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# Supply, Demand, and Minimum Wage: Unraveling U.S. Wage Inequality from 1963-2021

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**Abstract**

From 1963 to 2021, the U.S. evolved from a manual to a knowledge-based economy, intensifying the wage gap between skilled and unskilled workers. Using the CPS ASEC supplements and building on Autor, Katz, and Kearney (2008), this study contrasts two perspectives: the traditionalist view, associating rising inequality with increased demand for skilled labor, and the revisionist view, which sees it as a one-off event due to declining real minimum wage. Analyzing 90-10 inequality, left-tail (50-10) vs. right-tail (90-50) inequality, and college vs. high-school wage premiums, findings suggest a secular rise in inequality driven by technological innovation and demand for skilled workers from 1963 to 2005. However, from 2005 to 2021, the revisionist claim finds merit, as state-level minimum wage adjustments affect the left tail. This highlights the complex dynamics of wage inequality over this period.

## 1. Introduction

From assembly lines to algorithm-driven platforms, the United States underwent a remarkable change between 1963 and 2021. The country's shift from manual labor to a knowledge and information-powered economy ushered in a new age of prosperity. This shift created winners and losers. While innovative industries and intellectual capital flourished, a widening wage gap separated those with the skills to succeed in the information age from those struggling with economic stagnation.

In the labor economics literature, two distinct viewpoints emerged about the cause of this inequality. The traditionalist view, pioneered by Autor, Katz, and Krueger (1998) and later expanded by Autor, Katz, and Kearney (2008), argues that a rise in demand for skilled workers, driven by rapid technological innovation, caused wage inequality. Revisionists like Card and DiNardo (2002) challenge this view, claiming that wage inequality was a one-time event in the 1980s, mainly from the declining real minimum wage.

This paper replicates Autor, Katz, and Kearney (2008) and extends their analysis to 2021. I analyze data from the March Current Population Survey (CPS) since 1964, covering

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wages from 1963 to 2021. The sample includes full-time/full-year employees, aged 16-64, in private or government sectors with up to 39 years of experience. I adjust this data for composition based on sex, education, and potential experience and use other relevant information, including minimum wage data and PCE.

I examine graphical patterns in weekly wages from 1963 to 2005 to test the traditionalist and revisionist hypotheses. I examine overall 90-10 inequality, left-tail (50-10) vs right-tail (90-50) inequality and college V. high-school wage premium. I also adjust for labor force composition to accurately capture the impact of supply and demand dynamics on wage structures. This ensures that observed wage differentials across time are attributable to genuine changes in wage valuation rather than evolving worker characteristics. Autor, Katz, and Kearney (2008) aim to determine if inequality is a secular phenomenon or a one-time occurrence caused by declining minimum wage. They compare wage patterns between college and high school graduates to test whether institutional factors, like minimum wages, or market forces like, the supply and demand of skilled workers drive wage inequality.

From 1963 to 2005, evidence supports the traditionalist view that inequality grew steadily, not merely as a one-time event. Inequality continues to rise after 1990 as college graduates begin earning significantly more than high school graduates causing the top half's earnings to grow while the bottom half's remain stagnant. These trends indicate a growing demand for skilled college graduates, keeping their wages high. Though a declining minimum wage starting in 1970 kept lower earners' wages low until the late 1980s, the main driver of rising inequality is the need for skilled technical workers due to computerization. From 2005 to 2021, however, the revisionist view holds merit. As states raise minimum wages, the wages of high school dropouts increase slightly faster than other groups, keeping inequality steady.

## 2. Data

I use the Integrated Public Use Microdata Series (IPUMS) to access the Annual Social and Economic supplements to the Current Population Survey (CPS-ASEC) since 1963 to analyze the real weekly earnings of full-time/full-year workers aged 16 to 64. Full-time/full-year workers are those working at least 35 hours per week and 40 weeks per year. The data include variables such as gender, race, age, region, occupation, education, wages, and employment status. Following Autor, Katz, and Kearney (2008), I derive a potential experience variable as the age minus the assigned years of education minus six (the age when one typically enters first grade), rounded to the nearest integer value.

To adjust for the evolving labor force composition over time and also consider race and region effects, I group workers by sex, experience, education, race, and region. The labor force composition consists of 2 genders, 4 potential experience groups , and 5 education groups (high school dropout, high school graduate, some college, college plus, and greater than college). Race consists of three groups (White, Black, and Other), and 4 region groups based on geographic orientation in the United States.

