

DAT250 Final Paper

“Goal 8- Decent work and economic growth: Full employment and decent work with equal pay”

Introduction:

The main objective of the United Nations Sustainable Development Goal 8 is to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. This objective is crucial in raising living standards and lowering inequality, while promoting international economic stability. Through the reduction of economic disparities and employment challenges, SDG 8 seeks to ensure that economic progress accrues to all people, regardless of gender, age, or region.

Besides decent work, SDG 8 covers many other important aspects of economic growth: encouraging industry innovation and diversity, increasing production and consumption efficiency, and ensuring access to financial services on fair terms. The goal stresses the importance of sustainable tourism, youth employment, and the eradication of child labor and forced labor. SDG 8 focuses on the resilient and inclusive economic environment to be formed for present and future generations by setting up goals on increasing global production and hence sustainable practices.

This proposal outlines a strategy for analyzing and presenting data on specifically Targets 8.5.1 and 8.5.2 by evaluating progress toward "achieving full and productive employment and decent work for all" by using the Data Science Life Cycle.

Understanding of SDG and Target:

My proposal focuses on Target 8.5 of the United Nations Sustainable Development Goal 8 (SDG 8), which aims to achieve full and productive employment and decent work for all. This goal is necessary to guarantee that economic expansion benefits everyone by giving all groups equal access to good and fair job opportunities.

- Indicator 8.5.1: "Average hourly earnings of employees, by sex, age, occupation and persons with disabilities."

This indicator tracks the wage gaps between various demographic categories, such as gender, age, and people with impairments. It is essential for tracking advancements made in closing the gender pay gap and guaranteeing equitable compensation for equal labor in all industries.

- Indicator 8.5.2: "Unemployment rate, by sex, age, and persons with disabilities."

This indicator monitors the unemployment rates for various demographic groups, focusing on gender, age, and individuals with disabilities. By assessing this data, we can evaluate the extent to which economic growth has translated into inclusive employment opportunities and identify groups that may be disproportionately affected by unemployment.

In order to provide a thorough assessment of the current status of employment and income equality and to identify areas that require further advancement, I will gather, clean, and analyze pertinent data using the Data Science Life Cycle.

Implementation of Data Science Life Cycle:

1. *Business Understanding:*

The first stage in the Data Science Life Cycle is **Business Understanding**, which defines the goals of the analysis by framing the problem statement in alignment with **SDG-8**. This analysis focuses on **Indicator 8.5.1**—calculating the gender pay gap based on average hourly wages of men and women across various occupations—and **Indicator 8.5.2**, which examines unemployment rates by disability status. The objective is to evaluate the extent of gender inequality in the labor market and pinpoint areas requiring targeted interventions to promote equal pay and employment opportunities for women and marginalized groups. This stage involves collecting relevant data from reliable sources.

2. *Data Mining:*

Data for Indicator 8.5.1 may be available from national statistics offices, labor organizations, and academic research in the form of average hourly earnings by sex for selected industries and occupations. For instance, a chart might show the trends of average hourly earnings for employees from 1992 to 2016. On **Indicator 8.5.2**: Data mining from sources such as ScienceDirect, which concentrate on the inclusion of people with disabilities in the labor workplace, shows that when one adopts inclusive labor policies, labor participation by persons with disabilities goes up. This is in order to realize full and productive work for all under **SDG 8.5.2**. Cleaning will be required at a detailed level to have appropriate and usable datasets that analyze employment, decent

work, and equitable pay, among other issues, that often come out because of inconsistent reporting.

3. *Data Cleaning:*

Cleaning is a very important procedure that ought to be followed through to ensure the full employment, decent work, and equitable pay datasets are accurate and usable.

Missing information is a common problem in many areas with shaky reporting.

Consistency can be maintained by extrapolating from current data patterns to fill in missing values. Whereas unrounded statistics are too confusing, the following paper can clean the statistics found on ScienceDirect by assembling analogous tables and rounding a couple of numbers to make clearer statements; likewise, comparing earnings within a nation calls for adjustments over currency fluctuations and inflation, hence the need for standardization. Identify and validate proper outliers; for example, extraordinary wage data should be looked up and matched to its correctness from secondary data sources. These steps make the dataset more reliable for insightful analysis of the global progress on the issues of fair labor practices and equal compensation.

