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Introduction

The employment rate is one of the key indicators to analyse the performance of a country, reflecting the number of labour forces. An international place such as the United Kingdom, contains workers from different nationalities. However, it creates inequality for each ethnic group in terms of employment. Evidence showed that minorities ethnic groups in London earned around 22% less than White workers, as well as a huge gap in employment rates (Siddique, 2019). Thus, it raises awareness in the inequality issue of UK employment among ethnic groups.

Research Question

It was found that there is a significant difference between British workers and other nationalities, which tends to be in favour of local people (Brynin and Güveli, 2012). Previously, for example in Brynin and Güveli's article, was focusing on the pay inequality and based on obsolete data sets. Also, the most significant area was appeared in London (Siddique, 2019).

As a result, this paper is aiming to discover that to what extent the employment rate in London is less in favour of the ethnic minorities. Due to the most significant difference was in London, the direction of this investigation will be the 2019 employment rates in London.

In order to reach the aim of this paper, there are two objectives to investigate:

1. Identifying the distribution of employment rates between White and ethnic minority groups in London
2. Investigating the relationship between White and ethnic minority groups
3. Observing the key pattern of these two employment rates

Literature Review

In this section, it is going to summaries the studies and findings from academic journals in a relation to the employment rate inequality for the ethnic minority.

There is a number of authors stating the employment rate of ethnic minority tends to be less favourable (Berthoud, 2000; Yi Cheung, 2006; Brynin and Güveli, 2012). Brynin and Güveli (2012) mentioned the significant ethnic labour market disparities in the United Kingdom. Although the work performance was better than the White majority, it showed a higher unemployment rate and a larger pay gap for minorities such as Pakistanis and Bangladeshis. Such disadvantages were termed as 'ethnic penalties', which refers to this employment inequality (Yi Cheung, 2006). Berthoud (2000) suggested a 'hyper-cyclical' trend for these minorities. He explained that the employment rate movement of an ethnic minority was extremely. During the economic recession, their employment rates dropped fastest. Whereas, it recorded the highest employment rates when there is economic growth. These papers revealed that employment in Britain was inequal, ethnic minority suffered from unemployment and discrimination in workplace. To sum up the arguments from these scholars, the high unemployment rate and larger pay gap for minorities support the 'hyper-cyclical' pattern, as minorities were treated as low labour costs. Employers might perceive them as a cheaper labour force in executing the same job when there is prosperity,

simultaneously large pay gap for minorities creates a cheaper switching cost when facing an economic recession.

However, some authors hold a different opinion on such employment inequality. They believed that the difference in employment rates could be due to racial factors such as the reliance on White (Leibbrandt *et al.*, 2010; Levine, 2010). This is not a situation where only happens in London. From Leibbrandt el al.'s research, they concluded that White enjoyed a significant advantage in terms of employment rate. Based on their investigation of the labour market in South Africa, between 1997 and 2008, the percentage change in employment rates of White experienced a positive 164.1% growth. Whereas, African and Indian who proportionated the majority of the population, recorded a high percentage of unemployment rates. This phenomenon also found from Levine's investigation in Milwaukee. In which, the ethnic majority (Black male) held 32 percentage points lower than the employment rate of ethnic minority (White male). In regard to these circumstances, these papers came to the same conclusion. They believed that this result was caused by employment discrimination. The job allocation and opportunity were not fairly distributed, and "*the most menial and skilled tasks were reserved exclusively for the White population*" (Leibbrandt el al., 2010, p. 10).

As the academic papers summarised above were based on the previous information, it reveals the research gap of discovering the current trend of such employment inequality in Britain. In order to reach this answer, the sections below are going to conduct a data analysis on it.

Presentation of Data

The data for the following analysis is the employment rates by ethnicity in London. This data is obtained from the London Datastore, and the data set was collected from the Annual Population Survey produced by the Office of National Statistics. The data was created in 2014 and last updated in July 2020. It contains employment rates for BAME and White for each London boroughs since 2016. Key fields for each ethnicity include the number of workers, denominator, employment rate, and confidence level. Since the research targets are White and ethnic minority, the analysis will conduct based on these two main columns.