I analyze the weekly wages of all full-time, and full-year workers, taking the logarithm to facilitate interpretation in percentage point changes. I also adjust weekly wages to 2005 dollars using the personal consumption expenditure (PCE) price index data from the Bureau of Economic Analysis. CPS top-coded wages are multiplied by 1.5. The sample

Table 1. Summary Statistics

| | Women | Men | Both Sexes |
|---|---|---|---|
| Real Weekly Wage | 606.878 | 919.665 | 798.440 |
| | (464.082) | (769.486) | (685.070) |
| Age | 37.873 | 37.848 | 37.858 |
| | (10.544) | (10.295) | (10.392) |
| Potential Experience | 18.536 | 18.691 | 18.631 |
| | (10.728) | (10.332) | (10.487) |
| *Race* | | | |
| White | 0.832 | 0.880 | 0.861 |
| | (0.374) | (0.325) | (0.346) |
| Black | 0.130 | 0.087 | 0.104 |
| | (0.336) | (0.282) | (0.305) |
| Other | 0.038 | 0.033 | 0.035 |
| | (0.191) | (0.179) | (0.184) |
| *Region* | | | |
| Northeast | 0.209 | 0.213 | 0.212 |
| | (0.407) | (0.410) | (0.409) |
| Midwest | 0.244 | 0.253 | 0.249 |
| | (0.429) | (0.434) | (0.433) |
| South | 0.352 | 0.331 | 0.339 |
| | (0.478) | (0.471) | (0.474) |
| West | 0.195 | 0.203 | 0.200 |
| | (0.396) | (0.402) | (0.400) |
| *Education Group* | | | |
| High School Dropout | 0.092 | 0.145 | 0.124 |
| | (0.288) | (0.352) | (0.330) |
| High School Graduate | 0.394 | 0.363 | 0.375 |
| | (0.489) | (0.481) | (0.484) |
| Some College | 0.250 | 0.217 | 0.230 |
| | (0.433) | (0.412) | (0.421) |
| College Graduate | 0.187 | 0.183 | 0.185 |
| | (0.390) | (0.387) | (0.388) |
| College Plus | 0.077 | 0.091 | 0.086 |
| | (0.267) | (0.288) | (0.280) |
| $N$ | 675,434 | 1,053,944 | 1,729,378 |

Note: Mean and (standard deviation). Source: Current Population Survey, ASEC supplements, 1964-2006. The sample contains full-time employees working at least 35 hours a week, working at least 40 weeks in the previous year, in the private and government sectors, ages 16-64, with up to 39 years of potential work experience.

drops workers making wages below half of real minimum wage ($112 per week in year 2000 dollars). The final sample contains real weekly wages of full-time employees working at least 35 hours a week, 40 weeks in the previous year, in the private and government sectors, ages 16-64 with up to 39 years of potential work experience.

Table 1 displays summary statistics for key variables. Notably, men earn significantly more on average compared to females, while having marginally more potential experience and education.

## 3. Methods

Between 1963 and 2005, I investigate the two predominant theories on wage inequality, traditionalist vs revisionist. To discern between these competing theories I use plots and Ordinary least squares to analyze different tails of the wage distribution: the top earners, and median earners (90-50, right tail), compared with median earners and bottom earners (50-10 left tail). I examine how each wage ratio fluctuates over time and compare it with overall 90-10 inequality. Additionally, I examine wage variations adjusted for compositions between educational cohorts, specifically contrasting college graduates with high school graduates in measures of supply and wage differentials.