4. *Data Exploration:*

Data exploration reveals significant global disparities in unemployment, particularly when examining gender and disability. Europe, for example, has greater rates of unemployment for both sexes, with Spain and Serbia displaying very high numbers. However, Africa exhibits stark disparities, with some nations, like Djibouti, having extremely high unemployment rates

and others, like Malawi and Niger, having comparatively low rates. There is a discernible pattern when it comes to disability: in every region, the unemployment rate for individuals with impairments is continuously greater than that of those without. In Europe, the unemployment rate for individuals with impairments is particularly high, which is consistent with regional trends. The problem is made worse by gender disparity since women have greater unemployment rates, especially in Africa, where the figure is 20% for African women compared to 10% for men. Asia, on the other hand, has a comparatively lower gender gap (7% for women compared to 4% for males) and the lowest unemployment rate (5%). These trends demonstrate the necessity of focused strategies that address demographic and regional differences in employment, with a particular emphasis on gender inequality and impairments. The employment data for persons (Fig.1) with disabilities shows distinct sectoral and temporal patterns. The service sector dominates employment opportunities, with education and health services leading at 22.2%, followed by retail trade (13%) and professional services (12%). Manufacturing and leisure sectors each contribute about 10% of employment, while primary industries like mining and agriculture show minimal employment shares below 2%.

Unemployment trends for persons with disabilities have shown significant improvement over the past decade, declining from a peak of 15% in 2011 to 7.2% in 2023, (Fig.2) despite a temporary spike to 12.6% during the 2020 pandemic. Global comparisons reveal notable regional variations, with European countries like Serbia and Spain showing higher unemployment rates compared to Asian and African nations. Most notably, there exists a consistent pattern across regions where persons with disabilities face approximately double

the unemployment rate compared to those without disabilities, highlighting persistent employment challenges for this demographic group.

Fig. 1 Share of employment of disabled in the United States in 2023, by industry

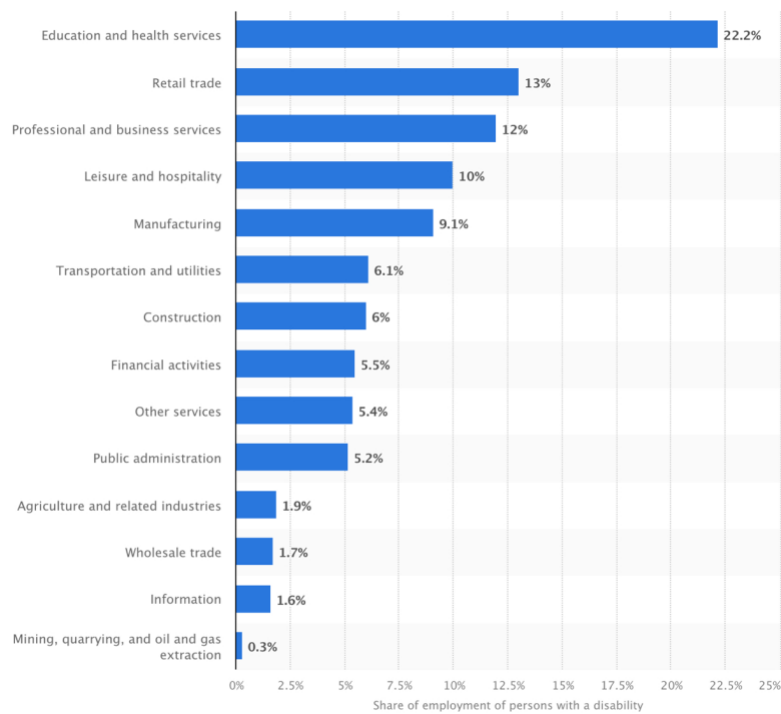
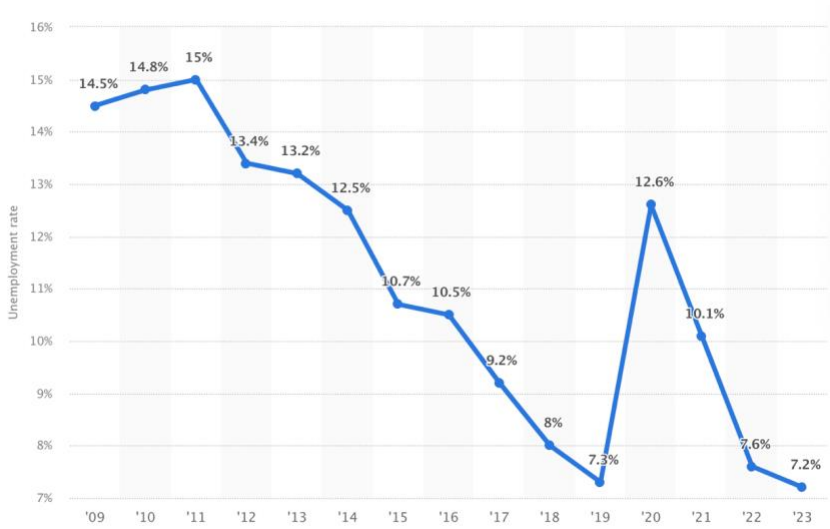


