users to conduct open simulations and play, exploring their behavior under different conditions. It is designed for modeling complex systems developing over time. Social structures and behaviors were interpreted based on the interaction of individual agent in an artificial environment (Tisue & Wilensky, 2004).

The Wealth Distribution Model focused on the distributive interactions among three ingredients: agents, an environment, and rules. The people in the artificial environment are the agents, in which each agent has internal attributes, particularly the parameters (Impullitti & Rebmann, 2002). Parameters have numerical values that do not change during the entire period of simulation. However, they can be changed during the various simulations.

Table 1 presents the Wealth Distribution Model which contains eight (8) attributes or parameters. The equitable distribution of wealth is simulated, where some of the parameters were renamed in the study.

Table 1. *The Wealth Distribution Model*

Wealth Distribution Parameters	Renamed Parameters/Attributes
num-people (0-1000)	Population (0-1000) • Represents the total number of people in a country, wherein the people are the agents while the country is the environment or the artificial world.
max-vision (0-15)	Perception in Life (0-15) • Refers to the outlook or vision of the individuals (e.g. optimistic/ pessimistic). The agent identifies on which part of the environment has greater economic opportunity.
metabolism-max (0-25))	Lifestyle/Consumption (0-25) • Indicates the person's consumption pattern based on the way of life they have. It influence on how the agent make use of the available resources.
life-expectancy-min (0-85)	Life-expectancy-min (0-85) • Minimum life expectancy refers to shortest year an individual can live. It is assumed that minimum life expectancy is zero (0).
life-expectancy-max (0-85)	Life-expectancy-max (0-85) • Denotes the longest year an individual can live. It is assumed that maximum life expectancy is eighty five (85).
per cent-best-land (0-25%)	Income opportunities (0-25%) • Represent the possible income that the person may derive from work or business. The more the sources of income for an agent, the more the possibility to acquire wealth.
grain-growth-interval (0-10)	Skills (0-10) • Exemplify the abilities, talents, and competencies that are possessed by the individual. These skills will be used by the agent to obtain greater opportunity to enhance wealth.
num-grain-grown (0-10)	Labour Market (0-10) • Refers to the capability of the working class to be employed or engaged in business.

The Wealth Distribution Model is used to determine the possible numerical values of the enumerated parameters to come up with an equitable wealth distribution. However, it has been stated in the literature that there is no perfect equality. The aim then is to achieve the possible occurrence of equality. The values for each parameter were set-up randomly, and simulated to depict the possible occurrence of equality based on the Gini coefficient. All the parameters are specified at a level that is adequate with a realistic assessment of the state of the social world.

Assumption of the Model

The catchphrase, "The rich gets richer, while the poor gets poorer" articulates inequity in the allocation of income and implies the Law of Increasing Poverty.

Data Requirements

The actual data of the Philippine Gini Coefficient have been used as basis to identify the optimal values for each parameter in the Wealth Distribution Model. The Gini coefficient of the Philippines is equivalent to 0.43 (World Bank, 2012).

Use of the Model

Based on the simulation of wealth distribution, the study generated an understanding of the dynamics of the parameters on wealth distribution. Links were established, identifying factors that primarily influenced the result of the Gini coefficient towards equality of wealth distribution.

Figure 1 shows the schematic diagram used in the study using factors affecting wealth distribution.

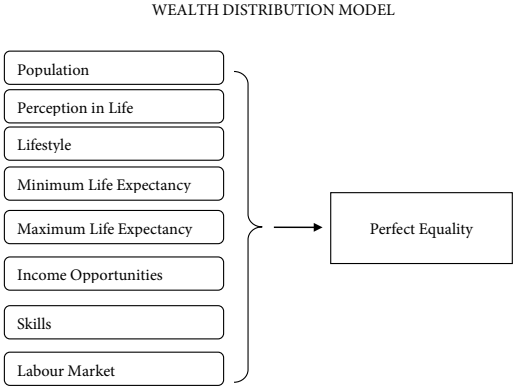

Figure 1. Factors affecting Wealth Distribution.

