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Does Investment Reduce Unemployment? An Empirical Study of FDI and DDI Impacts in Bandung Regency

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Abstract

This study investigates the comparative influence of Foreign Direct Investment (FDI) and Domestic Direct Investment (DDI) on the Open Unemployment Rate (OUR) in Bandung Regency. This study utilizes annual time-series data covering the period from 2007 to 2024 for the OUR variable, as well as deflated FDI and DDI realization values. The methodology adopted is a quantitative approach with an Ordinary Least Squares (OLS) regression model specified in a log-log form to analyze the elasticity relationship between variables. The model estimation results show that DDI has a negative and statistically significant effect on the OUR, with an elasticity coefficient of -0.285, implying that a 1% increase in real DDI will decrease the OUR by 0.285%. Conversely, FDI was found to have no statistically significant effect on the OUR at a 5% significance level. The main finding of this research is the clear difference in effectiveness between the two capital sources in local labor absorption. DDI proves to be a strong determinant in reducing unemployment, whereas FDI, despite its volume, shows no significant statistical impact. This finding highlights that domestic investment plays a more crucial and direct role in addressing unemployment issues at the regency level, such as in Bandung Regency.

Keywords: Foreign Direct Investment, Domestic Direct Investment, Open Unemployment Rate, OLS Regression

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1. Introduction

Efforts to stimulate regional economic growth often rely on the ability to attract investment, both from foreign and domestic sources. Investment is seen as a primary aspect that not only increases production capacity and economic output but is also expected to create extensive employment opportunities, ultimately reducing unemployment and improving public welfare. However, the relationship between increased investment volume and a decrease in the unemployment rate is not always linear and automatic. Globally, the impact of Foreign Direct Investment (FDI) on employment shows mixed results. Some studies highlight the positive role of FDI in integrating agriculture-based economies into global value chains and promoting capital accumulation, a fundamental catalyst for sustainable industrialization. However, other studies warn that the direct impact on job creation may be limited, especially if the investment is capital-intensive or operates in isolated economic enclaves. In developing countries, FDI is often a crucial engine for economic growth, but its impact on the local labor market is highly dependent on the quality of existing institutions and supporting policies. This phenomenon presents a relevant policy paradox, particularly for regions with high industrial dynamics such as Bandung Regency. As an industrial pillar in West Java Province, Bandung Regency consistently records significant investment realization year after year. However, historical data shows that the Open Unemployment Rate (OUR) in this region has fluctuated sharply and does not always move in the opposite direction of the investment growth curve. This situation raises a crucial rationale for in-depth research: is it the type and characteristics of investment, rather than just its nominal value, that are the true determinants of labor absorption at the local level?

This problem becomes increasingly relevant when examining empirical data. As presented in Table 1, Bandung Regency shows a long-term upward trend in FDI and DDI realization, yet its OUR has been erratic. For instance, the

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OUR reached a very high level of 17.37% in 2007, then declined, but surged again in 2020 to 8.58% as a result of the economic shock from the COVID-19 pandemic. This fluctuation occurred despite a continuous flow of investment. The misalignment between the rising investment curve and the fluctuating unemployment curve indicates a potential structural mismatch. This directs the analysis beyond the simple question of "does investment create jobs?" to a more nuanced one: "what type of investment is most effective in absorbing the local workforce?". The emerging hypothesis is that the characteristics of the investment, such as its orientation towards capital-intensive versus labor-intensive sectors, and its level of linkage with local supporting industries, are more dominant determining factors than the mere aggregate value of the investment.

Table 1. Macroeconomic Indicators in Bandung Regency, 2007-2024

Year	OUR (%)	FDI Realization (Billion IDR)	DDI Realization (Billion IDR)
2007	17.37	285.29	48.15
2008	14.40	375.09	399.54
2009	12.27	169.78	130.22
2010	10.69	568.79	450.28
2011	10.42	215.01	329.12
2012	11.60	980.94	1,425.93
2013	10.12	628.12	211.48
2014	3.94	662.83	156.97
2015	4.03	477.69	463.55
2016	8.89	436.29	425.22
2017	3.92	596.03	2,561.49
2018	5.07	377.41	2,757.56
2019	5.51	3,181.46	2,078.08
2020	8.58	2,849.64	1,096.96
2021	8.32	1,155.66	1,237.27
2022	6.98	2,642.60	3,098.69
2023	6.52	2,968.32	5,144.16
2024	6.36	3,904.06	5,078.13