All data analysis is reproducible and produced by Python. Relevant files are uploaded and publicly shared on GitHub (the hyperlink on the first page).

Methodology

It is going to describe the approach for the analysis. Firstly, it is to discover the employment rates of a White and ethnic minority in London in 2019. This step aims to identify the spread and shape of these two data. Secondly, it will perform a residuals analysis for those two variables, targeting to investigate the correlation. Thirdly, using the elbow method to determine the optimal number of clusters (k-Means). Finally, it is going to conduct a clustering analysis in order to observe the patterns of each cluster.

Results and Discussion

Figure 1a demonstrates the employment rate distribution of White in London. The blue line shows that it is normally distributed and mostly centralised in around 80 percentage. The kurtosis and skewness values are found as approximately -0.091 and -0.581 respectively. The result explains that the White employment rate data represents a lighter tail than the normal distribution, also illustrating that the left tail of the distribution is longer than the right tail.

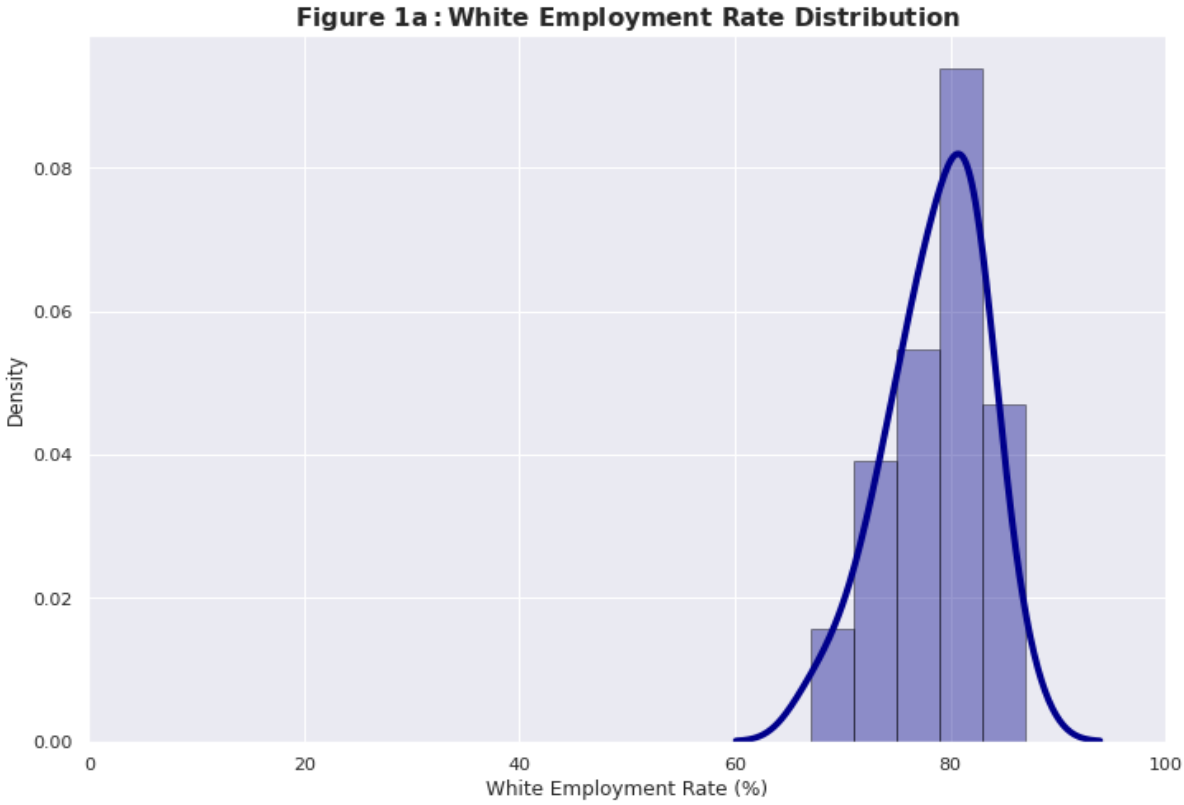


Figure 1b represents the employment rate distribution of the ethnic minority. Similarly, the data is relatively normal distributed as well. Whereas comparing to the White, the distribution of ethnic minority is less symmetric. It is revealed from the kurtosis and skewness values, 0.1377 and -0.5859 respectively. They share almost the same skewness but the minorities data hold a positive kurtosis, leading to the difference in the shape of the blue line.

