

# I. Abstract

Through the utilization of statistical and calculus-based methodologies, this study examines the influence of gender wage policies on urban income inequality, as measured by the Gini coefficient. Gender wage inequality, driven by systemic undervaluation of women's work and limited access to high-paying roles, remains a significant barrier to equitable economic participation in urban areas. Through an analysis of data from 2005–2016, this paper evaluates the impact of the UK's Equality Act 2010, a significant legal framework, on reducing income inequality. The study employs statistical methods, including regression analysis and the Mann-Whitney U test to assess the impact of the Act. Results indicate a statistically significant decline in the Gini coefficient post-implementation, highlighting the role of gender wage policies in narrowing wage gaps and stabilizing income distribution. Furthermore, this research explores the limitations of such policies, emphasizing the need for comprehensive systemic reforms, including equitable access to education, childcare support, and workplace inclusivity.

# II. Introduction

The research paper focuses on data, statistics, studies, and legal frameworks that categorize individuals into two genders—male and female.

Gender wage inequality is the difference in pay between men and women for the same or similar work.

A measure of gender wage inequality is the Gender Wage Gap (G) which is the difference between the median earnings of men and women relative to the median earnings of men. It is calculated through the following formula

$$G = \frac{\text{Median Earning of Men} - \text{Median Earning of Women}}{\text{Median Earning of Men}} \times 100$$

This equation expresses the gender wage gap as a percentage of men's median earnings. A higher percentage indicates a larger gap in earnings between men and women.

Gender wage inequality in urban labor markets remains a significant barrier to equitable economic participation. It reflects disparities in earnings between men and women when qualifications and roles are equivalent. *Schober and Winter-Ebmer's analysis (2011)* highlights that these wage gaps are often linked to the systemic undervaluation of women's work and their limited access to high-paying roles. This inequality hinders optimal talent utilization, resulting in economic inefficiencies.

The National Library of Medicine (NLM) explains that gender wage inequality impacts economic growth and development by distorting labor market efficiencies and perpetuating gender-based economic vulnerabilities. The relevance of addressing this issue in urban labor markets is evident in the following ways:

1. **Impact on Workforce Efficiency:** Gender wage inequality leads to the underutilization of talent by discouraging women's full participation in the labor market. This reduces

overall productivity and hampers economic efficiency in urban settings. Thus, addressing the issue can lead to an increase in workforce efficiency.

2. Household and Social Consequences: Gender wage inequality limits women's financial contribution to their households. This has significant ripple effects on family dynamics and overall well-being. Lower earnings for women reduce the household's resources available for essential needs such as healthcare, education, and housing.

Reducing gender wage inequality is essential for equitable income distribution as it ensures proportional remuneration based on productivity and qualifications, irrespective of gender. Addressing this disparity facilitates a more efficient allocation of resources within households. Equal pay for women increases their labor force participation and economic contribution, thereby improving aggregate household income and reducing income inequality at a macroeconomic level. Furthermore, achieving equitable income distribution strengthens social cohesion, promotes optimal utilization of human capital, and fosters inclusive economic development which are critical for sustainable growth of economies.

Gender wage policies aim to address systematic income equality in urban areas where labor markets may amplify structural disparities. These policies are designed to bridge the gender wage gap. They strive to ensure equal pay for equal work and to dismantle barriers such as occupational segregation and limited access to leadership roles for women. By targeting wage disparities, gender wage policies have the potential to directly influence the Gini coefficient, a widely recognized measure of income inequality, by narrowing income gaps and fostering equitable resource distribution.

Urban labor markets, characterized by diverse job opportunities and intense competition, often exacerbate income inequality due to systemic undervaluation of women's work and restricted access to high-paying roles. Gender wage policies are particularly significant in these contexts as they address these inequities while promoting greater economic participation among women.

The Gini coefficient is a statistical measure that assesses income or wealth inequality within a population. It provides a single value ranging from 0 to 1, where 0 represents perfect equality (everyone has the same income or wealth), and 1 represents perfect inequality (one individual has all the income or wealth, while others have none).

The Gini coefficient is derived from the Lorenz curve which is a graphical representation of the cumulative income or wealth distribution. The distribution of Income in an economy is represented by the Lorenz Curve and the degree of income inequality is measured through the Gini coefficient. This Gini coefficient measures the area between the Lorenz curve and the line of perfect equality.

