

May the Work Force be with BARMM: An Analysis of Labor Force Participation Rates

Jonah Terese Arellano, Jomar Calauod

¹jonahterese.arellano@teradata.com, ²jomar.calauod@teradata.com

Abstract – Labor force participation rate (LFPR) in BARMM has always been below the national average and ranking last in all regions. For this project, LFPR was disaggregated by age, gender, and municipality. This aims to determine if there exists spatial correlation of LFPR, observe its behavior, and incorporate the demographics of the labor force. Explanatory data analysis and local spatial autocorrelation were performed. It was found that early and prime mature working age LFPR are both high. The high early working age LFPR indicates that individuals join the labor force at an early age. This is reflected in the education level of the labor force since majority of them reached until elementary and high school level only. Disparity in the male and female LFPR was also identified and may be related to the prevalent early marriage in the region and the lack of job opportunities for women, specifically in the agricultural sector which is the main livelihood in the region. Hence, groups and areas with low-performing LFPR should be further investigated.

I. INTRODUCTION

In the transition of the Bangsamoro Autonomous Region in Muslim Mindanao to a new political entity, development in all sectors is necessary. In line with this, the Open Bangsamoro Data Challenge by Data Ethics PH was started to provide insights and strategies that will aid the region [1].

The growth of economy is one of the relevant issues in BARMM. The strength of the economy relies on the region's ability to generate goods and services [2]. Labor is a key factor of production, hence, improving the quality of the labor force is beneficial to the BARMM's economy.

Labor force participation in BARMM has been quite low for the previous years. From 57.2% LFPR in 2008, it decreased to 46.6% in 2018 [3]. In fact, the region's labor force participation rate always falls below the national level.

To better understand the problem of the labor force in BARMM, labor force participation rates (LFPR) will be disaggregated by municipality, gender, and age groups. This will give a detailed view, allowing more specific observations in the area.

This project aims to focus on the LFPR of BARMM. Specifically, it intends to:

1. Determine if there exists a spatial correlation of labor force participation rates in BARMM municipalities,
2. Observe the behavior labor force participation rate and how it varies across gender and age groups, and
3. Create a dashboard showing the LFPR by gender and age.
- 4.

II. METHODOLOGY

A. Data Sources and Scope

The LFPR and demographics data in this project are from the 2010 and 2015 Census of Population only due to lack of data.

B. Definition of Variables

Labor Force Participation Rates were disaggregated by gender (Male and Female) and age group (Early working age 15-24, Prime working age 25-54, and Mature working age 55 and above). Demographic factors considered were marital status, education level, and Job type (White-collar and blue-collar workers).

C. Methods

The explanatory data analysis was conducted in Power BI and Python to observe the disaggregated labor force data. Local spatial autocorrelation was used to create cluster maps in order to determine hot spots (spatial cluster of high values) and cold spots (spatial cluster of low values) of the LFPR.

III. RESULTS

A. Demographics of the Labor Force

The demographics of the labor force may give insights or hints as to why the labor force participation rates of different age groups and gender behave the way they do. For marital status, most of the labor force population in BARMM are married, followed by single, widowed, and lastly is separated. Moreover, the highest education level of the labor force is elementary, followed by highschool, those with no formal education, and lastly is college graduate. Highest proportion of individuals who reached elementary was in Maguindanao and the lowest is in Lanao del Sur. The college graduates, on the other hand, are higher Lanao del Sur, and lowest in Maguindanao. The labor force in the region is mostly composed of blue-collar workers.

B. Overall Labor Force Participation Rate

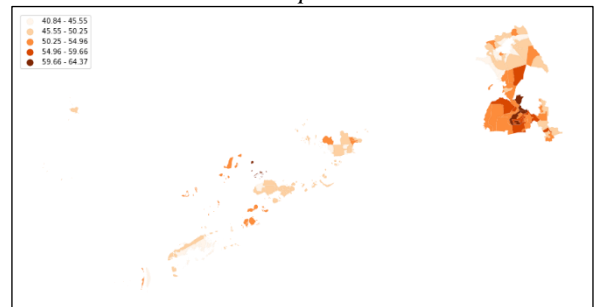


Fig. 1. LFPR per Municipality in BARMM

Looking at [Fig. 1], high LFPR is concentrated in Maguindanao while other provinces mostly have LFPRs below 50%. Among all provinces, Lanao del Sur was the lowest performing. This matches the location of the significant low LFPR clusters (Basilan & Lanao del Sur) and high LFPR clusters (Maguindanao & Sulu) in [Fig. 2]. Municipalities near the provincial capital does not necessarily show a higher LFPR. This is the same for the provinces not in the mainland.

