

# Gross Regional Domestic Product, Population and Employment as Predictors of Poverty Incidence in Northern Mindanao Region: A Prospective Study Using Path Analysis

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## Abstract

The main objective is to ascertain the direction and magnitude of the relationship of the variables that may have a bearing in the poverty reduction efforts in Northern Mindanao, that is, Region 10, Philippines. These variables were as follows: Gross Regional Domestic Product (GRDP), Population, Employment, and Poverty Incidence. The significance of this approach is to shed light on the developmental trend of previously and recently formulated policies, programs, and projects relative to poverty alleviation efforts in Northern Mindanao. Applying Path Analysis via Regression, the causal connections of these variables were tested using panel data from 2003 to 2018. The findings have shown that Population has a direct influence on GRDP while Employment has no direct influence on Poverty Incidence. GRDP, on the other hand, has a direct influence on Employment and Poverty Incidence but has no indirect influence on Poverty Incidence through Employment. While Population has a direct influence on Poverty Incidence but no indirect influence on Poverty Incidence through Employment. The study concluded that the direct influence of GRDP on Poverty Incidence is negative while the influence of GRDP on Employment; Population to GRDP; and Population to Poverty Incidence were all positive. Overall, the study, therefore, recommends that in the conceptualization and development of policies, interventions programs, and projects relative to poverty reduction and their consequent impact evaluation, such should take into account how the policies, programs, and projects have influenced a significant change of the relationship of these variables as seen in a period of fifteen years.

Keywords: Northern Mindanao Philippines; poverty trends; poverty alleviation efforts; Path analysis study; predictors of poverty, poverty incidence

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## 1. INTRODUCTION

It has been noted in the last fifty years of development research and policy that economic growth is the most effective way to pull people out of poverty and for a better life (Moreau 2018; Adams 2003). The central role of growth in driving the speed at which poverty declines is confirmed by research on individual countries and groups of countries. For example, a flagship study of 14 countries in the 1990s found that over the decade, poverty fell in the 11 countries that experienced significant economic growth and rose in the three countries with low or stagnant economic growth. It has been estimated that, on average, a one percent increase in per capita income reduced poverty by 1.7 percent (The World Bank 2005). The link between poverty

reduction and economic growth in reducing the poverty rate was concretely demonstrated by the performance of the Philippine economy during the year 2015 to 2018 in which it was underscored that the Philippines is “winning its fight against poverty” (Reyes, et al. 2020).

During the period 2015 to 2018, there was a notable decrease in the Philippine nationwide poverty incidence (Mapa 2019; Vera 2019; Mapa 2020), except in the ARMM Region (PSA 2015). Such a decrease had shown that in 2015, the poverty incidence rate was recorded at 23.3 percent, and this translated to 23.5 million Filipinos who lived below the poverty threshold (PSA 2019). As compared to 2018, the poverty incidence was recorded at 16.6 percent (PSA 2020), and this translated to 17.6 million Filipinos that lived below the poverty threshold (Lopez 2019). To put it differently, there was a 5.7 percentage point's decrease in poverty incidence from 2015 to 2018, and this means that more or less there were 5.9 million Filipinos uplifted from poverty in 2018. Accordingly, this decrease in poverty incidence in three years had been assessed as a substantial decrease in poverty (Navarro 2019).

In general, it was posited that the decrease in poverty incidence could be attributed “to sustained economic growth and critical and broad-based reforms and investments that have translated to employment generation and social protection” (Navarro 2019). As a result, “per capita, Gross National Income (GNI) grew by 4.4 percent and 3.6 percent, respectively ... while per capita Household Final Consumption Expenditure (HFCE) grew by 3.8 percent” (DTI 2019). In particular, this decrease in national poverty incidence was attributed to growth in the construction and manufacturing sectors that created more employment opportunities for Filipinos. Moreover, the increase in income of Filipino households and employment shifted from the agriculture sector to the industry and the services sectors, and this played a significant role in the reduction of the poverty rate (Navarro 2019). This is, therefore, suggestive that economic growth had reduced the poverty rate in the last three years, that is, from 2015 to 2018. Consequently, this contradicted the observation that the Philippines' “economic growth did not translate into poverty reduction in recent years” (ADB 2009). On the contrary, the robust growth in the Philippine economy over the past decade and in the period 2015 to 2018 has helped reduce the national poverty rate (The World Bank 2018; The World Bank 2021; Deshpande 2019; Pernia 2018).