By observing the frequency distribution, the distribution of ethnic minority recorded an inferior performance than White. The entire percentage distribution ranged between 50 to almost 80 per cent which is lower than the most frequent values of White (80%). The lowest frequent employment rate for White is still equivalent to the highest frequent records for the ethnic minority. It is clear to see that the employment rate of minorities in London in 2019 is less favourable generally.

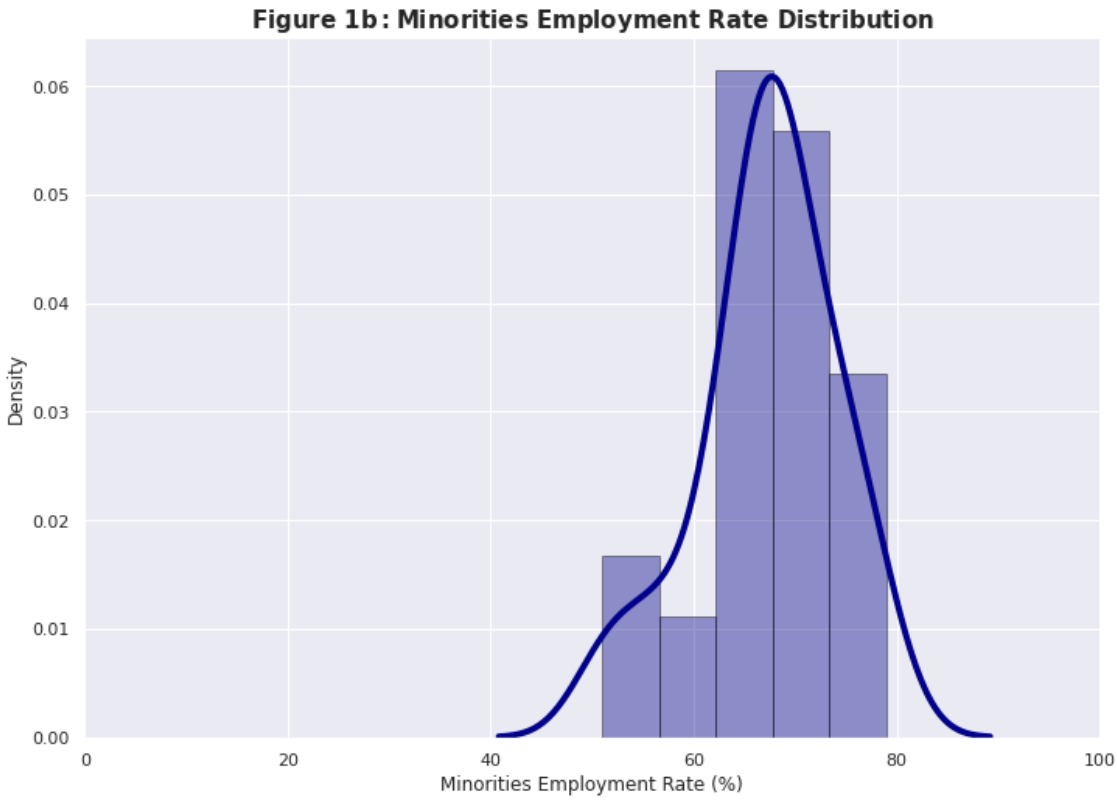


Figure 2 shows that the residuals plot between the White and ethnic minority employment rates is symmetrically distributed, tending to cluster towards the middle of the plot and no systematic patterns of residuals. It indicates the equal variance of residual for all values in the measure. The R-Squared value is as low as zero, meaning that the White percentage is not affecting much in the variation of the minority percentage. Furthermore, it is calculated that the t-value is around 7.888 and p-value with zero. It means that the null hypothesis is rejected and the difference is significant. Thus, these two variables are not highly correlated. There are no significant outliers in the residuals plot, as such, we did not conduct the removal of outliers. Based on the result of residuals analysis, it meets the requirements to conduct the clustering analysis, which are both normal distributed, not highly correlated, and on the same scale (standardised in the following section).