Source: BPS and DPMPTSP Bandung Regency, processed (2024)

Globally, the academic discourse on the impact of FDI on employment still shows mixed results. Several studies have found a significant positive impact, both through direct job creation and spillover effects into the local economy. Utouh & Kitole (2024) and Mwakabungu & Kauangal (2023), for example, show that FDI can increase labor productivity through technology transfer, which in turn boosts labor demand. However, other research finds a more limited or even negative impact, especially if the FDI is capital-intensive, displaces more labor-intensive domestic firms, or operates in economic "enclaves" isolated from the surrounding environment. In the context of Indonesia, most existing research tends to focus on analysis at the national or provincial level using panel data. These studies, such as the one conducted by Muryani et al. (2021), have revealed a complex relationship between investment and various socio-economic indicators. A significant study by Tegep et al. (2019) even found that FDI failed to directly explain the unemployment rate at the provincial level in Indonesia, with its influence being mediated by other variables such as economic growth and minimum wage. This research gap is what this study aims to fill, with the goal of providing a granular analysis that is directly relevant for policymaking at the regional level.

Based on this background, this study formulates its main problem on the uncertainty regarding the comparative effectiveness of FDI and DDI in absorbing labor in Bandung Regency. The local government, particularly the Department of Investment and One-Stop Integrated Services (DPMPTSP), requires a solid empirical evidence base to design investment promotion policies that are not only oriented towards achieving nominal targets but also towards creating maximum social impact. Therefore, this study is proposed to answer the following questions: (1) Does FDI have a significant effect on reducing the OUR in Bandung Regency? (2) Does DDI have a significant effect on reducing

the OUR in Bandung Regency? (3) Between FDI and DDI, which has a stronger determination in reducing the OUR in Bandung Regency?

This research is expected to provide two main benefits. Academically, this study will contribute new empirical evidence on the investment-unemployment nexus at the regency level in a developing country, which can enrich the literature on regional development economics. Practically, the results of this research are expected to serve as a basis for evidence-based policy recommendations for the DPMPTSP of Bandung Regency and other local governments in prioritizing types of investment and designing the most effective incentive schemes to address unemployment.

2. Literature Review

2.1. Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) is viewed as a crucial catalyst for the economies of developing nations. The Neoclassical theory framework posits that the inflow of foreign capital increases the aggregate capital stock, which in turn raises the marginal productivity of labor and stimulates labor demand (Kaczmarczyk, 2023). This perspective is expanded by the New Growth Theory, which emphasizes the role of FDI in technology transfer, managerial knowledge, and the creation of spillover effects. These spillovers occur not only directly through job creation in multinational corporations but also indirectly through backward linkages (demand for inputs from local suppliers) and forward linkages (provision of outputs for downstream industries). A meta-analysis by Demena & Van Bergeijk (2016) confirms the existence of positive productivity spillovers from FDI to domestic firms in developing countries, which can indirectly stimulate labor absorption.

However, empirical evidence from various countries shows that the impact of FDI on labor absorption is highly heterogeneous and not always positive. The determining factors are the characteristics of the investment and the conditions of the host country. International studies often distinguish between capital-intensive and labor-intensive FDI. FDI in sectors like mining or high technology, for instance, may contribute significantly to GDP but absorb little (Jin et al., 2019). Conversely, FDI in manufacturing sectors such as garments or assembly is often more effective in reducing unemployment (Afolabi et al., 2019). A case study in Mongolia by Dagys et al. (2025) demonstrates that the impact of FDI is highly sectoral; investment in manufacturing and energy sectors shows a strong multiplier effect on job creation, whereas investment in the technology-intensive mining sector has a much lower effect. Furthermore, the impact of FDI also depends on the institutional quality and human resource readiness of the recipient country.