Furthermore, the Philippine economy in 2015, in terms of Gross Domestic Product (GDP), grew to 5.8 percent (Bersales 2016); and in 2018, it further grew to 6.2 percent (DTI 2019). Meaning to say, the Philippine economy, measured in terms of GDP, grew by 0.4 percentage points from 2015 to 2018. This expansion of the economy was attributed mainly to the main drivers of growth particularly in the construction, trade, and repair of motor vehicles, motorcycles, personal and household goods; and other services (DTI 2019; PSA 2019). Among the major economic sectors that contributed substantially to 2018 economic growth were the Industry sector, which had the fastest growth, and followed by Services, and Agriculture (DTI 2019; PSA 2019).

As a consequence, this resulted in the improvement of the poorest Filipinos from the start of 2015 to 2018 (Rappler.Com 2014; Ramos 2019; NEDA 2019). However, the amplitude of GDP growth and the varying contributions of each sector of the economy also explains the differences in the reduction of the poverty rate observed among the regions. This is because the Gross Regional Domestic Product (GRDP) growth varies among regions. In Northern Mindanao, which was the focus of this study, it was reported

“[T]hat the regional poverty incidence among population decreased to 23.0 percent in 2018 or a sharp reduction of 15.4 percentage points from its 38.4 percent in 2015. All of the five provinces recorded [a] notable decline, with Bukidnon posting the steepest decline at 26.2 percentage points. However, in terms of magnitude, there are still 1.13 million poor Filipinos in the region. The subsistence or food incidence among families and [the] population in 2018 also declined significantly at 3.9 percent and 6 percent, respectively. Region X's estimated poverty threshold or the minimum income/expenditure required

for a family/individual to meet the basic food and non-food requirements amounted to ₱ 24,792 per annum per capita or ₱ 2,066 per month per capita. A family of five needs a total of ₱ 10,333 per month to provide for its basic food and non-food requirements” (NEDA 2020).

Given the above, we need also to underscore that the fight for poverty reduction in Northern Mindanao started before the period 2015 to 2018, hence, these previous years inevitably have a bearing on the present poverty efforts as well. Thus, this raises the question of what could be the overall relationships trend of Northern Mindanao GRDP, population, employment, and poverty incidence when viewed from 2003 to 2018. By looking at the relationship of these variables from 2003 to 2018 within the framework of testable hypotheses, a bird’s eye view, so to say, could be provided as to the overall direction of the relationship of these variables in the last fifteen years. Given such information, it is possible then to deduce whether the policies, programs, and projects crafted for poverty reduction in the last fifteen years are making a positive dent in the fight against poverty regardless of who held the rein of power of government at the highest level.

On the other hand, while there were initial, reasons cited for the decline in poverty at the national level, such as

“economic growth that generated jobs for the poor, increased incomes of the poor that outweighed inflation, the implementation of social programs like conditional and unconditional cash transfers and pensions, population and family planning program, and less extreme weather conditions ... inclusive, job-generating growth and better-targeted programs [that] helped increase the incomes of the poor” (NEDA 2020).