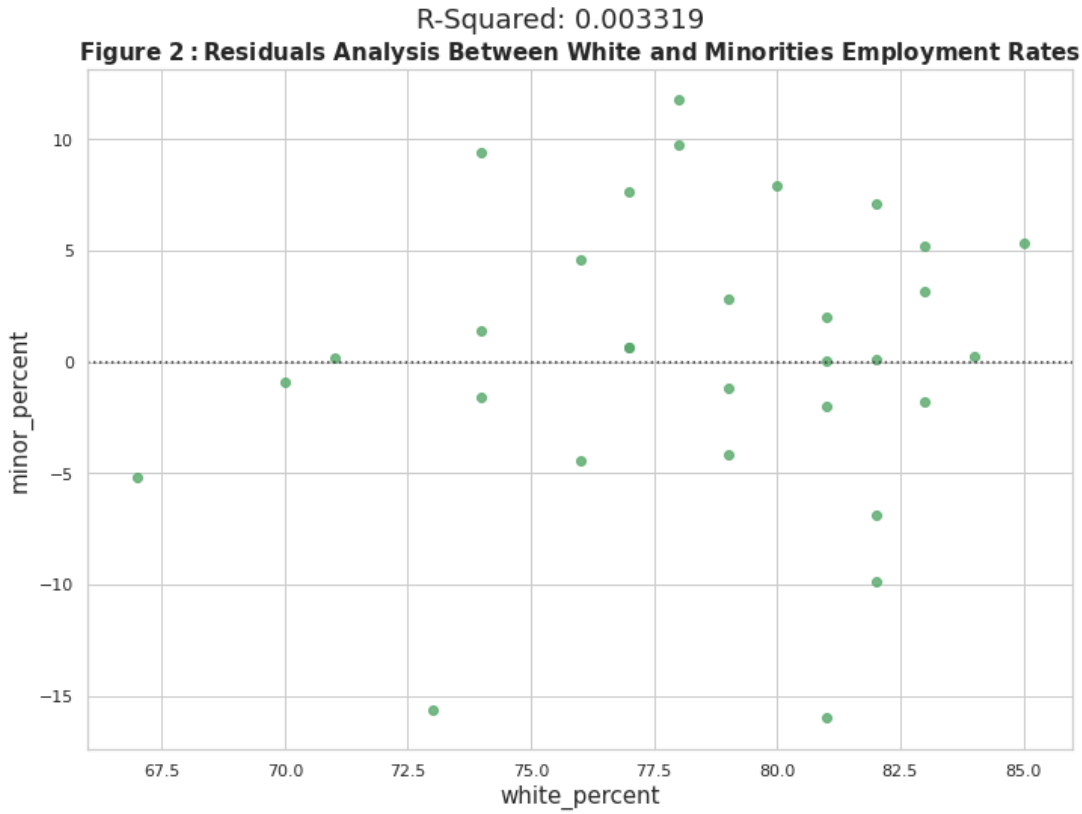


Figure 2 : Residuals Analysis Between White and Minorities Employment Rates

Figure 3 illustrates an elbow curve that provides the optimal number of clusters for analysis. It is clear to see that the level of distortion reaches to 2000, and then diminishing slightly after the k-Means equals to 5. As a result, it is going to use 5 clusters for the following analysis.