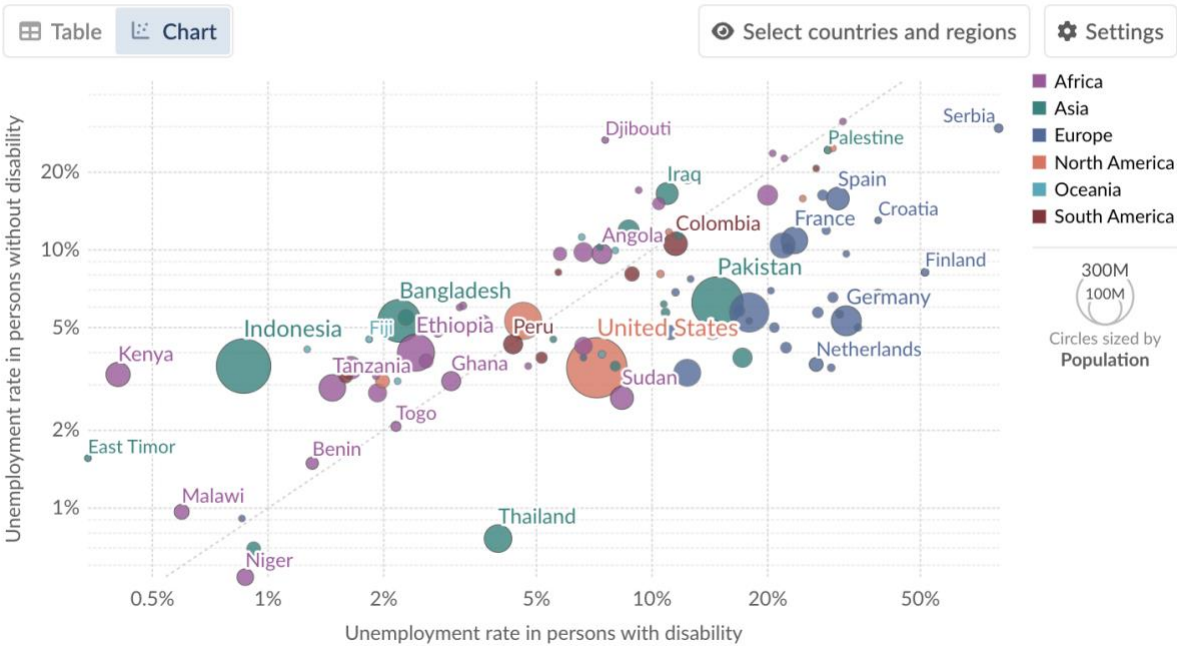
Fig.2 Unemployment rate of disabled in the United States from 2009 to 2023



Unemployment rate in people with vs. without disability, 2023

Unemployment refers to individuals of working age (typically 15 years and over) currently unemployed but actively seeking work. A person with a disability is defined as someone limited in the kind or amount of activities they can do due to a long-term health problem.