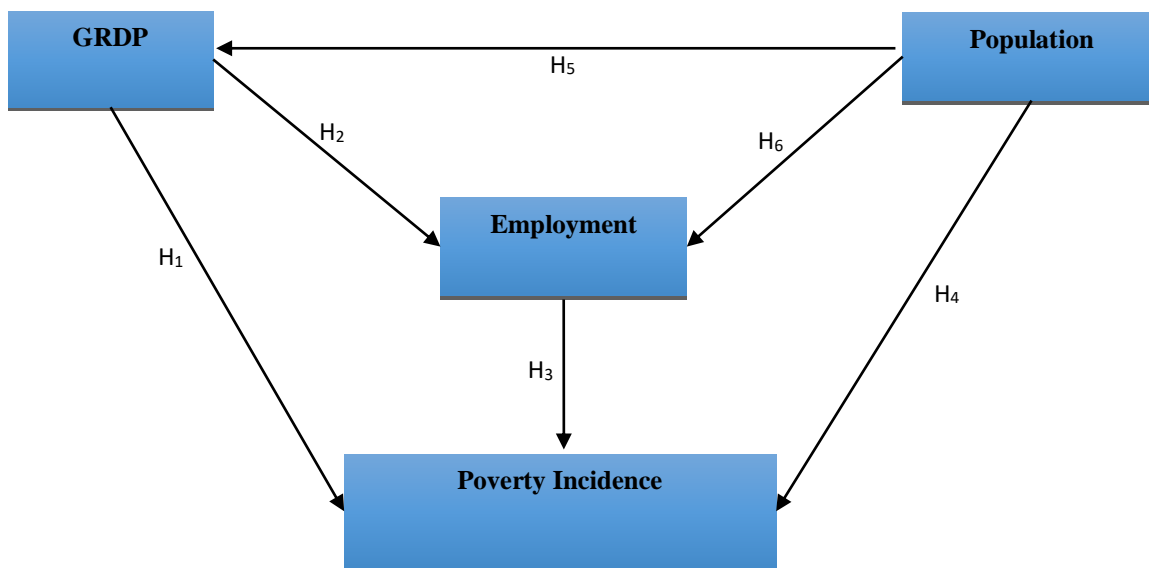
Nonetheless, a period of three years, i.e. 2015-2018, seems not enough to determine the overall trend of the relationship of these variables mentioned earlier. According to the ADB (2009) and the WorldBank (2021), the key constraining factors in the poverty reduction efforts in Northern Mindanao are low economic growth, increased population rates, and unemployment (Asian Development Bank 2009; World Bank 2021). Although in the period 2015 to 2018 there had been a remarkable improvement in the Region’s poverty reduction efforts, economic growth, while at the same time population increases, and an upbeat in employment rate as well, nonetheless, the challenge is to identify the empirical relationship of these variables such as GRDP, population, and employment and poverty rate in Northern Mindanao to find out how these variables correlate to each other in terms of direction and magnitude. As a result, providing further insight into the above statement made by the ADB and the WorldBank.

In this study, however, the Gross Regional Domestic Product (GRDP) of Northern Mindanao was used as a proxy indicator for economic growth. Likewise, the region’s GRDP, its population, employment, and poverty incidence were situated within the span of fifteen years, that is, from 2003 to 2015. It is on this perspective that the study posited an a-priori framework that is tested in terms of the direction and magnitude of the relationships of Northern Mindanao’s GRDP, population, employment, and poverty incidence. Of course, with the end in mind that the findings and recommendations can be elevated to the policy realm so that more responsive concrete programs and projects can be formulated to further improve Northern Mindanao’s effort in poverty reduction.

### The Model with Hypothesized Causal Connections

This research is exploratory. The objective was to examine the path coefficients of an a priori theory-driven causal model for poverty reduction efforts in Northern Mindanao so that further research can be undertaken in this area. The variables in this model were Gross Regional Domestic Product (GRDP), Population, Employment, and Poverty Incidence. At present, no studies have yet been undertaken that attempted to ascertain the relationships of these variables within the setting of the Northern Mindanao economy. This is the gap this study attempted to fill in with corresponding recommendations for further research.

The variables in the model and the hypothesized causal connections were conceived through meta-analysis. A panel data from the Philippines Statistics Authority (PSA) relative to GRDP (as the proxy indicator of economic growth), Population, Employment Rates (as the proxy indicator of income), and Poverty Incidence was collected from 2003 to 2018. Based on these data, a Path Analysis via Regression was applied to ascertain the path coefficients along with the testing of the six hypotheses embedded in the model. The test was set at a  $p=0.05$  level of significance. The raw data from PSA was converted into standardized scores before it was subjected to Regression Analysis, and the standardized coefficients that resulted from the Regression Analysis served as the path coefficients.



Based on the above causal model, the following hypotheses were tested.