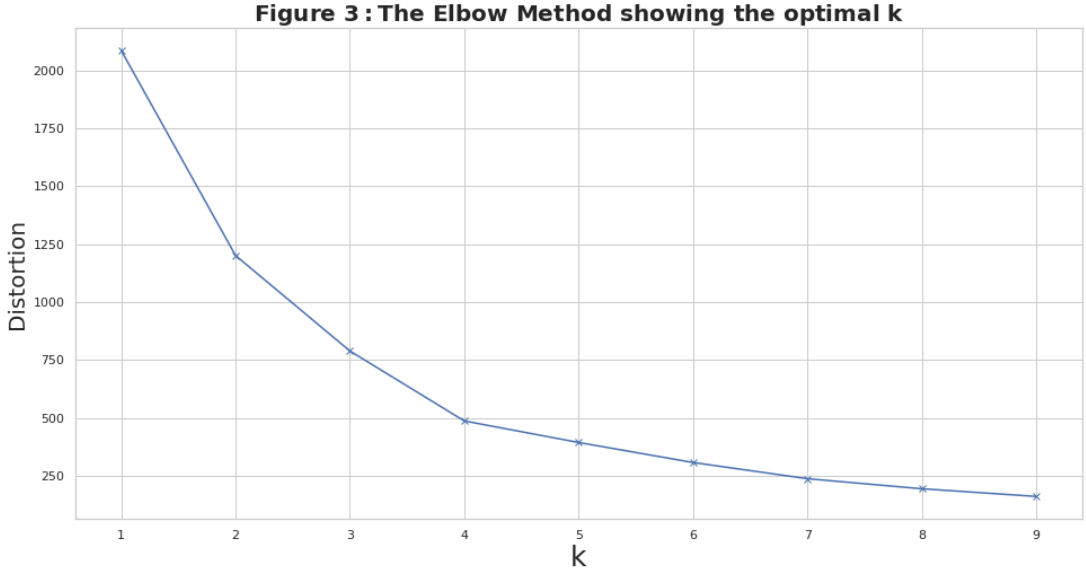


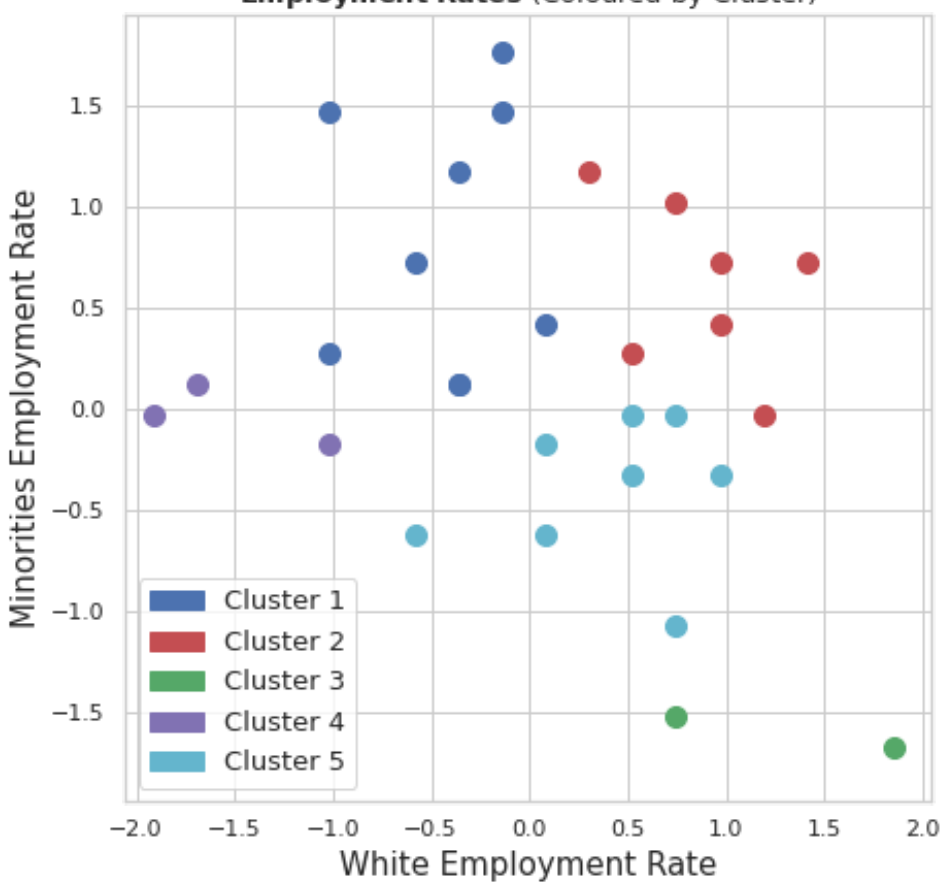
Figure 3 : The Elbow Method showing the optimal k