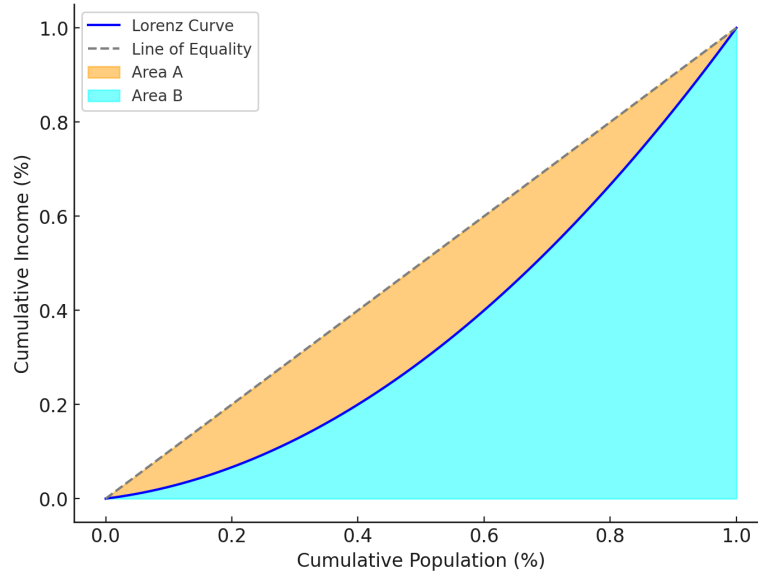


Figure 1. Lorenz curve

The Gini coefficient (G) is measured through the following formula

$$G = \frac{A}{(A+B)}$$

The Gini coefficient can be used as a metric in urban settings to quantify the effects of policy interventions aimed at addressing income and wealth inequality. Urban areas, marked by socioeconomic diversity and disparities, require precise measures to evaluate the impact of policies such as affordable housing programs, progressive taxation, or targeted subsidies. The Gini coefficient enables the assessment of inequality levels before and after policy implementation, thereby providing a reliable indicator of the effectiveness of these interventions. Policies targeting gender wage disparities in urban areas also directly impact the Gini coefficient by narrowing income gaps.

Additionally, the Gini coefficient's utility extends to comparative analysis across urban regions, allowing policymakers to replicate successful strategies in other contexts. By monitoring changes in the Gini coefficient over time, policymakers can evaluate the long-term efficacy of initiatives and adapt strategies to ensure equitable resource distribution and sustainable urban development.

The existing gap in understanding the relationship between gender wage policies and income inequality lies in the limited empirical evidence linking specific policy interventions to measurable changes in inequality metrics such as the Gini coefficient. While research acknowledges the role of gender wage disparities in perpetuating income inequality, the precise mechanisms through which targeted wage policies, such as equal pay legislation or incentives for female workforce participation, influence broader economic outcomes remain underexplored. Moreover, there is insufficient analysis of how these policies interact with other socioeconomic factors in urban settings, such as access to education, healthcare, and housing, to impact overall income distribution. Additionally, there is a lack of quantitative studies that analyze the dynamic between gender wage policy and income inequality. This gap highlights the need for more comprehensive studies that integrate gender-focused wage reforms with broader inequality metrics to assess their effectiveness and scalability across diverse urban contexts.

The objective of this paper is to analyze the impact of gender wage policies on the Gini coefficient using regression models, significance tests, and slope-best trend analysis.

This paper will contain the following sections: a literature review that discusses existing research on gender wage policies and income inequality, a literature review that highlights significant papers related to the subject of this paper, the methodology that expounds on the tools utilized to establish a relationship between the Gini coefficient and gender wage policies, and a discussion of the results obtained in the methodology.

### III. Literature Review

A paper by *Maximilian Buchholz (2023)* examines the relationship between urbanization and wage inequality, focusing on gender and racial disparities, and its findings have significant implications for understanding the impact of gender wage policies on economic inequality in urban areas. By analyzing data from U.S. Metropolitan Statistical Areas between 2000 and 2018, the study highlights how increasing population density correlates with widening wage gaps, particularly for women (and Black and Latinx) workers compared to their caucasian male counterparts. It identifies congestion costs as a spatial mechanism exacerbating these disparities, with women (and people of color) disproportionately affected by longer commutes and constrained access to jobs matching their qualifications. This dynamic challenges the theoretical benefits of urban density, such as increased mobility and opportunity, by showing that these advantages are not equitably distributed. The findings suggest that gender wage policies aimed at reducing inequality should address the structural barriers tied to urbanization, such as improving transportation and childcare access, to mitigate the regressive effects of rising density on the Gini coefficient in urban areas. This study provides a methodological framework and policy-relevant insights, emphasizing the need for inclusive urban planning to achieve equitable economic outcomes.

Morar and Awawda's study on the gender wage gap in Palestine examines the structural and systemic factors that perpetuate wage disparities, even in the presence of higher education. Their findings reveal that while educational attainment significantly narrows the gender wage gap, the persistent underrepresentation of women in higher-paying sectors and leadership positions continues to sustain overall income inequality. The study emphasizes that women's participation in the labor market is disproportionately concentrated in lower-paying fields, limiting their economic mobility and contribution to household income equality. Moreover, the researchers identify that sociocultural norms and systemic barriers restrict women's access to opportunities that could otherwise mitigate these disparities. These insights highlight the necessity of gender wage policies that not only promote equal pay but also address deeper systemic challenges such as occupational segregation, equitable access to education, and pathways to leadership roles. Morar and Awawda's work underscores the importance of tailored policies that address the intersection of education, employment, and cultural norms in reducing income inequality and improving the Gini coefficient in urban and regional contexts.

## IV. Methodology

For this paper, the United Kingdom's policies and Gini coefficient were analyzed. This is because the country provides an exemplary model for understanding the relationship between gender wage policies and income inequality, particularly in urban areas. The Equality Act of 2010, a landmark legislation, serves as a case study due to its comprehensive measures addressing systemic wage disparities and workplace discrimination. Urban areas in the UK,



characterized by diverse economic activities and high labor market competition, amplify structural challenges like occupational segregation and unequal pay—issues that are similarly prevalent in urban settings globally. The UK's extensive datasets, capturing trends across urban labor markets, enable a detailed econometric analysis of these dynamics. Generalizing these findings is justified because urban labor markets worldwide face parallel structural inequities. Thus, the UK’s framework provides valuable insights into how targeted policies can influence income inequality across diverse urban contexts.