- Hypothesis 1 (H<sub>1</sub>): The influence of GRDP on Poverty Incidence is not significant
- Hypothesis 2 (H<sub>2</sub>): The influence of GRDP on Employment is not significant.
- Hypothesis 3 (H<sub>3</sub>): The influence of Employment on Poverty Incidence is not significant.
- Hypothesis 4 (H<sub>4</sub>): The influence of Population on Poverty Incidence is not significant.
- Hypothesis 5 (H<sub>5</sub>): The influence of Population on GRDP is not significant.
- Hypothesis 6 (H<sub>6</sub>): The influence of Population on Employment is not significant.

## 2. RESULTS AND FINDINGS

The following were the results of the hypotheses testing.

1) Accept Hypothesis 1 ( $H_1$ ),  $p=0.375$ ,  $p>.05$  with path coefficient of  $-0.446$ ,  $R\text{ square} = 0.199$  or  $19.9\%$ . This hypothesis test showed that GRDP's influence on poverty incidence is negative, suggesting that for every 1-unit increase in GRDP, poverty incidence tends to decrease by  $0.446$  standard deviations. Though common knowledge has shown that economic growth, measured in terms of GRDP, is a factor in poverty reduction, however, in fifteen years, GRDP accounted for only  $19.9\%$  influence in the decrease of poverty incidence in Northern Mindanao. This influence, however, was not significant.

Furthermore, the result of Hypothesis 1 could connote that though the period 2015 to 2018 was characterized by significant economic growth in the Philippine economy in general, and in the Northern Mindanao economy in particular, nevertheless, this period of unprecedented economic growth seen in the context of fifteen years of poverty reduction efforts, in which economic performance of the Region before the said period was punctuated by economic growth and recession, was not enough to significantly influence the overall poverty reduction efforts in Northern Mindanao.

2) Reject Hypothesis 2 ( $H_2$ ),  $p=0.006$ ,  $p<.05$  with path coefficients of  $0.939$ ,  $R\text{ square} = 0.881$  or  $88.1\%$ . This hypothesis test showed that GRDP's influence on employment is positive, suggesting that for every 1-unit increase in GRDP, employment tends to increase by  $0.939$  standard deviations. Though common knowledge has shown that economic growth, measured in terms of GRDP, is a factor in increasing employment, nevertheless, in fifteen years, GRDP accounted for  $88.1\%$  influence in the increase of employment in Northern Mindanao. And, this influence is significant.

On the other hand, the result of Hypothesis 2 could connote that though the period 2015 to 2018 was characterized by significant economic growth in the Philippine economy in general, and in the Northern Mindanao economy in particular, nonetheless, this period of unprecedented economic growth seen in the context of fifteen years of employment trend in which economic performance of the Region before the said period was punctuated by economic growth and recession was significant to influence the overall employment generation efforts in Northern Mindanao.

3) Accept Hypothesis 3,  $p=0.555$ ,  $p>.05$  with path coefficients of  $-0.301$ ,  $R\text{ square} = 0.094$  or  $9.4\%$ . This hypothesis test showed that employment's influence on poverty incidence is positive, suggesting that for every 1-unit increase in employment, poverty incidence tends to decrease by  $0.301$  standard deviations. Though common knowledge has shown that employment generation is a factor in poverty reduction, however, employment generation in the last fifteen years accounted for only  $9.4\%$  influence in the decrease of poverty incidence in Northern Mindanao. As a consequence, this influence was not significant.

Furthermore, the result of Hypothesis 3 could connote that though the period 2015 to 2018 was characterized by significant economic growth which in turn significantly influenced employment generation in the Philippines in general, and in Northern Mindanao in particular, nonetheless, this period of high employment rate seen in the context of fifteen years of employment trend, which was characterized by a period of negative and positive employment rate, was not significant to influence the reduction of poverty incidence in Northern Mindanao.

4) Accept Hypothesis 4,  $p=0.767$ ,  $p>.05$  with path coefficients of  $0.157$ ,  $R\text{ square} = 0.025$  or  $2.5\%$ . This hypothesis test showed that the influence of population growth on poverty incidence is positive, suggesting that for every one unit increase in population, poverty incidence tends to increase by  $0.157$  standard deviations. Though common knowledge has shown that population growth is a factor in poverty reduction, however, population growth in the last fifteen years accounted for a  $2.5\%$  influence in the increase of poverty incidence. And, this influence was not significant.