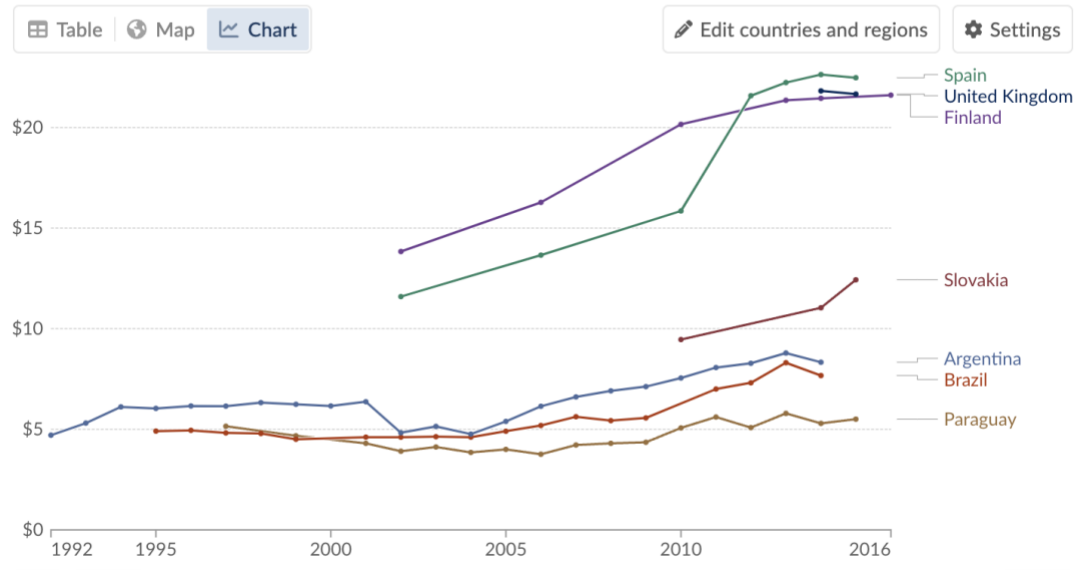
Our World
in Data



Average hourly earnings of employees, 1992 to 2016

Earnings are defined as in-cash and in-kind payments to employees at regular intervals for time worked or work done together with remuneration for time not worked, such as annual vacation, other paid leave, or holidays. This data is adjusted for inflation and differences in the cost of living between countries.