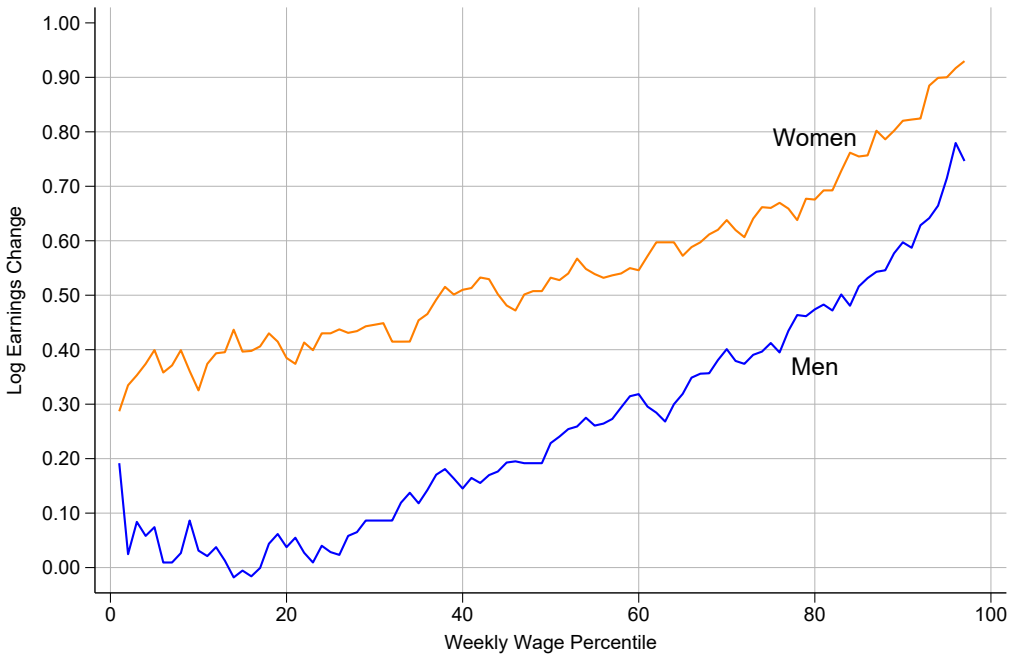
Understanding the wage/ratio is pivotal. When the wage gap between the right tail widens, but the left tail remains unchanged, it suggests the traditionalist hypothesis is at play: high-level skills or credentials are garnering more value. If the right tail remains consistent but the left tail gap increases, the revisionist theory takes precedence, indicating potential policies or structural changes adversely impact the lowest earners. A simultaneous rise in both gaps signifies an overarching wage inequality trend, influenced by both the traditionalist view of heightened skilled labor demand and the revisionist perspective of factors suppressing lower wages.

Composition adjustment is pivotal to ensure that the observed trends aren't merely artifacts of changing demographics. Composition adjustment isolates the impact of supply and demand factors on the wage structure, independent of changes in the characteristics of the labor force as well as ensuring that the comparisons made across different time periods are mutually interpretable. Adjusting for composition also adds robustness to the results. If findings hold even after controlling for potential compositional changes, it provides stronger evidence for the traditionalist hypotheses.

Moreover, by evaluating the composition-adjusted wage disparity between college and high school graduates, I gauged the market's demand for skilled labor. A consistent widening of this disparity, especially in tandem with the overall wage gap, would further validate the traditionalist theory that the demand for skilled labor is driving wage inequality.

For the period since 2005, I employed similar analytical techniques to assess wage patterns. It is noteworthy that from 2006 to 2016, several U.S. states increased their minimum wages. Such changes directly influence the earnings of the 10th percentile, often comprising individuals without a high school diploma.

Figure 1. Change in Log Real Weekly Wages by Percentiles and Gender 1963-2005



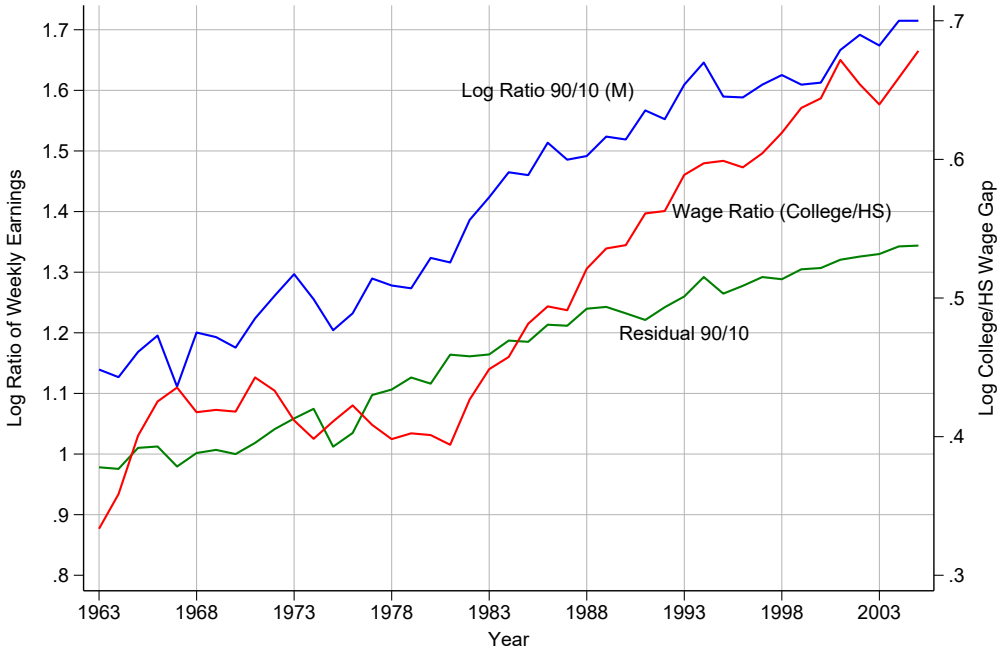

Source: Current Population Survey, ASEC supplements, 1964-2006. The sample contains full-time employees and working at least 35 hours a week, working at least 40 weeks per year, in the private and government sectors, ages 16-64, with up to 39 years of potential work experience.