Methodology

This study used the descriptive method to gather data that demonstrated the relationship among the parameters such as population, the perception of life, lifestyle, minimum life expectancy, maximum life expectancy, income opportunities, skills, and labor force.

Simulations were done to trace the effects of the interactions of the different parameters. There are many ways to analyze the distribution of wealth. However, this study was limited only to the use of NetLogo, specifically the Wealth Distribution Model.

The NetLogo software is a modeling program which includes pre-determined parameters for a specific phenomenon to be studied. Hence, literatures cited in this study are limited to the parameters included in the model.

In this model, the Gini Coefficient is a determinant factor in identifying income equality. To achieve perfect fairness, the ideal state of wealth distribution's Gini Coefficient must be 0. On the other hand, if Gini Coefficient is equivalent to 1, it results in a perfect inequality. Hence, simulations have been made using the said model. It is simulated to depict the possible occurrence of perfect equality of wealth distribution.

Results and Discussions

Simulation Results Using the Model Data

To achieve objective number1, numerous simulations were done in which varying optimal values were set to attain equality on wealth distribution.

Table 1 shows the summary of the numerical values used for each parameter of the Wealth Distribution Model from the various simulations.

Table 1. *Optimal Values Set in the Simulations*

PARAMETERS	1st Run	2nd Run	3rd Run	4th Run
a) Population	100	50	2	1000
b) Perception in Life	15	15	15	15
c) Lifestyle	1	1	25	25
d) Minimum Life Expectancy	1	1	1	1
e) Maximum Life Expectancy	85	85	85	85
f) Income Opportunities	25	25	15	15
g) Skills	10	10	5	1
h) Labor Force	10	10	5	1
Gini-Coefficient	0.138	0.338	0.014	0.372

It is interesting to note that on the third run, the Gini Coefficient is 0.014 which is near to zero (0). This indicates that these are the most desirable numerical values for the parameters contributing towards equitable wealth distribution. Another simulation was made using the same values except for the population, setting it at its maximum value of 1000. The result showed that the Gini Coefficient increased, deviating from 0, which shows inequality. The second trial revealed that when the population decreased, there was a higher probability of achieving perfect equality in wealth distribution.

There is a growing recognition that equity is significant for development. Thus, the more we are, the poorer we will be. Also, the increase of population is a problem for economic growth because a large population can threaten a country's stability. Economists say that the population growth creates problems that include poverty, famine, and unemployment. Rapid population growth can undesirably affect economic growth in developing countries (Birdsall & Sinding, 2001).

In most East Asian countries, it is highly evident that there is a close relationship between population and economic growth rates. Several Asian nations implemented population control policies in the 1970s, with Thailand, Japan, Singapore, South Korea, Taiwan, and Indonesia as forerunners. These countries experienced economic growth following the implementation of such policies that made them the economic powerhouses in the region. It shows that population size significantly affects the country's economic growth (Sethy & Sahoo, 2015).

Simulation Using the Actual Data

To address objective number 2, the Wealth Distribution Model was simulated to identify the numerical values of each parameter based on the Philippine Gini Coefficient.

In the Philippines, Gini index as of 2012 was equal to 0.43 (World Bank, 2015), which has the same data given by the Poverty and Inequality Statistics (2015). This shows that there are no improvements in the country's Gini Index for the past four years.

Simulations were conducted to arrive at the equivalent index. To obtain the desired index, the parameters are on the following value: Population is 1000; Perception in Life is 4; Lifestyle is 9; Life Expectancy is 1 as the minimum and 85 as the extreme; Skills is 10 as well as the Labor force. Hence, wealth distribution in the Philippines is significantly unequal.

The Philippines continues to experience inconsistent economic development. One distinctive problem is the continual population growth. In fact, its population was almost quadrupled from 1948 to 2000, ranging from 19.2 million to 76.5 million and based on World Population Policies 2013, the country has a low level of commitment to population control. The country had the best policies in theory but was not able to implement them. A crucial factor in its implementation is the role of the Catholic Church, which is against the practice of artificial family planning (Genilo, 2014 p.1044). Essentially, the smaller the population, the lesser natural resources consumed which would eventually augment resource allocation, labor productivity, income and output (Pantig, 2012). Accordingly, fiscal policies have hampered economic growth which resulted in income disparity and poverty in the Philippines (Dee, 2015).