The result of Hypothesis 4 could connote that though the period 2015 to 2018 was characterized by increasing population growth in the Philippines in general, and in Northern Mindanao in particular, nonetheless, in the context of fifteen years of population growth, its influence on poverty incidence in Northern Mindanao was not significant. Meaning to say, Northern Mindanao's increasing population could not be considered a significant influence in the increase of poverty incidence in the last fifteen years. Thus, suggestive that the government's policies, programs, and projects in the last fifteen years relative to human capital development are gaining positive headway in the sense that it was able to neutralize the detrimental effects of population growth vis-à-vis poverty incidence. Examples of prominent policies and programs that lead to various projects in human capital development are free education program at the tertiary level; and the K-12 curriculum that equipped our Senior High school graduates with skills and competence for employment – especially the Tech-Voc strand; as well as the various programs for out of school youth such as those offered by DepEd and TESDA – which are all part of the human capital development program of our government.

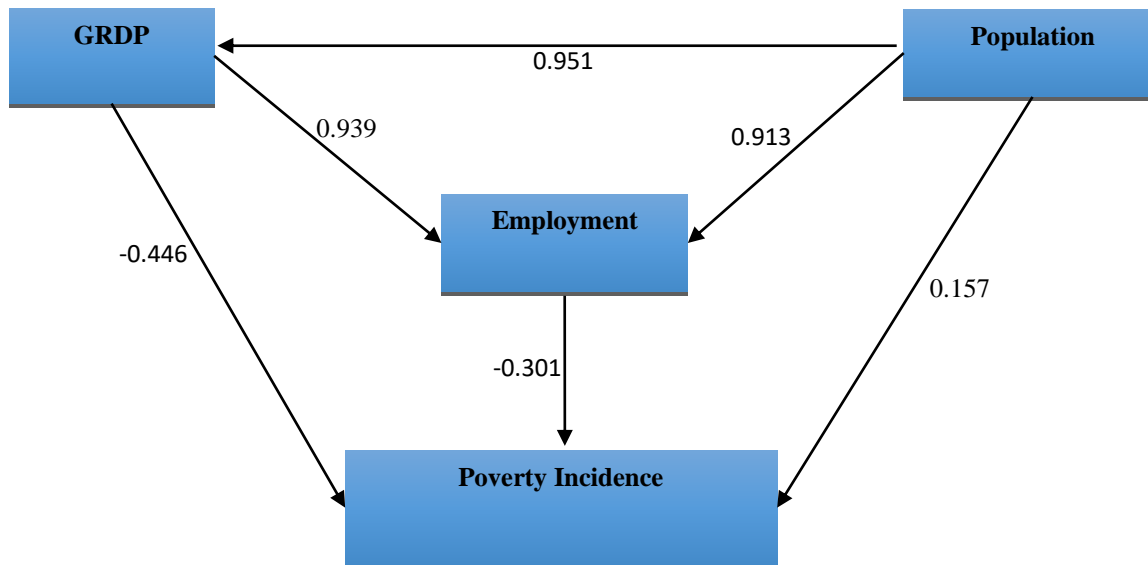
5) Reject Hypothesis 5,  $p=0.004$ ,  $p<.05$  with path coefficients of 0.951, R square= 0.904 or 90.4%. The result of this hypothesis test had shown that the influence of population on GRDP is positive, suggestive that for every 1-unit increase in population, GRDP tends to increase by 0.951 standard deviations. At this point, we need to underscore that though it is commonly perceived that population growth is sometimes perceived as a liability to economic growth, however, in the case of Northern Mindanao, it was shown that population growth accounted for 90.4% influence in GRDP in the last fifteen years. And, this influence is significant.

The result of Hypothesis 5 could connote that though the period 2015 to 2018 was characterized by increasing population growth in the Philippines in general, and in Northern Mindanao in particular, nonetheless, in the context of fifteen years of population growth, population growth influence GRDP in Northern Mindanao was significant. Meaning to say, Northern Mindanao's increasing population could be considered a significant influence in the Region's increased economic growth in the last fifteen years. Thus, suggestive that the government's policies, programs, and projects in the last fifteen years relative to population control are gaining positive headway in the sense that it was able to neutralize the detrimental effects of population growth vis-à-vis economic growth. Examples of prominent policies and programs that lead to various projects in human capital development are free education program at the tertiary level; and the K-12 curriculum that equipped our Senior High school graduates with skills and competence for employment – especially the Tech-Voc strand; as well as the various programs for out of school youth such as those offered by DepEd and TESDA – which are all part of the human capital development program of our government.