B. LFPR by Age

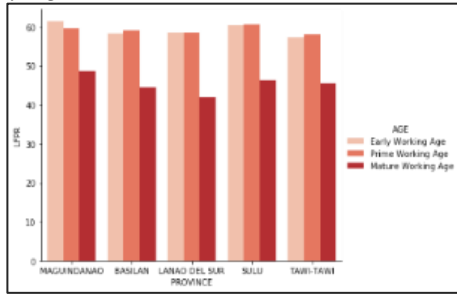


Fig. 3. LFPR by Age Group in BARMM Provinces

Based on [Fig. 3], early and prime working age labor force dominated the region. On the other hand, mature working age LFPR remained below 50% for all provinces, which is reasonable since it includes the retirement age. In [Fig. 4.], clusters of high and low LFPR vary across different age groups. Most of the municipalities with the lowest LFPR in the different age groups are from Lanao del Sur the highest LFPR mostly comes from municipalities in Maguindanao. As identified in [Fig. 4a], high early working age LFPR clusters were mostly in Maguindanao, while the low clusters are in municipalities surrounding Lanao Lake and Sulu.

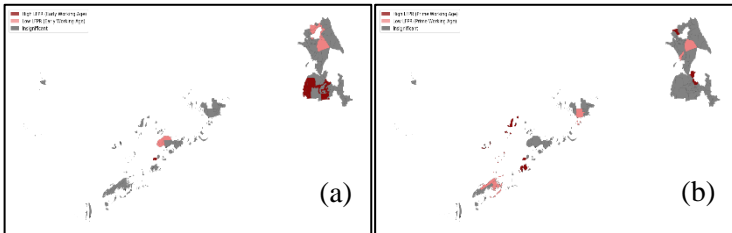


Fig. 4. Spatial Autocorrelation Map of LFPR by Age. a) Early working age b) Prime working age

C. LFPR by Gender

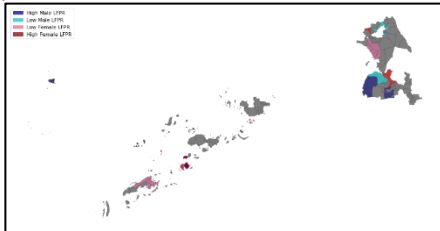


Fig. 5. Spatial Autocorrelation Map of LFPR by Gender

Approximately 24% of the labor force in BARMM are female, and 76% are male. There is a huge difference in male and female LFPR for each province as well. Female LFPR ranges from 18-28%, while male LFPR ranges from 72-79%. Best performing LFPR for both genders were in Maguindanao. The lowest female and male LFPR are in Tawi-tawi and Lanao del Sur, respectively. This was all reflected in [Fig. 5] which indicates that low LFPR for both genders are clustered municipalities in Lanao del Sur, while high LFPR for both are mostly clustered in Maguindanao.

D. Dashboards

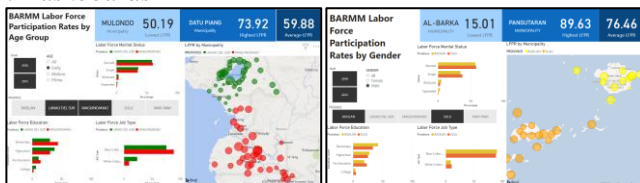


Fig. 6. Power BI Dashboards of LFPR by Age and Gender

[Fig. 6] are screenshots of the dashboards done through Microsoft Power BI. Specific gender or age group and multiple provinces may be selected.

IV. CONCLUSION

The LFPR of age groups showed varying behavior. Highest LFPR is from the prime working age (15-24) and early working age (25-54), with a huge gap from mature working age (55 and above). Mature working age are those nearing retirement, so it is expected to have a low LFPR. The difference between the early and prime working age LFPR is minimal, suggesting that a lot of them work early instead of continuing their studies. In fact, the education level of the labor force indicates that most of them have only reached elementary and high school. This may also be attributed to the prevalence of blue-collar workers.

For the male and female LFPR, the region shows a huge disparity between the male and female, which is similar to the national level. This reflects in all provinces as well. Based on their marital status, most of them were married. Women in the working age and even below the working age were put through early marriage. This may possibly restrict them from joining the labor force. Moreover, most of the labor force were with blue-collar jobs, specifically in the agricultural and fisheries sector [4]. This may be related to the low female LFPR since agricultural employment opportunities for women are few.

V. RECOMMENDATIONS

A huge part of the labor force is comprised of those in the early working age. Hence, there should be more opportunities to pursue academic interests for the youth. There should be more opportunities for females as well. Since early marriages are still prevalent for women in the region, programs in their local areas might be beneficial for them. Identified areas with high and low LFPR clusters should also be further inspected.

REFERENCES

- [1] Open Bangsamoro Data Challenge. (2019, December 2). Retrieved from ethics.ph/openbangsamoro
- [2] Mangelen, H. J. I. R. A. (2019, January 25). 2018 Annual Labor and Employment Situation in ARMM. Retrieved from rssoarrrm.psa.gov.ph
- [3] Philippine Statistics Authority. (2019, May 22). Labor Force Participation Rates in ARMM. Retrieved from rssoarrrm.psa.gov.ph
- [4] Philippine Statistics Authority. (2017, January 20). Quickstat on Autonomous Region in Muslim Mindanao. Retrieved from psa.gov.ph

AUTHORS' PROFILE

Jonah Terese Arellano is currently an Analytics Consultant for Teradata GDC Philippines. She received her undergraduate degree in BS Applied Mathematics from the University of the Philippines Los Baños.

Jomar Calauod is an Analytics Consultant at Teradata. He finished his bachelor's degree in Electronics Engineering at FEU Institute of Technology.