However, the nation continues its effort to expedite sustainable economic growth and development. The Philippine government initiates programs to uplift the standards of living of the Filipino, empower the humble and the deprived members of the society and boost social cohesion. The State will serve as a guide to formulate policies and implement development programs for the country. The policy change can be very significant when the attitude and behavior of the people are not yet stable.

Possible Policy Reforms

The government will create policies to ensure that there will smooth economic transition. Great consideration should be given to the consistency and comprehensiveness of the policies and allow coordination among various dimensions such as social, political, demographic, spiritual, economic and technological dimension. Through the policies, programs and initiatives can be developed to address population control and its consequences, highlighting the harms of excess population.

Awareness among society on population control policy should be strengthened. There should be robust collaboration among the various government agencies and non-governmental organizations to implement the information campaign. The information about fertility trends can be made available to support family planning program.

In addition, the existing Reproductive Health Law of the Philippines promotes the use of artificial family planning in which there is a noticeable friction between the State and the Church. Despite the resistance of the Church, the Catholic Bishops' Conference of the Philippines made a statement on the RH Law which expressed its respect on such law (Villegas, 2014). The Government may work intently with the Church in accentuating family harmony, and promoting the social value of reproductions on child-raising to the society.

In this context, the study provides suggestion on policy amendments, particularly on population. According to Human Life International, assistance for population moderation should give primary emphasis to the largest and fastest growing developing countries like the Philippines (Clowes, 2016).

Conclusion

Among the parameters used in the Wealth Distribution Model of NetLogo, the population has greatly influenced in achieving an ideal state of wealth distribution based on the Gini Index.

The results have potentially important implications for policy interventions. The Philippine Government as well as the non-governmental organizations may intervene to control population through programs and initiatives. Just slowing population growth cannot solve such problems, but can contribute to their solution. A carefully planned population growth strategy coupled with institutional and policy changes could be beneficial to the country. Therefore, there is a high probability of achieving desirable distribution of wealth when population decreases. If wealth is equitably distributed, economic prosperity and sustainability will be attained.

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Acknowledgment

This study is made possible with the generous funding of the Bukidnon State University Research Unit.

Appendices

This figure represents the first simulation conducted in which the number of people is set at 100; perception of life at 10; lifestyle and life-expectancy - min at 1; life-expectancy-max at 85; income opportunities at 25%; skills and labor force at 10. The values set on the parameters generate a Gini coefficient of 0.138.

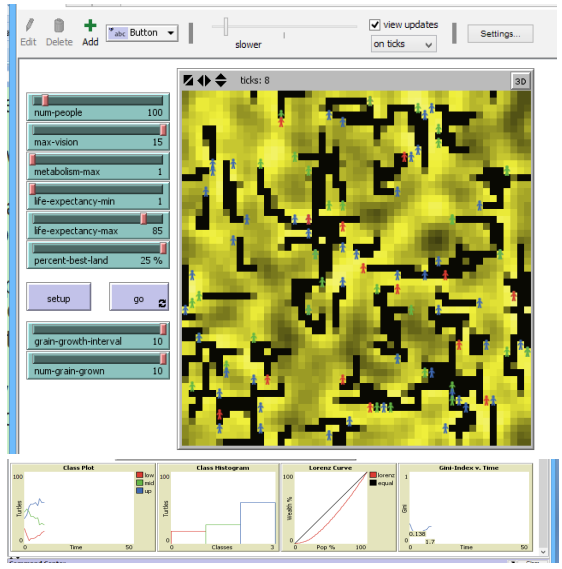

Figure 2.1: 1st run

Figure 2.2 depicts the second simulation conducted, in which the number of people is set

at 50; perception in life at 15; lifestyle and life-expectancy - min at 1; life-expectancy-max at 85; income opportunities at 25%; skills and labor force at 10. The values set on the parameters generate a Gini coefficient of 0.338.

