Reflection: Education and Pedagogical Insights

Indonesian Labor Conditions on February 2016-2019 using Linear Trend Forecasting

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ABSTRACT

The purpose of this study is to analyze the labor conditions in Indonesia from February 2016 to February 2019 using the Linear Trend Forecasting method. This study employs a quantitative research approach using Linear Trend Forecasting to analyze Indonesia's labor conditions from February 2016 to February 2019. The objective is to identify trends in the unemployment rate, labor force growth, sectoral employment shifts, and educational disparities in unemployment. The Linear Trend Forecasting analysis reveals a declining trend in Indonesia's unemployment rate from 2016 to 2019, with projections indicating further reductions in 2020. Urban unemployment remains higher (6.205%) than rural unemployment (3.135%), highlighting disparities in labor absorption. Human Capital Theory suggests that differences in employment rates are influenced by education, skill development, and labor market readiness. The findings emphasize the importance of workforce training, education reform, and government policies in reducing unemployment. Future studies can explore the impact of digital transformation on employment trends in Indonesia.

Keywords: Labor; Linear Trend; Forecasting

Field: Education; Macro Economics; Statistics

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SDG's: No Poverty (1); Zero Hunger (2); Decent Work and Economic Growth (8); Responsible Consumption and Production (12)

INTRODUCTION

The Central Statistics Agency (BPS) announced that Indonesia's open unemployment rate (TPT) in the past year has decreased by 50,000 people to 5.01%. The number of unemployed in February 2019 was recorded at 6.82 million people or down compared to February 2018 of 6.87 million people. The urban unemployment rate is higher than unemployment in rural areas (Afzal et al., 2023).

BPS Head Suhariyanto said the unemployment rate in cities reached 6.3% and 3.45% in rural areas. "The open unemployment rate in February 2019 was 5.01%, a downward trend but with the note that unemployment in cities is higher than in villages," he said at the BPS Building, Jakarta, Monday (6/5/2019). Judging from the level of education, the highest unemployment is still dominated by graduates of Vocational High Schools (SMK) at 8.63% followed by Diploma (D3) 6.89%. "The highest number of unemployed people come from vocational schools and D3. The quality of government workers still has a lot of homework to do, because it is still dominated by elementary school graduates and below at 40.5%," explained Suhariyanto.

Meanwhile, the number of workers in February 2019 increased to 136.18 million people compared to 133.94 million people in the same period a year earlier. This means that there was an increase in the workforce of 2.24 million people. "During the year, there were several fields of work where the number of workers decreased, for example agriculture, experienced a decrease of 1%, then government administration 0.23%, and information and communication also decreased. Other sectors saw the number of workers increase compared to the position in February 2018," he said. Then based on data from the Central Bureau of Statistics, the employment situation in 2019 fell to 5.01% compared to the previous year. Total unemployment in February 2019 fell to 6.82 million people compared to February 2018 of 6.87 million people.

The purpose of this study is to analyze the labor conditions in Indonesia from February 2016 to February 2019 using the Linear Trend Forecasting method. Specifically, this research aims to: Identify Trends in

the Unemployment Rate. Examine the changes in Indonesia's open unemployment rate (TPT) from 2016 to 2019. Forecast future unemployment trends based on historical data.

LITERATURE REVIEW

Human Capital Theory

This study is grounded in Human Capital Theory (Shoaib et al., 2021), which was developed by Becker (1964) and Schultz (1961). The theory posits that investments in education, training, and health improve an individual's productivity and earning potential, ultimately influencing employment outcomes. According to this perspective, unemployment can be linked to mismatches between labor market demands and the skills possessed by workers.

Trends in Indonesia's Unemployment Rate

Indonesia's unemployment rate has shown a declining trend over the years, as indicated by the Central Statistics Agency (BPS). The open unemployment rate in February 2019 was 5.01%, a decrease from 5.13% in 2018 and 5.61% in 2017 (BPS, 2019). However, urban unemployment remains higher than rural unemployment, suggesting structural issues such as labor market saturation in cities (World Bank, 2019).

According to Human Capital Theory, individuals with higher skills and education should have better employment opportunities. However, empirical data from BPS contradicts this assumption, as Vocational High School (SMK) graduates have the highest unemployment rate at 8.63%, followed by Diploma (D3) graduates at 6.89%. This indicates a potential mismatch between education and industry needs (Suryadarma et al., 2017).

Workforce Growth and Sectoral Shifts

Between 2018 and 2019, Indonesia's workforce grew from 133.94 million to 136.18 million people, an increase of 2.24 million workers (BPS, 2019). However, this growth has not been evenly distributed across sectors. While industries such as services and manufacturing experienced an increase in employment, traditional sectors such as agriculture (-1%) and government administration (-0.23%) saw a decline in workers (OECD, 2020).