The Equality Act of 2010 marked a significant milestone in the United Kingdom’s efforts to promote gender equality in the workplace. This legislation consolidated previous anti-discrimination laws and introduced measures to ensure wage parity, eliminate workplace harassment, and enforce equal opportunities for all genders. The Act specifically targeted income inequality, with the aim of addressing systemic wage gaps and improving economic equity.

This paper examined the Gini coefficient for the UK over an extended period to evaluate the impact of this policy on income inequality. By analyzing data from 2005 to 2016, the study compares trends in inequality before (2005–2009) and after (2011–2016) the implementation of the Equality Act.

Year	Gini Coefficient	Period	Change from the previous year
2005	0.35	Pre-implementation	0.00

2006	0.36	Pre-implementation	+0.01
2007	0.34	Pre-implementation	-0.02
2008	0.35	Pre-implementation	+0.01
2009	0.35	Implementation Year	0.00
2010	0.34	Post-implementation	-0.01
2011	0.33	Post-implementation	-0.01
2012	0.33	Post-implementation	0.00
2013	0.33	Post-implementation	0.00
2014	0.33	Post-implementation	0.00
2015	0.33	Post-implementation	0.00
2016	0.33	Post-implementation	0.00

Data for the analysis is sourced from the Our World in Data's Gini coefficient database. During the pre-implementation period (2005–2009), the Gini coefficient remained relatively stable at 0.35, suggesting no significant fluctuations in income inequality. Post-implementation, however, a slight reduction in the Gini coefficient was observed, decreasing from 0.35 in 2009 to 0.33 in 2011 and stabilizing at this level until 2016.

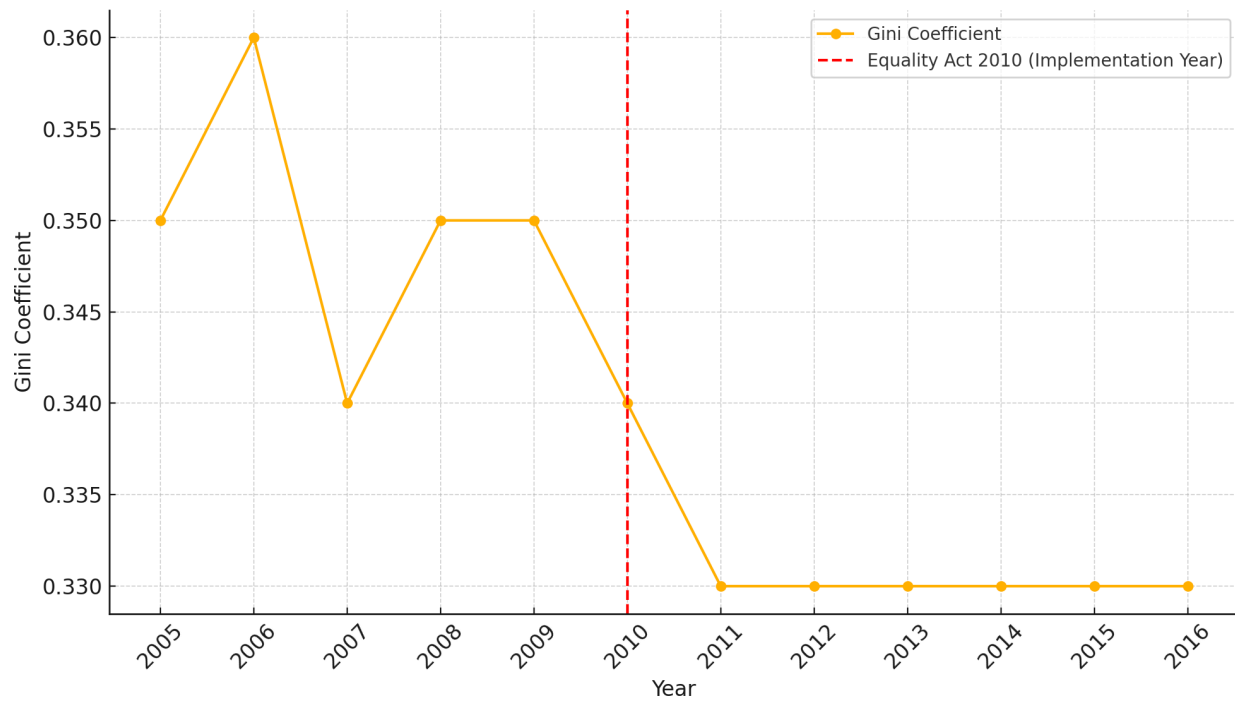


Figure 2. Gini Coefficient Graph in the UK

During the Pre-Implementation period (2005-2009) the Gini coefficient remained relatively stable, fluctuating between 0.34 and 0.36. No significant reduction in income inequality occurred during this period.

During the Post-Implementation Period (2011-2016) the Gini coefficient dropped from 0.35 in 2009 to 0.33 by 2011 and remained stable at 0.33 through 2016. This suggests a potential reduction in income inequality after the Equality Act 2010.