6) Reject Hypothesis 6,  $p=0.011$ ,  $p<.05$  with path coefficients of 0.913, R square= 0.833 or 83.3%. The result of this hypothesis test had shown that the influence of population on employment is positive, suggestive that for every 1-unit increase in population, employment tends to increase by 0.913 standard deviations. At this juncture, we need to emphasize that, in the case of Northern Mindanao, population increase in the last fifteen years accounted for an 88.3% influence in employment. As such, this influence is significant.

The result of Hypothesis 6 could imply that though the period 2015 to 2018 was characterized by an increase in employment in the Philippines in general, and in Northern Mindanao in particular, nonetheless, in the context of fifteen years of population growth, its influence on employment was significant. To put it differently, Northern Mindanao increasing population growth in the last fifteen years could be considered an asset rather than a liability when it comes to employment generation. Thus, suggestive that the government's policies, programs, and projects in the last fifteen years relative to human capital development are gaining positive headway in the sense that despite population increase it was able to neutralize its detrimental effects vis-à-vis employment generation.

From the above findings, the path coefficients are shown below:



### 3. CONCLUSION

As found out, in the last fifteen years of poverty reduction efforts, GRDP's influence on poverty incidence is not significant though GRDP had a significant influence on employment. However, a concrete manifestation of the economic growth of Northern Mindanao as measured in GRDP is that of employment generation. Evidence has shown that in the last fifteen years the increase in employment did not have a significant influence on poverty incidence. Therefore, in a span of fifteen years the effect of three years of economic growth from 2015 to 2018 though it translated to an increase in employment, which can be considered part of the poverty reduction efforts, still failed to make a turnaround of the Region's entrenched poverty. This is even though the population is not a significant influence in poverty incidence while it is a significant influence on GRDP and employment.

### 4. RECOMMENDATIONS

Given the above findings, the study would like to recommend the following:

1. Given that the data used in this study are archival data, and since this study is exploratory and theoretical, there is a need to conduct further study of the connection of these variables to each other using both quantitative and qualitative data. Taking into account the period during and after the COVID-19 Pandemic. In this way, the framework that is being posited here especially the direction and strength of the correlation still holds.
2. The non-significant influence of GRDP on poverty incidence could mean a need to further sustain and boosts the economic gains and its positive effect in poverty reduction efforts of the period 2015 to 2018. Also, in the next three to five years specifically taking into account the Covid-19 pandemic that significantly pushback the economic gains of 2015 to 2018 as well as the end of



Pres. Rodrigo Duterte's term, it is therefore imperative to examine again if the relationship between GRDP of Northern Mindanao and its poverty incidence is still the same. In a word, there is a need to look at whether the direction of the correlation is still positive and whether the influence of GRDP on poverty incidence has decreased, increase, or is relatively still the same. Having such kind of information is crucial since it gives us an idea of whether the gains in poverty reduction by way of economic growth have been reversed by the pandemic or not. In addition, it will provide us an idea of the extent of the work that must be done to put back on track the gains in poverty reduction efforts.