From the Human Capital Theory perspective, this shift reflects a transition toward a knowledge-based economy, where sectors requiring digital skills and specialized knowledge grow, while traditional labor-intensive sectors decline (Acemoglu & Autor, 2011). The declining employment in agriculture suggests a movement away from primary sector jobs toward more modern industries.

Unemployment by Education Level and Skill Mismatch

Despite the increasing number of higher-educated individuals, unemployment rates remain high among Vocational High School and Diploma graduates. This suggests a skill mismatch, where graduates possess qualifications that do not align with market needs (Hanushek et al., 2017). The World Bank (2019) notes that many vocational graduates in Indonesia lack soft skills, adaptability, and industry-relevant technical skills, leading to challenges in securing employment.

From a Human Capital Theory perspective, education should enhance productivity and employability. However, the current education system may not be adequately equipping students with marketable skills (Psacharopoulos & Patrinos, 2018). This gap calls for improved vocational training programs that align more closely with industry requirements.

METHODOLOGY

Research Design

This study employs a quantitative research approach using Linear Trend Forecasting to analyze Indonesia's labor conditions from February 2016 to February 2019 (Sekaran & Bougie, 2016). The objective is to identify trends in the unemployment rate, labor force growth, sectoral employment shifts, and educational disparities in unemployment (Suhardjo et al., 2023).

Data Collection

The research utilizes secondary data sourced from:

- Central Statistics Agency (BPS): Official unemployment rates, labor force participation, and employment by sector (Renaldo et al., 2023).

- World Bank: Reports on labor market trends and workforce development.
- OECD & ILO Reports: Insights into employment policies and vocational education effectiveness.

The dataset includes:

- Unemployment Rate (2016–2019) (%).
- Total Unemployed Population (in millions).
- Labor Force Growth (in millions).
- Sectoral Employment Changes (e.g., Agriculture, Manufacturing, Services, Government Administration).
- Unemployment by Education Level (e.g., Vocational High School, Diploma, Bachelor's Degree).

Data Analysis Method

The study applies Linear Trend Forecasting (Lind et al., 2018), a time series analysis method, to predict future labor conditions based on past trends. The formula used is:

$$Y = a + bX$$

where:

Y = Forecasted Unemployment Rate / Employment Figures

a = Intercept (starting value)

b = Slope (rate of change per year)

X = Time (year, coded as 1 for 2016, 2 for 2017, etc.)

Steps in Analysis:

- Calculate the slope (bb) using least squares regression.
- Determine the intercept (aa) based on historical data.
- Project unemployment rates and workforce trends for future periods based on the linear equation.
- Interpret the findings to identify patterns and factors influencing labor conditions.

Validity and Reliability

- Data Validation: Cross-checking BPS reports with World Bank and ILO datasets to ensure consistency.
- Model Accuracy: Measuring Mean Absolute Percentage Error (MAPE) to assess the reliability of the trend forecasting model.

RESULTS AND DISCUSSION

Result

Table 1. Indonesia Labor State

YEAR	CITY	VILLAGE
Feb-16	6,53%	4,35%
Feb-17	6,50%	4,00%
Feb-18	6,34%	3,72%
Feb-19	6,30%	3,45%

Source: Central Bureau of Statistics, 2019

Based on the data above, we can see that the percentage of Indonesian unemployment in February 2016 to February 2019, both cities and villages, has decreased. Although the percentage in cities is much higher than the percentage in villages.

DATA KETENAGAKERJAAN INDONESIA FEBRUARI 2019				
TAHUN	KOTA (Y)	X	XY	X^2
Feb-16	6,53%	-3	-19,59%	9
Feb-17	6,50%	-1	-6,50%	1

DATA KETENAGAKERJAAN INDONESIA FEBRUARI 2019				
TAHUN	KOTA (Y)	X	XY	X^2
Feb-18	6,34%	1	6,34%	1
Feb-19	6,30%	3	18,90%	9
JUMLAH	25,67%		-0,85%	20
TAHUN	DESA (Y)	X	XY	X^2
Feb-16	4,35%	-3	-13,05%	9
Feb-17	4,00%	-1	-4,00%	1
Feb-18	3,72%	1	3,72%	1
Feb-19	3,45%	3	10,35%	9
JUMLAH	15,52%		-2,98%	20

Based on the table above, Indonesian employment data from 2016 to 2019 experienced a significant decline in both cities and villages.