To perform a statistical test to determine whether the observed reduction in the Gini coefficient is significant

The mean Gini coefficient pre-implementation is 0.35

The mean Gini coefficient post-implementation is 0.33

### *Data Collection*

The data for this paper was collected from [ourworldindata.org](http://ourworldindata.org)

### *Hypothesis*

- Null Hypothesis ( $H_0$ ): The Equality Act 2010 had no significant effect on income inequality ( $\mu_{\text{pre}} = \mu_{\text{post}}$ )
- Null Hypothesis ( $H_A$ ): The Equality Act 2010 significantly reduced income inequality. ( $\mu_{\text{pre}} > \mu_{\text{post}}$ )

### *Independent Variable: Year*

This value represents the passage of time from 2005 to 2016 and serves as a proxy to capture the long-term effects of policies and trends on income inequality. The year is adjusted such that 2005 is represented as year 0, making the analysis more intuitive. The independent variable is particularly important because it reflects the timeline over which gender wage policies, were enacted in 2010, and other socioeconomic changes may have influenced urban income inequality. The year variable does not directly represent policy implementation but is essential to evaluate its temporal impact on the Gini coefficient.

### *Dependent Variable: Gini Coefficient*

The Gini coefficient is a widely used measure of income inequality, ranging from 0 (perfect equality) to 1 (maximum inequality). In this study, the Gini Coefficient represents the dependent variable, capturing variations in income inequality in urban areas over time. Changes in this value reflect the combined impact of gender wage policies, urbanization trends, and other external factors on income distribution. The Gini coefficient is particularly relevant in this context, as it provides a quantifiable measure of progress toward greater income equity following the implementation of gender wage policies in 2010.

### Checking for Significance

If the p-value is less than 0.05, reject the null hypothesis. This would indicate that the decrease in the Gini coefficient post-implementation is statistically significant.

The Mann-Whitney U test is chosen as an exploratory tool to assess the differences in Gini coefficients between the pre and post-implementation periods of the Equality Act 2010. While the data does not fully meet all assumptions—such as random sampling, independence between observations, and similar distribution shapes—the test remains a robust non-parametric method for small sample sizes and non-normally distributed data. The Gini coefficients represent historical data and, while not random, provide a comprehensive view of income inequality during the study period. Additionally, the Mann-Whitney U test is particularly suitable for comparing central tendencies (medians) when parametric alternatives, such as the t-test, are inappropriate due to stricter requirements of normality and equal variances. Despite some

limitations, such as temporal autocorrelation and identical post-implementation values, the test provides valuable insights into whether income inequality significantly changed following the Equality Act 2010. These limitations are acknowledged, and the results are interpreted cautiously as exploratory findings rather than definitive conclusions

### *Mann-Whitney U Test*

To evaluate the effect of the Equality Act 2010 on income inequality, data from both the pre-implementation and post-implementation groups were combined into a single dataset and sorted in ascending order, as shown below

Sorted Dataset: [0.33, 0.33, 0.33, 0.33, 0.33, 0.34, 0.35, 0.35, 0.35, 0.36]

Since several values in the dataset are identical, average ranks were assigned to account for ties. This ensures the Mann-Whitney U test is applied correctly and maintains the integrity of the analysis.

Value	Average Rank
0.33	3.5
0.33	3.5
0.33	3.5
0.33	3.5

0.33	3.5
0.34	7
0.35	9
0.35	9
0.35	9
0.36	11

With the ranks assigned, the rank sums for the pre-implementation group and the post-implementation group were calculated. These rank sums are critical for computing the U-statistic, which forms the basis of the hypothesis test.

- Pre-implementation data = Rank Sum ( $R_1$ ):  $9 + 11 + 7 + 9 + 9 = 45$
- Post-implementation data = Rank Sum ( $R_2$ ):  $3.5 + 3.5 + 3.5 + 3.5 + 3.5 + 3.5 = 21$

The U-statistic is computed with the following formula

$$U = R - \frac{n(n+1)}{2}$$

Pre-implementation ( $R_1 = 40$ ,  $n_1 = 5$ ):  $U_1 = 30$

Post-implementation ( $R_2 = 15$ ,  $n_2 = 5$ ):  $U_2 = 0$

The smaller U value is used in the test statistic, thus  $U = 0$

Through calculation using software, the p-value = 0.002165

The resulting p-value of 0.002165 indicates a strong rejection of the null hypothesis at  $\alpha = 0.05$