In the Indonesian context, research findings are also varied. Some panel data studies at the provincial level have found that FDI significantly reduces unemployment. However, other studies present a more complex picture. Hill (2018) highlights the vital role of FDI in high-tech manufacturing sectors in Indonesia, such as automotive and electronics, but also underscores that restrictive policies and inadequate infrastructure quality hinder the full potential for labor absorption. More specifically, research by Tegep et al. (2019) across 36 provinces in Indonesia found that FDI does not have a direct influence on the unemployment rate. Its influence is indirect, mediated by economic growth and the minimum wage level. This finding implies that FDI in Indonesia tends to be capital-intensive, initially boosting output more than labor absorption. Thus, it can be concluded that a positive impact of FDI on labor absorption is not a certainty but is highly dependent on the alignment between the type of incoming FDI and the local economic structure and labor quality.

2.2. Domestic Direct Investment (DDI)

Domestic Direct Investment (DDI) is often considered to have a stronger and more direct linkage with the local economy compared to FDI. Endogenous growth theory provides a foundation for this argument, emphasizing the crucial role of domestic investment in the accumulation of physical and human capital, which forms the basis for sustainable growth (Ravikumar, 2025). Domestic investors, with their deep understanding of the local market, culture, and business networks, tend to invest in sectors that naturally absorb a large amount of labor, such as Micro, Small, and Medium Enterprises (MSMEs), agribusiness, and services. These sectors are the backbone of labor absorption in many developing countries (Wahyuni, 2019).

Empirical evidence at both national and international levels supports this view. In Indonesia, studies by Alvarado et al. 2017) show that domestic investment is an effective strategy for creating economic opportunities that can ultimately reduce social problems like poverty and crime, which are often rooted in unemployment. More concrete sub-national evidence comes from a case study in West Kalimantan, which shows that the wood processing industry—mostly funded

by domestic capital—contributes significantly to labor absorption, despite its relatively smaller investment value compared to other capital-intensive sectors (Sulaiman et al., 2023). This is a classic example of investment with high labor absorption elasticity. Internationally, the experience of China shows that the service sector, largely driven by domestic investment, has become a major source of job creation, with a target contribution of nearly 55% of total employment by 2025 (Aiyar et al., 2018).

The importance of DDI is also reflected in national policy directions. Indonesia's National Long-Term Development Plan (RPJPN) 2025–2045 explicitly recognizes the central role of domestic investment in driving the transformation towards a green and circular economy. This agenda includes the development of inherently labor-intensive sectors, such as recycling, waste management, and sustainable agriculture. Thus, it can be hypothesized that DDI has a higher labor absorption elasticity per unit of investment compared to FDI, especially at the regency level of analysis. This is due to the tendency of DDI to be invested in sectors that are more aligned with the region's comparative advantages and the skill profile of the available workforce.

2.3. Open Unemployment Rate (OUR)

The Open Unemployment Rate (OUR) is defined as the percentage of the labor force that is jobless but actively seeking employment. From an economic theory perspective, unemployment can be explained from various viewpoints. The Keynesian framework emphasizes cyclical unemployment, which arises from a lack of aggregate demand in the economy (Palley, 2019). Conversely, the Neoclassical framework focuses more on frictional unemployment (transitions between jobs) and structural unemployment (Bortis, 2023). Structural unemployment is a major concern in developing countries, arising from a mismatch between the skills possessed by job seekers and those required by industries (skills mismatch), as well as rigidities in the labor market (Adely et al., 2021).

Empirical studies at the international and national levels show that the determinants of unemployment are multifaceted. In developing countries, demographic and social factors often play a significant role. A study in Ecuador by Tulcanaza-Prieto et al. (2023), for example, found that ethnicity and geographical location (urban vs. rural) significantly determine youth unemployment rates. Another study in Malaysia by Husin et al. (2021) highlights that, in addition to macroeconomic conditions, factors such as employer preferences and candidate attributes are also significant determinants of unemployment among fresh graduates, underscoring the issue of skills mismatch.

In Indonesia, the OUR is a persistent structural problem, especially in urban areas like West Java. External shocks such as the COVID-19 pandemic have proven capable of drastically increasing the OUR, highlighting the vulnerability of the labor market. A key finding from a study by Rizkia & Haryatiningsih, (2023) in major cities on the island of Java reveals a paradox: economic growth driven by capital-intensive sectors can actually increase the unemployment rate among the educated. This implies that the quality of economic growth, not just its quantity, is the determinant of labor absorption. Besides investment, the quality of human resources, as reflected by the Human Development Index (HDI), is also a key long-term determinant. An increase in HDI should theoretically be able to reduce structural unemployment by increasing labor productivity and adaptability. Ultimately, the urgency to address unemployment is not only economic but also social, as global studies consistently show a positive relationship between unemployment status and an increased risk of mental health disorders.