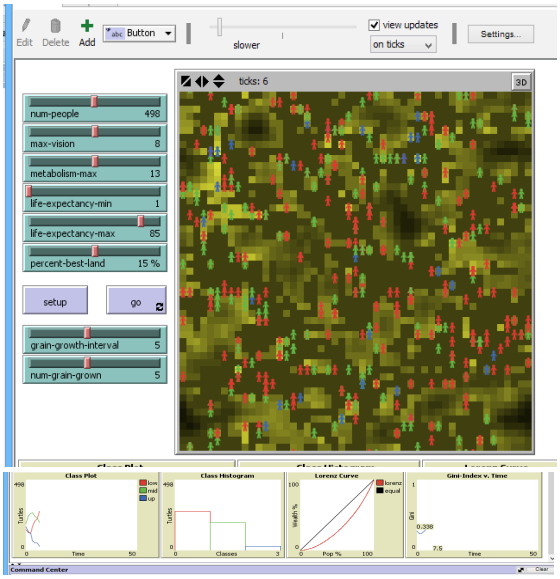

Figure 2.2: 2nd run

Figure 2.3 shows the third simulation conducted, in which the number of people is set at 2; perception in life at 15; lifestyle at 25; life-expectancy - min at 25; life-expectancy-max at 85; income opportunities at 15%; skills and labor force at 5. The values set on the parameters generate a Gini coefficient of 0.014.

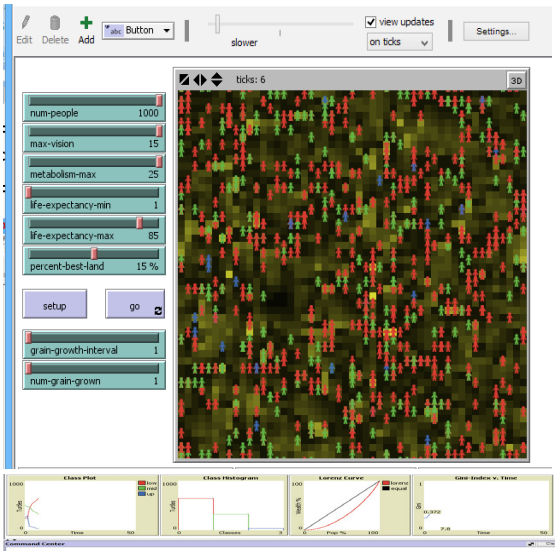

Figure 2.3: 3rd run

Figure 2.4 represents the fourth simulation conducted, in which the number of people is set at 1000; perception in life at 15; lifestyle at 25; life-expectancy - min at 1; life-expectancy-max at 85; income opportunities at 25%; skills and labor force at 1. The values set on the parameters generate a Gini coefficient of 0.372.

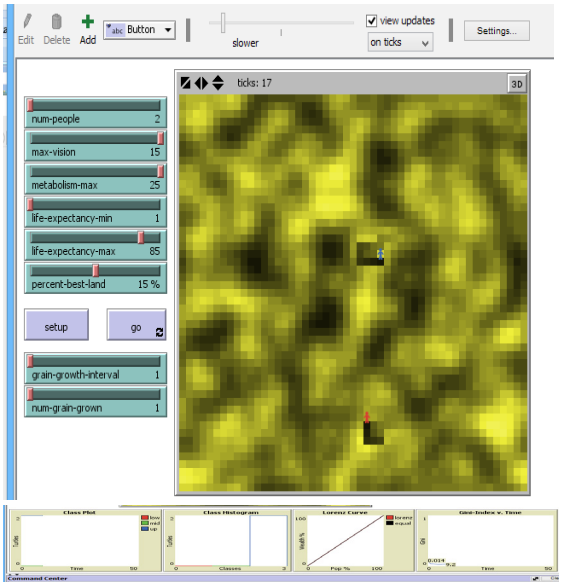

Figure 2.4: 4th run