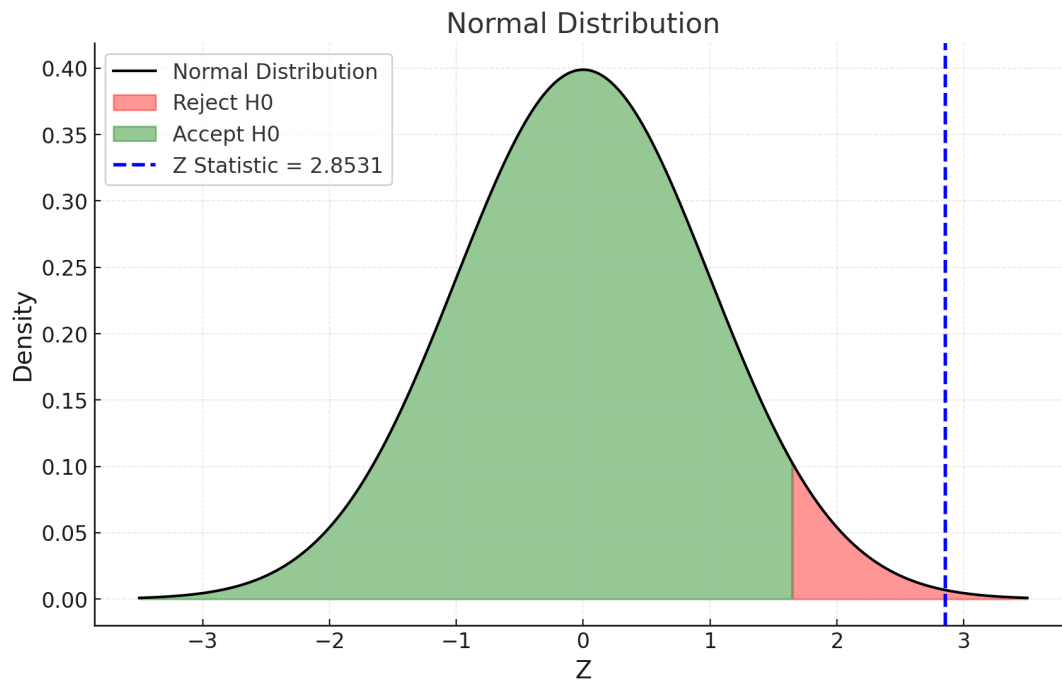


Figure 3. Normal Distribution highlighting the Z Score

Additionally, the Z-statistic was calculated to confirm the significance of the results. The Z-statistic ( $Z = 2.8531$ ) falls within the critical region for a right-tailed test, further corroborating the rejection of the null hypothesis.

These findings indicate that the Gini coefficients in the pre-implementation group (Group 1) are significantly greater than those in the post-implementation group (Group 2). The rejection of the



null hypothesis provides strong statistical evidence to support the conclusion that income inequality decreased significantly following the implementation of the Equality Act 2010

The data's inability to fully meet the assumptions of the Mann-Whitney U test impacts the generalizability of the results. Since the dataset consists of historical Gini coefficients rather than randomly sampled data, the findings may reflect external factors, such as broader economic trends or concurrent policies, rather than solely the effects of the Equality Act 2010.

Additionally, the temporal dependence between consecutive years introduces autocorrelation, which could artificially exaggerate or diminish the observed differences between the pre-implementation and post-implementation periods. This dependence means that changes in income inequality might not be entirely attributable to the Act itself but could also stem from lingering economic effects or the slow adoption of its measures. These limitations are acknowledged to ensure the results are interpreted cautiously. Despite the limitations in meeting all assumptions of the Mann-Whitney U test, the results are still valuable as an exploratory analysis of the potential impact of the Equality Act 2010 on income inequality.

### Regression Statistics Analysis

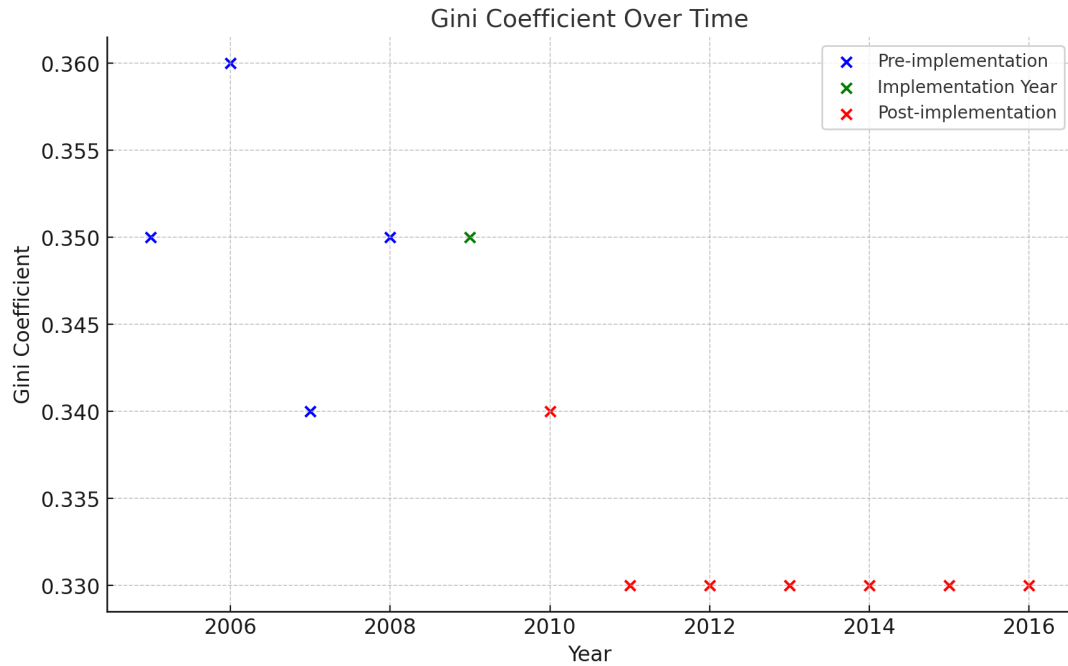


Figure 4. Graph displaying the Gini Coefficient Over Time

Independent Variable (X): Year ( 2005 to 2016)