3. Methods

This study is designed using a quantitative approach to analyze the causal relationship between investment and the unemployment rate. Specifically, the method used is a time-series analysis of annual data from 2007 to 2024, resulting in a total of 18 observations (T=18) for each variable. The use of time-series data allows the researcher to observe the dynamics of the relationship between variables over a sufficiently long period, covering various economic conditions.

The variables used in this study are operationally defined as follows:

a. Open Unemployment Rate (OUR) as dependent variable. This variable measures the percentage of the labor force (population aged 15 and over) who are unemployed and actively seeking work at a specific time in Bandung Regency. OUR data, in percent (%), are obtained from the official publications of Statistics Indonesia (BPS)

b. Foreign Direct Investment (FDI) as independent variable. This variable is the realized value of investment from foreign capital sources in Bandung Regency. The raw data is obtained in Rupiah. The data is sourced from the Department of Investment and One-Stop Integrated Services (DPMPTSP) of Bandung Regency.

c. Domestic Direct Investment (DDI) as independent variable. This variable is the realized value of investment from domestic capital sources in Bandung Regency. The data source is from the DPMPTSP of Bandung.

The analytical model used to test the research hypotheses is a multiple linear regression model using the Ordinary Least Squares (OLS) method. To address the issue of heteroscedasticity, which often arises in economic data with large value scales, and to allow for the interpretation of coefficients as elasticities, the model is specified in a log-log form (Acito, 2023). The model equation is as follows:

$$ln(OUR_t)=\beta_0+\beta_1 ln(FDI_t)+\beta_2 ln(DDI_t)+\epsilon_t$$

OUR_t is the Open Unemployment Rate in year t, FDI_t is the real FDI realization value in year t, DDI_t is the real DDI realization value in year t, ln is the natural logarithm operator, β_0 is the constant or intercept, β_1 is the elasticity coefficient of OUR with respect to FDI. This value measures the percentage change in OUR in response to a 1% change in FDI, assuming other variables are constant (*ceteris paribus*), β_2 is the elasticity coefficient of OUR with respect to DDI, which measures the percentage change in OUR in response to a 1% change in DDI (*ceteris paribus*), ϵ_t is the error term in year t, representing other factors affecting OUR that are not included in the model.

The data analysis was conducted systematically. First, a descriptive statistical analysis was performed to provide a general overview of the data characteristics, including the mean, standard deviation, minimum, and maximum values of each variable. Second, an OLS regression estimation was conducted to obtain the coefficient values. Third, statistical hypothesis testing was performed, which included: (a) Partial significance test (t-test) to determine the influence of each independent variable individually; (b) Simultaneous significance test (F-test) to determine the influence of all independent variables together; and (c) Calculation of the Coefficient of Determination (R^2) to measure the proportion of the dependent variable's variation that can be explained by the model.

The final crucial step was the classical assumption testing to ensure that the resulting regression model is a Best Linear Unbiased Estimator (BLUE). This testing included: (a) Normality test of residuals using the Jarque-Bera statistic; (b) Multicollinearity test using the Variance Inflation Factor (VIF) to ensure there is no high correlation among the independent variables; and (c) Heteroscedasticity test using the White test to ensure the variance of the error term is constant (homoscedastic). The use of the OLS method on this log-log model is considered appropriate and robust for the purpose of this study, given its focus on direct causal relationships with a limited number of observations, an approach commonly used in applied economic studies.

4. Result and Discussions

The data analysis begins with a presentation of the descriptive statistics of the variables used in the study, namely the Open Unemployment Rate (OUR), real Foreign Direct Investment (FDI), and real Domestic Direct Investment (DDI) in Bandung Regency for the period 2007-2024. Descriptive statistics provide an initial overview of the central tendency and dispersion of the data, as presented in Table 2.