3. The significant influence of GRDP on employment generation could mean a need to further sustain and boost the economic gains and its positive effect on employment generation of the period 2015 to 2018. Also, in the next three to five years specifically taking into account the Covid-19 pandemic that significantly pushback the economic gains of 2015 to 2018 and with that the end of Pres. Rodrigo Duterte's term, it is, therefore, imperative to examine again if the relationship between GRDP of Northern Mindanao and its employment rate is still the same. In a word, there is a need to look at whether the direction of the correlation is still positive and whether the influence of GRDP on the employment rate has decreased, increase, or is relatively still the same. Having such kind of information is crucial since it gives us an idea of whether the gains in employment generation as a consequence of economic growth have been significantly reversed by the pandemic or not. In addition, it will provide us an idea of the extent of the work that must be done to put back on track the gains in employment generation.
4. The non-significant influence of employment on the reduction of poverty incidence could mean a need to further sustain and boost the economic gains and its positive effect on employment generation of the period 2015 to 2018. Also, in the next three to five years specifically taking into account the Covid-19 pandemic that significantly pushback the employment gains of 2015 to 2018 and with that the end of Pres. Rodrigo Duterte's term, it is, therefore, imperative to examine again if the relationship between employment and poverty incidence is still the same. In a word, there is a need to look at whether the direction of the correlation is still negative and whether the influence of the employment rate on poverty incidence has decreased or increased, or is relatively still the same. Having such kind of information is crucial since it gives us an idea of the extent of the work that must be done to put back on track the gains in employment generation vis-à-vis reduction in poverty incidence. Likewise, the non-significant influence of employment on the reduction of poverty incidence is suggestive of a need to examine the labor situation that underlay Northern Mindanao's economy.
5. The non-significant influence of population growth on poverty incidence could mean that the Region's population should not be blamed for the increase in poverty incidence. Rather, there is a need to focus more on programs and projects both in the government and in the private sectors that concentrate on human capital development. Also, in the next three to five years specifically taking into account the Covid-19 pandemic that significantly increases the Region's poverty incidence, it is, therefore, imperative to examine again if the relationship between population growth and poverty incidence is still the same. In a word, there is a need to look at whether the direction of the correlation is still positive time and whether the influence of population growth on poverty incidence has decreased, increased, or is relatively still the same. Having such kind of information is crucial since it gives us an idea of the extent of human capital development work that must be done to cancel out the negative effect of population growth vis-à-vis reduction in poverty incidence. Likewise, the non-significant influence of population growth on poverty



incidence is suggestive of a need to intensify the government's and private sector's efforts in human capital development in the Northern Mindanao economy.

6. The significant influence of population growth on GRDP could mean that the Region's population should not be blamed as a factor that hampered the economic growth of the Region. Rather, it should be seen as an asset that positively impacted Northern Mindanao's economy. What is crucial at this time given the fact that the Covid-19 pandemic had negatively impacted the Region's economy, is for the government and the private sector to be able to sustain the good practices in human capital development effort during the last fifteen years.

## References

- Ashenafi Abate Woya, "Employability among Statistics Graduates: Graduates' Attributes, Competence, and Quality of Education", Education Research International, vol. 2019, Article ID 7285491, 7 pages, 2019. <https://doi.org/10.1155/2019/7285491>
- Herrmann, D., Dilger, B. and M. Junghanns. (2010). Specialized Questionnaires in Graduate Tracer Studies; Demand, Development, and Back Channeling Results. Koln: University of Cologne.
- Khan, A. (2017). Is education the key to a successful future? Retrieved from: <https://www.jagranjosh.com/articles/education-is-the-key-to-future-success-or-not-503914512-1>
- Khan, A. (2017). Is education the key to a successful future? Retrieved from: <https://www.jagranjosh.com/articles/education-is-the-key-to-future-success-or-not-1503914512-1>
- Qureshi, T. (2017). Is education the key to a successful future? Retrieved at <https://www.jagranjosh.com/articles/is-education-the-key-to-a-successful-future-1498733181-1>
- Schomburg, H. &Teichler, U. (2011).Employability and Mobility of Bachelor Graduates in Europe: Key Results of the Bologna Process
- Shakil, A.F., Faizi, W.U.N., Ahmed, S.M., &Jabeen, F. (2015). A Critical Study Of The Subject Of Education At Graduate Level In Karachi. European Journal of Educational Research, 4(2), 81-89. <https://doi.org/10.12973/eu-jer.4.2.81>
- Teichler U. (1998). "The Transition from Higher Education to Employment in Europe", Higher Education in Europe, Vol. XXIII, No. 4.
- Teichler U. (2003). "The Future of Higher Education and the Future of Higher Education research", Tertiary Education and Management, Vol. 9: pp. 171-185.
- Teichler U. (2011). Lessons to be learned from Graduates: Interpretation of the Results of Graduate Surveys. Kassel: INCHER-Kassel.
- Woya, A. (2019). Employability among Statistics Graduates: Graduates' Attributes Competence, and Quality of Education, Education Research International, p.7. <https://doi.org/10.1155/2019/7285491>