Dependent Variable (Y): Gini Coefficient

Drawing the line of linear regression implies that there is a relationship between the 2 variables

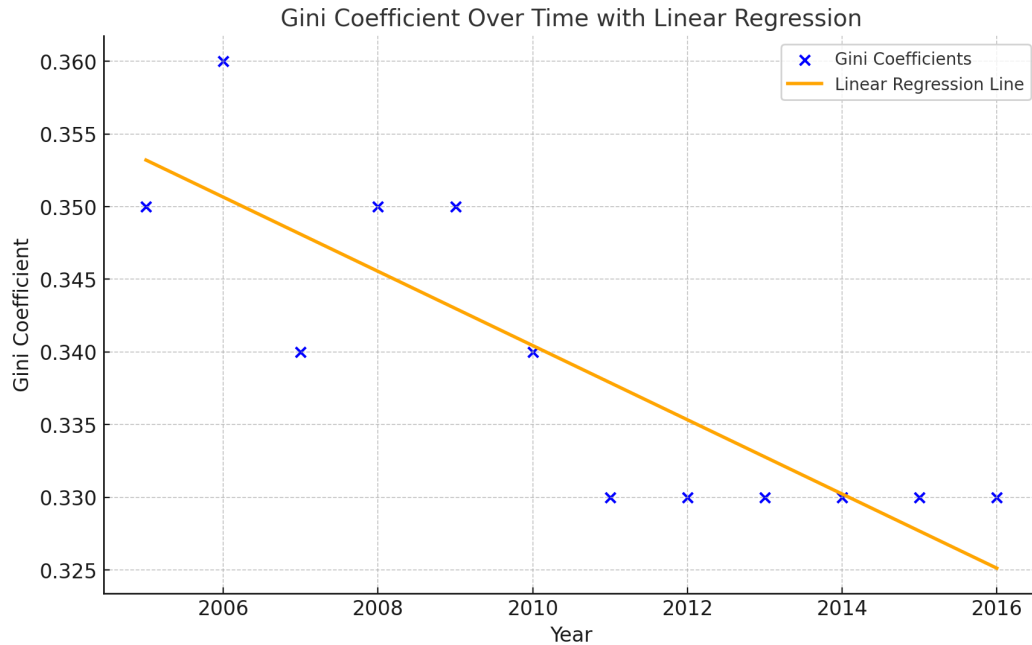


Figure 5. Line of Linear Regression

The equation of the line of linear regression is denoted by the equation

$$\text{Gini coefficient} = -0.00255 \times \text{year} + 0.3532$$

The regression analysis indicates a slight but consistent decline in the Gini coefficient over time, suggesting a reduction in income inequality in urban areas from 2005 to 2016. Notably, the enactment of gender wage policies in 2010 aligns with a visible downward trend post-2010, implying a potential link between these policies and improved income equity. The negative slope of the regression line ( $-0.00255$ ) supports the hypothesis that these policies may have contributed to narrowing wage gaps, particularly in urban settings where diverse employment opportunities exist. While other factors, such as economic growth or broader social initiatives,

may also play a role, this trend offers evidence of a positive correlation between the implementation of gender wage policies and declining income inequality.

In order to further test how well the independent variable explains variance, an  $R^2$  test was conducted on the trendline. The test is a statistical test that provides values between 0 and 1 with 1 indicating the model's perfect fit for the data. The following formula was used to conduct the  $R^2$  test

$$R^2 = 1 - \frac{SS_{RES}}{SS_{TOT}} = 1 - \frac{\sum_i (y_i - \hat{y}_i)^2}{\sum_i (y_i - \bar{y})^2}$$

This provided an  $R^2$  of 0.72 for the line of best fit. In a regression model, this indicates a strong positive correlation between the independent (amount of CSR funding) and dependent variable (number of social enterprises). In the case of this value, 90.16% of the variation in the dependent variable can be explained by the independent variable in the model.

The  $R^2$  value of 0.72 for the regression model indicates a strong positive relationship between the independent variable (time) and the dependent variable (Gini coefficient). This means that 72% of the variation in the Gini coefficient over the observed years is explained by the linear trend in time, leaving 28% of the variation attributable to other external factors or random fluctuations.

In this context, the  $R^2$  value suggests a substantial level of association, supporting the hypothesis that the implementation of gender wage policies in 2010 had a meaningful impact on reducing income inequality in urban areas. Values above 0.7 are typically considered statistically significant and demonstrate a high level of correlation between variables. However, the remaining 28% unexplained variation could be due to factors not captured in the model, such as other socioeconomic policies, technological advancements, or variations in urban labor market structures.