## 4. Results

Figure 1 shows that wages grew more for the highest percentiles than for the lowest from 1963-2005, with women seeing larger changes than men. A review of this overall percentage change reveals an 80-100% wage increase for workers in the highest percentiles during 1963-2005, while wages for those in the lower percentiles stagnated. Across all percentiles, women experienced greater changes in earnings than men, with women in the top 10 percentile seeing substantial wage increases.

Figure 2 showcases consistent increases in multiple measures of inequality from 1963-2005, challenging the revisionist perspective. Figure 2 examines three measures of inequality: 90-10 inequality, composition-adjusted college/high school wage gap, and within-group 90-10 residual inequality. The latter is based on residuals from a regression of log real weekly wages on dummy variables for age, nine schooling groups, and interactions between a quartic in age and the nine schooling dummy variables. Each measure displays a steady increase in wage inequality from 1963-2005, suggesting that inequality does not stem from a singular phenomenon as revisionists (e.g.,Card and DiNardo (2002) might argue. 90-10 inequality exhibits an uninterrupted positive rise, while the college-high school wage premium, after a brief wage gap decline from 1970 to 1980, demonstrates continuous growth through 2005. This persistent increase after 1980 indicates that earnings disparities stem from highly skilled and educated workers.

Figure 2. Three Measures of Wage Inequality: Men's Overall 90/10 Inequality, College/High School Wage Gap, and Men's 90/10 Residual Inequality, 1963-2005




Notes: Overall 90/10 is based on March CPS data for men. College/HS gap is based on composition-adjusted data ( refer to notes under Table 1). Residual inequality is based on predicted residuals from a regression of log wages on dummy variables for age, nine schooling groups, and interactions between a quartic in age and school dummy variables.

Building on the insights from Figure 2, Table 3 offers a deeper look into the dynamics of the college/high school wage gap from 1963-2005. I regress the college/high school wage differential on explanatory variables such as the college/high school relative supply, log real federal minimum wages, male unemployment rate, and time. As the number of college-educated workers relative to high school-educated ones varies, I observe a fluctuating impact on the wage gap across models, as direction varies by explanatory variable. Notably, an increase in the real minimum wage results in a slight narrowing of the wage gap. Furthermore, a rise in unemployment among prime-age men similarly leads to a diminished wage gap. Interestingly, around the 1992 mark, the influence of these variables on the wage gap evolves. In conjunction with the trends observed in Figure 2, these results reinforce the notion that wage differences between educational levels are multifaceted, with education and skills playing significant roles.

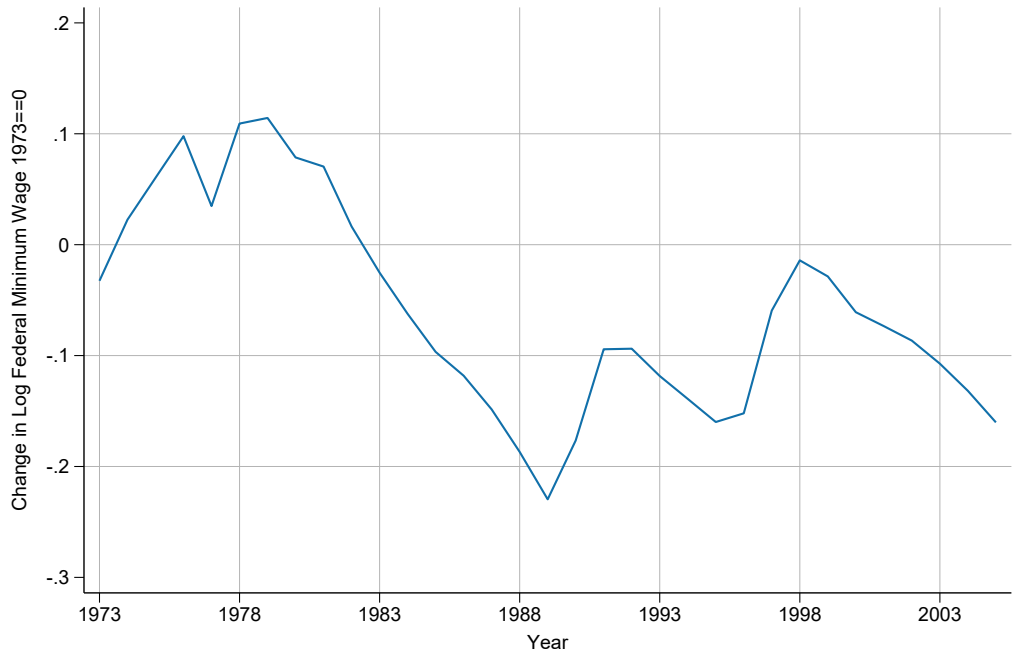
Figure 3 shows shifting left tail and right tail inequality. The 90/50 ratio for both genders demonstrates a steady upward trend from 1963, whereas the 50/10 ratio plateaus and slightly decreases for men in the mid-1980s, and sees a sharp decline and plateau for females during the same period. This divergence between the 90/50 and 50/10 ratios suggests more pronounced wage increases among top earners, arising from the increased demand and corresponding wage growth for high-skilled workers, thus supporting the traditionalist