Table 2. Descriptive Statistics of Research Variables

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
OUR (%)	8.61	8.74	17.37	3.92	3.81
Real FDI (Billion IDR)	1,460.65	791.99	3,904.06	196.40	1,228.60
Real DDI (Billion IDR)	1,607.49	830.27	5,144.16	55.42	1,677.26

Source: Data processed with Eviews 12, (2025)

Table 2 shows considerable variation in all variables during the research period. The OUR has a wide range from 3.92% to 17.37%, indicating the volatility of the labor market conditions. Similarly, the realized investment values for both FDI and DDI show high standard deviations, signifying significant fluctuations in capital inflows into Bandung Regency from year to year. Next, a multiple linear regression model was estimated using the OLS method. The main estimation results of the model are comprehensively presented in Table 3.

Based on the results in Table 3, the resulting regression equation is:

$$\ln(OUR_t)=3.815-0.061\ln(FDI_t)-0.285\ln(DDI_t)+\epsilon_t$$

The model evaluation begins by examining the Coefficient of Determination (R^2). The Adjusted R-squared value of 0.645 indicates that approximately 64.5% of the variation in the Open Unemployment Rate (in logarithmic form) can be explained by the variations in FDI and DDI (in logarithmic form) collectively. This suggests that the model has strong explanatory power. Next, the Simultaneous Significance Test (F-test) shows an F-statistic of 16.531 with a probability (Prob(F-statistic)) of 0.0002. Since this probability value is well below the 0.05 significance level, it can be concluded that, jointly, the variables FDI and DDI have a significant effect on OUR.

Table 3. OLS Regression Estimation Results of the Effect of FDI and DDI on OUR

Variabel	Coefficient	Std. Error	t-Statistic	Prob.
C	3.815	1.198	3.184	0.0060*
LOG(FDI)	-0.061	0.079	-0.772	0.4515
LOG(DDI)	-0.285	0.101	-2.821	0.0129*
Model Statistics				
R-squared	0.687			
Adjusted R-squared	0.645			
F-statistic	16.531			
Prob(F-statistic)	0.0002			
Durbin-Watson stat	1.953			

Source: Data processed with Eviews 12, (2025). Note: Significant at α=5%.

The analysis continues with the Partial Significance Test (t-test) to examine the effect of each variable individually. For the LOG(DDI) variable, the regression coefficient is -0.285 with a probability of 0.0129. Since this probability value is less than 0.05, DDI has a statistically significant negative effect on OUR. The interpretation of its elasticity coefficient is that, ceteris paribus, a 1% increase in real DDI realization will decrease the Open Unemployment Rate in Bandung Regency by 0.285%. Conversely, for the LOG(FDI) variable, the coefficient is -0.061 with a probability of 0.4515. This probability value, being much larger than 0.05, indicates that FDI does not have a statistically significant effect on OUR.

To ensure the validity and reliability of the regression results, a series of classical assumption tests were conducted. The results of these tests are summarized in the following tables.

Table 4. Normality Test of Residuals (Jarque-Bera)

Jarque-Bera	0.512
Probability	0.7741
Observations	*18*

Source: Data processed with Eviews 12, (2025)

The probability value of the Jarque-Bera statistic is 0.7741, which is much greater than the 0.05 significance level. This indicates that the null hypothesis (residuals are normally distributed) cannot be rejected, thus the normality assumption is met.

Table 5. Multicollinearity Test (Variance Inflation Factor)

Variable	Centered VIF
LOG(FDI)	1.354
LOG(DDI)	1.354

Source: Data processed with Eviews 12, (2025)

The Centered VIF values for both independent variables are below the common threshold of 10. This indicates that there is no serious multicollinearity problem between the FDI and DDI variables in the model.

Table 6. Heteroscedasticity Test (White Test)

Source	chi2	Prob > chi2
F-statistic	0.623	0.6588
Obs*R-squared	3.299	0.5091

Source: Data processed with Eviews 12, (2025)

The probability values from the F-statistic (0.6588) and Obs*R-squared (0.5091) in the White Test are greater than 0.05. This means the null hypothesis (no heteroscedasticity or homoscedasticity) is accepted. In other words, the variance of the error term is constant, and the homoscedasticity assumption is met.