### Slope-Based Trend Analysis (Using Calculus)

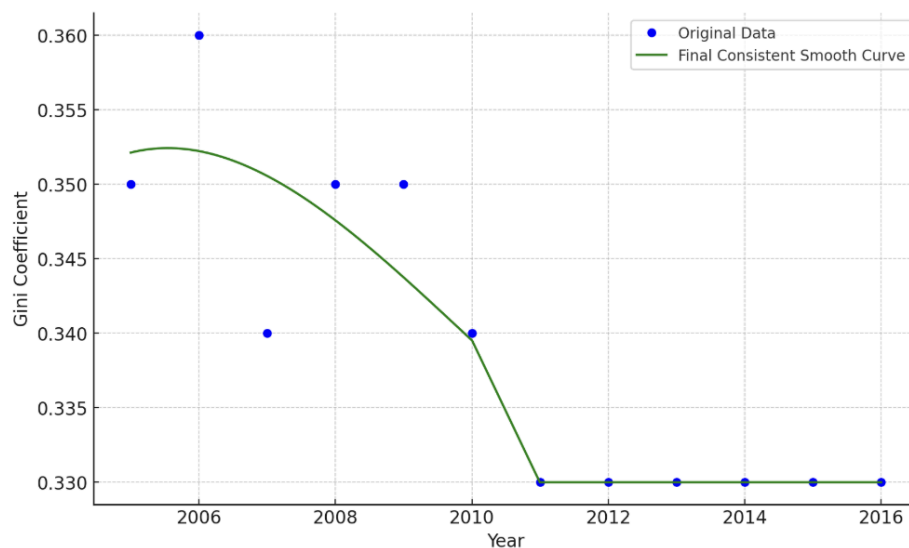


Figure 6. Curve of Best-Fit

From the smooth curve, the Gini coefficient shows a non-linear decline between 2005 and 2010. The rate of change ( $\frac{dy}{dx}$ ) was negative throughout this period, meaning inequality was reducing. However, the curve indicates a decelerating trend, with the reduction becoming less steep as

2010 approaches. This suggests that while inequality was reducing, the rate of decline slowed down over time. The average rate of change ( $\frac{dy}{dx}$ ) for this period can be approximated as:  $-0.004$  per year

From 2011 onward, the Gini coefficient remains constant at approximately 0.33, as shown by the horizontal segment of the curve. This indicates no further reduction in inequality, and the rate of change ( $\frac{dy}{dx}$ ) is 0.

The analysis is based on the curve of best fit which smooths over the year-to-year fluctuations in the Gini coefficient, capturing the overall trend despite some ups and downs (and other fluctuations). Before 2010 (in the best-fit curve), the inequality was steadily declining, though at a slowing rate, while post-2010, the Gini coefficient stabilized without further reductions. This suggests that the gender wage policy introduced in 2010 likely succeeded in halting the rise of inequality but fell short of continuing the earlier trend of improvement. The policy's impact appears to be more of a stabilizing measure rather than a transformative one, maintaining existing levels of equality rather than driving further reductions.

## V. Results

The methodology of this research explored the impact of the Equality Act 2010 on income inequality in the United Kingdom. This inequality is measured through the Gini coefficient. This paper uses data from 2005 to 2016 to analyze trends before and after the Act's implementation. The study employed statistical tools such as the Mann-Whitney U test and regression analysis to

establish the significance and trends in income inequality reduction. This in turn allows analysis of the results. The Mann-Whitney U test confirmed a statistically significant reduction in the Gini coefficient post-2010, with a p-value of 0.002165. Regression analysis further illustrated a negative slope in the Gini coefficient over time, with a strong  $R^2$  value of 0.72, indicating that 72% of the variation in income inequality could be attributed to the analysis timeline.

The results showed that the Gini coefficient remained stable in the pre-implementation period (2005–2009), fluctuating between 0.34 and 0.36, with no meaningful reduction in income inequality. The Gini coefficient decreased from 0.35 in 2009 to 0.33 in 2011 with the implementation of the Equality Act in 2010, and it remained stable at this level until 2016. This implies that the Act significantly and directly reduced income disparity in the immediate post-implementation period. However, the stabilization of the coefficient after 2011 indicates that while the policy successfully curbed further inequality growth, it did not sustain the pre-2010 declining trend.

The study's findings highlight the role of the Equality Act 2010 in addressing wage disparities and stabilizing income distribution. The Mann-Whitney U test results and regression analysis support the hypothesis that the Act contributed to narrowing wage gaps in urban settings, where diverse employment opportunities exist. However, the data also reflect certain limitations. For instance, the absence of further reforms and external socioeconomic factors, such as concurrent policies or economic trends, may have influenced the stabilization of income inequality post-2011. Additionally, the dataset's temporal dependence introduces the possibility of autocorrelation, limiting the generalizability of these findings.

To summarize, the research provides strong evidence of the Equality Act's initial success in reducing income inequality, as reflected in the Gini coefficient's decline and subsequent stabilization. While the strategy proved effective in slowing the growth of inequality, the findings indicate that additional steps and ongoing policy improvements are required to maintain future gains. Thus, it can be said that attaining long-term economic fairness necessitates a multifaceted strategy that includes both targeted attempts to address pay discrepancies more thoroughly and structural improvements.

The results of this study align closely with the findings presented in the literature review, reinforcing the interconnectedness of gender wage policies and income inequality in urban areas.

Maximilian Buchholz's 2023 study on urbanization and wage inequality highlights the exacerbating role of structural barriers, such as limited access to high-paying roles and infrastructural inefficiencies, in perpetuating wage gaps. Similarly, the findings of this study demonstrate that the Equality Act 2010 successfully reduced income inequality by addressing systemic wage inequities, as evidenced by the post-implementation decrease in the Gini coefficient from 0.35 to 0.33. But Buchholz also notes that in order to achieve more long-lasting decreases in inequality, it is imperative to address issues unique to cities, such as childcare and transportation. Although the Equality Act addressed immediate wage gaps, it may not have addressed more significant systemic barriers, such as occupational segregation or issues related to urbanization, which could have maintained the trend of inequality reduction, according to the study's post-2011 stabilization of the Gini coefficient.