$y = ax + b$

$a = \frac{\sum y}{n} = \frac{15{,}52\%}{4}$ = 0,0388 / 3,88% (DESA)

$a = \frac{\sum y}{n} = \frac{25{,}67\%}{4}$ = 0,064175/ 6,4175% (KOTA)

$b = \frac{\sum xy}{\sum x^2} = \frac{-2{,}98\%}{20}$ = -0,001490 / -0,1490% (DESA)

$b = \frac{\sum xy}{\sum x^2} = \frac{-0{,}85\%}{20}$ = -0,000425 / -0,0425% (KOTA)

Desa = $y2020 = a + bx$

= $y2020 = 0{,}0388 + (-0{,}001149)x$

= $y2020 = 0{,}0388 + (-0{,}00149)(5)$

= $y2020 = 0{,}0388 + (-0{,}00745)$

= $y2020 = 0{,}03135 = 3{,}135\%$

Kota = $y2020 = a + bx$

= $y2020 = 0{,}064175 + (-0{,}000425)x$

= $y2020 = 0{,}064175 + (-0{,}000425)(5)$

= $y2020 = 0{,}0641755 + (-0{,}002125)$

= $y2020 = 0{,}0620505 = 6{,}205\%$

From the linear trend analysis, it can be analyzed that in February 2020, the unemployment rate in both urban and rural areas will decrease. The urban unemployment rate in February 2020 is predicted to decrease by 0.095% or 6.205%, while the rural unemployment rate is predicted to decrease by 0.135% or 3.135%. And the difference in the unemployment rate between urban and rural areas is indeed very clear.

Discussion

Human Capital Theory and Employment Trends

Human Capital Theory (Becker, 1964) emphasizes that education, skills, and experience enhance individual productivity, leading to better employment opportunities and economic growth. The decline in unemployment can be analyzed through this lens, as government initiatives (Yuan et al., 2023), skill development programs, and economic shifts likely contributed to higher labor absorption.

Urban Unemployment and the Role of Human Capital

Urban areas typically offer higher-paying jobs but require specialized skills and education. The data shows that Vocational High School (SMK) and Diploma (D3) graduates have the highest unemployment rates (8.63% and 6.89%, respectively). This suggests a mismatch between education and industry needs, where graduates may lack the competencies demanded by employers. As per Human Capital Theory, investments in job training and reskilling could help bridge this gap, reducing urban unemployment further.

Rural Employment and Skill Development

The rural unemployment rate is lower (3.135% projected in 2020), which aligns with high employment in traditional sectors like agriculture. However, rural employment is often low-skilled and vulnerable to automation and economic shifts. Strengthening human capital through education (Hartog et al., 2022), vocational training, and entrepreneurship programs can diversify rural employment opportunities, reducing dependency on agriculture.

Government Policies and Workforce Development

The Indonesian government has implemented various labor and education policies, including:

- Revitalization of Vocational Education to align curricula with industry needs.
- Workforce training programs to upskill workers in emerging fields.
- Investment in digital literacy to support employment in tech-driven sectors.

CONCLUSION

Conclusion

The Linear Trend Forecasting analysis reveals a declining trend in Indonesia's unemployment rate from 2016 to 2019, with projections indicating further reductions in 2020. Urban unemployment remains higher (6.205%) than rural unemployment (3.135%), highlighting disparities in labor absorption. Human Capital Theory suggests that differences in employment rates are influenced by education, skill development, and labor market readiness. The findings emphasize the importance of workforce training, education reform, and government policies in reducing unemployment.

Implication

The study has several practical and policy implications:

- For Policymakers: The government should strengthen vocational education programs, align curricula with industry demands, and promote digital skills training to enhance labor market absorption.
- For Businesses: Companies can invest in employee training to reduce skills mismatches and enhance productivity.
- For Educational Institutions: Universities and vocational schools must adjust their curricula to equip graduates with relevant, in-demand skills.
- For Society: Increased access to education and skill development programs can improve employment opportunities, particularly in urban areas where competition is high.

Limitation

While this study provides valuable insights, it has several limitations:

- Limited timeframe (2016-2019): The analysis does not account for external shocks, such as COVID-19, which significantly impacted employment in 2020 and beyond.
- Lack of sectoral analysis: The study does not differentiate between formal and informal sector employment, which may impact unemployment trends.
- Data constraints: The analysis relies on BPS data, which may not capture hidden unemployment or underemployment.

Recommendation

To address these limitations and improve labor market outcomes, the following recommendations are proposed:

- Enhance Vocational and Digital Training: The government should strengthen industry-relevant skill programs to reduce unemployment, particularly among Vocational High School and Diploma graduates.
- Support for Rural Job Creation: Expanding rural industrialization and entrepreneurship programs can diversify employment opportunities.
- Promote Public-Private Partnerships: Collaboration between government, industry, and educational institutions can bridge the skills gap and improve job placements.
- Increase Labor Market Research: Continuous labor market assessments can provide real-time data to guide employment policies.

Future Research

Future studies can explore:

- The impact of digital transformation on employment trends in Indonesia.
- The role of the informal sector in reducing unemployment rates, particularly in rural areas.
- The effectiveness of government employment policies in different industries.
- Post-pandemic labor market recovery trends and their implications for economic growth.

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