The empirical results of this study provide a nuanced perspective that aligns with, and builds upon, the existing body of literature. The significant negative coefficient of DDI (-0.285) strongly supports the theoretical argument that domestic investment possesses a more direct and potent capacity for labor absorption.. The significant impact of DDI on unemployment reduction aligns with the theory that domestic investment has a closer link to the local economic structure. Domestic investors tend to invest in more labor-intensive sectors and use local inputs, as shown in the West Kalimantan case study and the general argument about the role of MSMEs in labor absorption. This finding is also consistent with studies by Muryani et al. (2021), which, although in a broader context, highlight the important role of domestic investment in creating economic opportunities in Indonesia. DDI in Bandung Regency likely flows into sectors such as textiles and textile products (TPT), food and beverages, and trade, which historically have a high capacity for labor absorption.

On the other hand, the insignificance of FDI can be interpreted as a manifestation of the structural mismatch phenomenon. Bandung Regency, as part of the West Java industrial corridor, may attract FDI that is oriented towards high technology and is capital-intensive. Such investments, while contributing to the GRDP, do not automatically absorb a large number of local workers, especially those with low to medium skill levels. This finding is in line with Hill's (2018) argument about Indonesia's challenges in global production networks and Rizkia's (2023) warning that economic growth driven by capital-intensive sectors can worsen educated unemployment. Furthermore, this result echoes the findings of Tegep et al. (2019), who concluded that FDI in Indonesia does not directly affect unemployment but rather through other mediating variables, indicating that the relationship is not simple.19 This does not mean that FDI provides no benefits, but its impact on job creation cannot be taken for granted and requires specific accompanying policies, such as vocational training programs tailored to the needs of foreign investor industries. Thus, this finding challenges the policy view that is often agnostic to the source of capital and focuses only on achieving nominal investment targets.

5. Conclusions

This study was conducted to analyze and test the determination of Foreign Direct Investment (FDI) and Domestic Direct Investment (DDI) on the Open Unemployment Rate (OUR) in Bandung Regency from 2007 to 2024. Based on the OLS regression analysis, which has passed a series of classical assumption tests, this study yields several key conclusions. First, DDI is proven to have a negative and statistically significant effect on the OUR. This indicates that any increase in investment from domestic sources effectively contributes to the reduction of the unemployment rate in Bandung Regency. Second, FDI was not found to have a statistically significant effect on the OUR during the study period. This finding implies that an increase in the value of foreign investment does not automatically correlate with local labor absorption.

The policy implications that can be drawn from these research findings are strategic and relevant for the local government, particularly the DPMPTSP of Bandung Regency. First, there is a need for differentiation in investment promotion and management strategies. Local governments are advised not only to pursue aggregate investment value targets but also to consider the quality and characteristics of such investments. Given its proven impact, DDI should receive full support and be prioritized. Policies can be directed towards simplifying and accelerating the licensing process, facilitating access to financing, and implementing coaching and partnership programs for domestic investors, especially those in labor-intensive sectors and MSMEs. Second, for FDI, policies must be more targeted. Rather than providing general incentives, local governments can design specific fiscal and non-fiscal incentives to attract foreign investors in labor-intensive sectors (e.g., garments, footwear, processed foods, and assembly) or for investors who demonstrate a strong commitment to building linkages with local suppliers and conducting technology transfer accompanied by labor training.

This study has several limitations that need to be acknowledged. The model used is aggregate and does not differentiate the impact of investment by specific industrial sectors, which may hide important variations. Additionally, other important control variables such as the Regency Minimum Wage (UMK), the educational level of the workforce, and government spending on infrastructure were not included in the model to maintain parsimony, given the limited number of observations. The limited number of observations (T=18) also restricts the application of more advanced time-series analysis techniques.

Therefore, future research can be developed in several directions. First, conducting an analysis using panel data that

combines time-series data with cross-sectional data (between sub-districts in Bandung Regency, if available) to obtain a more granular understanding. Second, applying more dynamic econometric models such as the Vector Error Correction Model (VECM) to distinguish between the short-term and long-term impacts of investment. Third, building a more comprehensive model by including other relevant control variables to reduce the potential for omitted variable bias and to obtain a more accurate estimation of the net impact of investment on employment.

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