After choosing the optimal number of clusters and standardisation, Figure 4 demonstrates the five different clusters between White and ethnic minority employment rates. The silhouette score is approximately 0.2637, which means that each cluster is located nearby other.

By observing the clusters, each of those has a different characteristic. Cluster 3 and 4 are in two extremes, which mainly hit on the highest and lowest of White employment rate. Both clusters contain the lowest proportion of points, and the distance of each points varies within the cluster. Cluster 2 represents the situation where both races largely holding a positive employment rate, however ethnic minority is generally less favourable in standardised employment rate than White.

Interestingly, Cluster 1 and 5 hold the majority of points, whereas Cluster 5 concentrates on the top of the figure (mostly positive minorities employment rate and negative White employment rate) and vice versa for Cluster 1. It indicates that the ethnic minority tends to face a high level of unemployment when White has a high employment rate. When the White employment rate is low (for example during the economic recession), minorities would perform a slightly better employment rate in comparison. Therefore, the clustering analysis reflects that the 'hyper-cyclical' pattern occurs in 2019 in London, in which the employment of ethnic minorities is relatively volatile.

Figure 4 : Clustering Between White and Minorities Employment Rates (Coloured by Cluster)



Conclusion

To sum up, evidence mentioned above showing that there is an inequality phenomenon for the employment rate of the ethnic minority in London in 2019. Pieces of literature discovered that such a pattern is not limited in Britain solely, it also occurs the same situation in other places such as America and South Africa. Ethnic minority tends to suffer from an inferior employment rate elsewhere in the world. Although their employment rate is better in some circumstances, it could be meant as high volatile (sudden employment demand during an economic downturn). However, in general cases, ethnic minority performed worse especially when comparing to White. In the future study, it is proposed to investigate the qualitative reason for the differences and research the ethnical variation by occupation. It might provide a different view of argument in terms of the employment inequality for the ethnic minority.

References

Berthoud, R. (2000) ‘Ethnic employment penalties in Britain’, *Journal of Ethnic and Migration Studies*, 26(3), pp. 389–416. doi: 10.1080/713680490.

Brynin, M. and Güveli, A. (2012) ‘Understanding the ethnic pay gap in Britain’, *Work, Employment and Society*, 26(4), pp. 574–587. doi: 10.1177/0950017012445095.

Leibbrandt, M. *et al.* (2010) ‘EMPLOYMENT AND INEQUALITY OUTCOMES IN SOUTH AFRICA’, *University of Cape Town: Southern Africa Labour and Development Research Unit*.

Levine, M. V (2010) ‘Race and Male Employment in the Wake of the Great Recession: Black Male Employment Rates in Milwaukee and the Nations Largest Metro Areas, 2010’, *Center for Economic Development*, pp. 1–41. Available at: https://dc.uwm.edu/ced_pubs (Accessed: 10 January 2021).

Siddique, H. (2019) ‘Britain’s ethnic pay gap: workers of Bangladeshi heritage paid least | Inequality | The Guardian’, *The Guardian*, 9 July. Available at: https://www.theguardian.com/inequality/2019/jul/09/ethnic-pay-gap-bangladeshi-workers-earn-fifth-less-white-britons (Accessed: 9 January 2021).

Yi Cheung, S. (2006) *Ethnic Penalties in the Labour Market: Employers and Discrimination*. Available at: https://www.researchgate.net/publication/265248323 (Accessed: 10 January 2021).