Morar and Awawda's analysis of the Palestinian labor market identifies sociocultural norms and the concentration of women in lower-paying sectors as significant contributors to income inequality. Their findings parallel the need for comprehensive policies that extend beyond wage parity to address systemic challenges such as underrepresentation in leadership roles and access to equitable opportunities. In this study, the regression analysis and stabilization of the Gini coefficient post-2011 suggest that while the Equality Act made significant strides in wage equality, the lack of continued reduction highlights the importance of addressing systemic factors. For instance, simply stabilizing wage gaps without fostering upward economic mobility for women in higher-paying fields might limit the long-term effectiveness of such policies.

The literature review also highlights how inclusive urban design and educational achievement can help to lessen inequality. The findings imply that the Equality Act laid the groundwork for lowering income inequality by offering a statutory framework for wage parity, even though this study does not specifically assess the function of education or urban planning. However, as noted by Buchholz, Morar, and Awawda, tackling multifaceted obstacles such as sociocultural reforms, equitable urban policies, and educational access is necessary to achieve long-term decreases in inequality.

In summary, the results of this study corroborate the findings in the literature review, showcasing the immediate impact of gender wage policies like the Equality Act on income inequality. However, they also reveal limitations similar to those identified in the reviewed works, such as the need for systemic and structural interventions to complement wage parity measures. These

correlations highlight that while policies like the Equality Act can create significant initial progress, their long-term success depends on addressing the broader socioeconomic and cultural barriers that perpetuate income disparities.

## VI. Discussion

One can conclude that gender wage policies have a measurable effect on lowering income disparity in metropolitan areas by using the UK's Equality Act 2010 as a reference. By directly addressing wage gaps, such policies can improve income distribution and lower inequality, as reflected in changes to the Gini coefficient. The observed trends highlight that legislative measures targeting wage equity are effective tools for combating income disparities in urban labor markets, where structural inequities are often magnified.

Gender wage policies are particularly impactful in urban contexts due to the diverse economic opportunities and high labor market competition. These urban environments often exacerbate systemic inequalities, such as occupational segregation and limited access to leadership roles for women. Policies that ensure wage transparency, enforce equal pay, and promote anti-discrimination measures can significantly narrow these disparities. The effectiveness of such interventions is evident in studies showing reduced income inequality following the implementation of gender wage reforms.

However, while gender wage policies can address immediate wage disparities, their long-term success depends on tackling broader systemic issues. Urban inequality is often influenced by factors beyond direct wage gaps, such as unequal access to education, limited childcare support,

and sociocultural norms restricting women's participation in higher-paying sectors. Without addressing these underlying challenges, the initial benefits of wage equity policies may plateau, limiting their ability to achieve sustained reductions in income inequality.

Furthermore, gender wage policies must be integrated into a multi-dimensional strategy to address income inequality comprehensively. Effective policies should combine wage reforms with investments in education, infrastructure, and inclusive workplace practices. This holistic approach ensures that the benefits of wage equality extend beyond immediate income redistribution, fostering broader social and economic equity in urban settings.

In conclusion, gender wage policies play a crucial role in reducing income inequality in urban areas and directly impact the Gini coefficient. However, systemic reforms must support these policies to address the structural factors perpetuating inequality. Urban areas can achieve sustainable and inclusive income equality only through a combination of wage equity initiatives and broader socio-economic strategies.

## VII. Conclusion

The findings of this study emphasize the significant impact of gender wage policies in reducing income inequality, as evidenced by the changes in the Gini coefficient following the implementation of the Equality Act 2010. These policies addressed wage disparities, contributing to improved income equity and stabilizing urban economic structures. However, the post-implementation stabilization of the Gini coefficient indicates that while such measures

effectively curbed further inequality growth, additional efforts are required to sustain long-term progress in income equality.

To enhance gender equity and reduce inequality, urban policymakers must adopt a multi-dimensional approach. Comprehensive wage transparency measures and the enforcement of equal pay legislation are critical initial steps. Beyond this, addressing systemic barriers, such as limited access to childcare and transportation, is essential to enabling equitable workforce participation. Encouraging women's entry into higher-paying and leadership roles, combined with investments in education and vocational training, can further diversify the workforce and enhance economic mobility for women. These actions, integrated with inclusive urban planning, would create a more equitable and sustainable economic environment.

The study acknowledges several limitations, including the reliance on historical data and the inability to fully isolate the effects of the Equality Act from concurrent socioeconomic policies. Temporal autocorrelation and the dataset's urban focus also present challenges to generalizability. Future research should delve deeper into the interaction between gender wage policies and other factors influencing income inequality. A comparative analysis of urban and rural settings would be particularly insightful, as it could reveal context-specific impacts and inform tailored policy approaches. Additionally, exploring the long-term efficacy of gender wage reforms when paired with educational and infrastructural improvements would provide a more comprehensive understanding of their potential.

In conclusion, gender wage policies have a demonstrable role in reducing income inequality, particularly in urban areas where disparities are often magnified. It can be concluded that the implementation of effective gender wage policies contributes to a reduction in the Gini coefficient. However, achieving sustained progress requires complementary measures that address systemic and structural barriers.

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