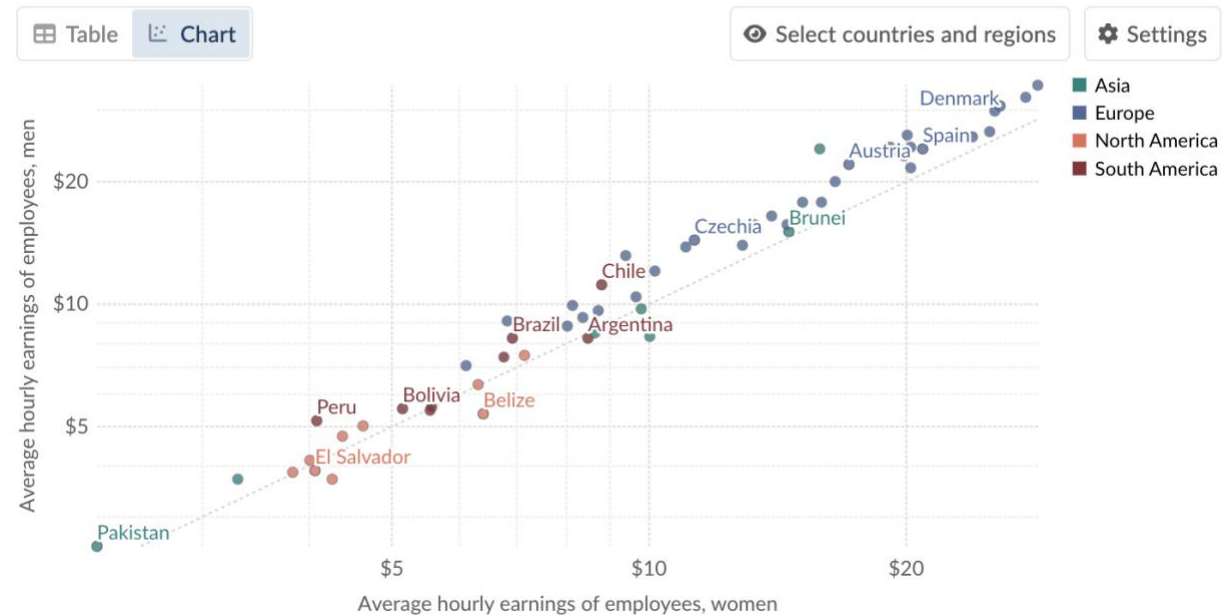
Our World in Data



Average hourly earnings of male and female employees, 2016

This data is adjusted for inflation and differences in the cost of living between countries.

Our World in Data



5. *Feature Engineering:*

To better analyze equal pay and employment quality for Indicator 8.5.1 and 8.5.2, we can create two features. The Female-to-Male Earnings Ratio will compare women's earnings to men's, showing the gender pay gap, with a ratio of 1 indicating equal pay. A ratio below 1 indicates a disparity. For employment quality (Indicator 8.5.2), the Employment Quality Index combines factors like Income Level (higher income equals a better score), Job Stability (more stable jobs score higher), and Job Type (full-time jobs get higher scores than part-time or casual work). These features will help analyze disparities in pay and job quality across regions and demographics.

6. *Predictive Modeling:*

Predictive modeling helps forecast trends in employment and earnings. Regression models predict factors such as the pay gap by gender or unemployment rates based on factors such as education or economic policies. It may provide an estimate of how wage disparities are influenced by changes in education levels. Classification models predict the likelihood of unemployment by classifying individuals into groups with features such as gender, age, or disability status. These models help policymakers with employment patterns and identify key factors in influencing equal pay and decent work. They give guidance toward inequalities and improved employment outcomes as they predict future trends.

7. *Data Visualization*

Data visualization is a powerful technique that summarizes complex trends related to employment, earnings, and inequality. It helps in summarizing key insights, including those of the gender pay gap across different regions or the extent of disability status and its connection to unemployment rates. Through this technique, bar charts line graphs, and scatter plots reveal patterns; heatmaps show its correlation and make data more interactive and usable. These visualizations allow decision-makers to better understand the disparities in order to undertake targeted policy initiatives that promote equal pay and full employment. Visualizations simplify information and clarify where labor markets need improvement.

Ethical Implications:

The ethical consequences of unequal opportunities in employment because of age, gender, and disability are vital in realizing SDG 8, which emphasizes "decent work and economic growth." Discrimination within the workforce is against fairness and the full realization of individual potential, hence limiting productivity and extending economic inequalities. For instance, gender pay gaps and lack of job access for persons with disabilities prevent full labor market participation, which stifles growth at both individual and general economic levels. It ensures a supply of inefficient resources by shutting out competent workers on grounds irrelevant to productivity. Such discriminatory practices might also be illegal and involve violations of legislation related to workers' rights, and could even lead to business implications, including legal and reputational repercussions. It means equal opportunities for all employees irrespective of

age, gender, or disability will make the workforce more ethical, inclusive, and productive, which directly contributes to the goals of SDG 8.

Conclusion:

This will lead to fostering an inclusive and equitable labor market that ensures continued economic growth with social stability. Reaching the targets of SDG 8.5.1 and 8.5.2 becomes highly important. Using the Data Science Life Cycle, critical employment data analysis will lead to the detection of patterns in inequality and find intervention opportunities. This approach gives actionable insights into closing gender pay gaps, improving the quality of employment, and making the workforce more inclusive through strong predictive modeling, data visualization, and ethical considerations. This helps in addressing disparities in benefits accruing from economic progress for all, a proposition advanced in the overarching mission of Sustainable Development Goal 8.

CITATIONS:

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Brenda Gannon a, a, b, AbstractThis paper estimates the level of explained and unexplained factors that contribute to the wage gap between workers with and without disabilities, Adams, S., Even, W., Kidd, M., Acemoglu, D., Baldwin, M., Becker, G., Cotton, J., DeLeire, T., Gannon, B., Gujarati, D. N., & Heckman, J. (2009, May 21). *Age and disability: Explaining the wage differential*. Social Science & Medicine.
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