Figure 3. Upper-half and Lower-half Wage Inequality: 90/50 and 50/10 Inequality for Men and Women, 1963-2005


Source: Current Population Survey, ASEC supplements, 1964-2006. The sample contains full-time employees working at least 35 hours a week, 40 weeks in the previous year, in the private and government sectors, ages 16-64 with up to 39 years of potential work experience.

hypothesis of Autor, Katz, and Krueger (1998).

Figure 4. Log Real Federal Minimum Wage, 1973–2005




Source: Federal Reserve Economic Data (FRED). Federal log minimum wages are deflated by personal consumption expenditure.

Table 2 shows the log difference in composition-adjusted wages at six intervals (1963-71, 1971-79, 1979-87, 1987-95, 1995-2005, 1963-2005). This, along with the graphical change in earnings from Table 4, demonstrates that post-graduates did not experience a decrease in composition-adjusted wages from 1973-1995, whereas wages for high school dropouts dropped around 15%. This wage decrease aligns with the falling minimum wages seen from 1973-1989 as depicted in Figure 4, but fails to account for the steep wage increase for highly educated workers after 1995. Table 2 also shows that even when adjusting for composition, wage growth has been heavily concentrated for highly skilled workers since 1963, greatly supporting the traditionalist hypotheses.

Figure 5 underscores the widening earnings gap between individuals with a college education and high school dropouts. A clear stratification emerges between the earnings of those with a college degree and those of high school dropouts, after 1990. Wages of men and women with higher education see significant gain, around 60%, whereas wages for high school dropouts and high school graduates either stagnate or decline during the same period (0 - 15 %).

## Extension

Building on the findings of Autor, Katz, and Kearney (2008), I examined wage inequality from 2005 to 2021, shedding light on evolving trends since their seminal work. The data presents intriguing patterns: Figure 6, which maps the change in log real weekly wages

by percentiles, reveals a stabilization in wage growth. This stagnation is further evident in Figure 8, where both the 90/50 and 50/10 wage ratios largely remain unchanged. Delving deeper, Figure 7 highlights pronounced variations in the wage gap between College and HS dropouts starting in 2005, the college graduate premium falls from 115 percentage points to 100 percentage points. This variability likely stems from the uptick in minimum wages across several states between 2008 and 2016. This policy shift tends to elevate the earnings of lower-skilled workers at a quicker pace than their more skilled counterparts. Validating this theory, Figure 9 showcases a noticeable rise in adjusted wages for high school dropouts from 2015 onwards, for both genders. Such observations underscore the instrumental role of minimum wages in curtailing wage disparity, echoing the revisionist perspective of Card and DiNardo (2002).

## 5. Summary and Conclusion

My findings align with Autor, Katz, and Kearney (2008) from 1963 to 2005. The evidence supports the traditionalist view that increasing inequality is a secular phenomenon, not a one-time event. Although declining real minimum wages influence inequality in the 1980s, the demand for skilled workers due to computerization caused wages of those on the right tail to grow disproportionately after 1990.

From 2005 to 2021, patterns lean toward the revisionist claim. As many states increase minimum wages, the lower end of the wage distribution sees significant gains, keeping overall inequality constant. This suggests that minimum wages can combat inequality. Both viewpoints are valid, and neither can be rejected with high confidence. Inequality is complex, and the time period plays a crucial role in determining which view is accurate.

## Bibliography

Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2008. "Trends in U.S. Wage Inequality: Revising the Revisionists." *Review of Economics and Statistics* 90 (2): 300–323.

Autor, David H., Lawrence F. Katz, and Alan B. Krueger. 1998. "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics* 113 (4): 1169–1213.

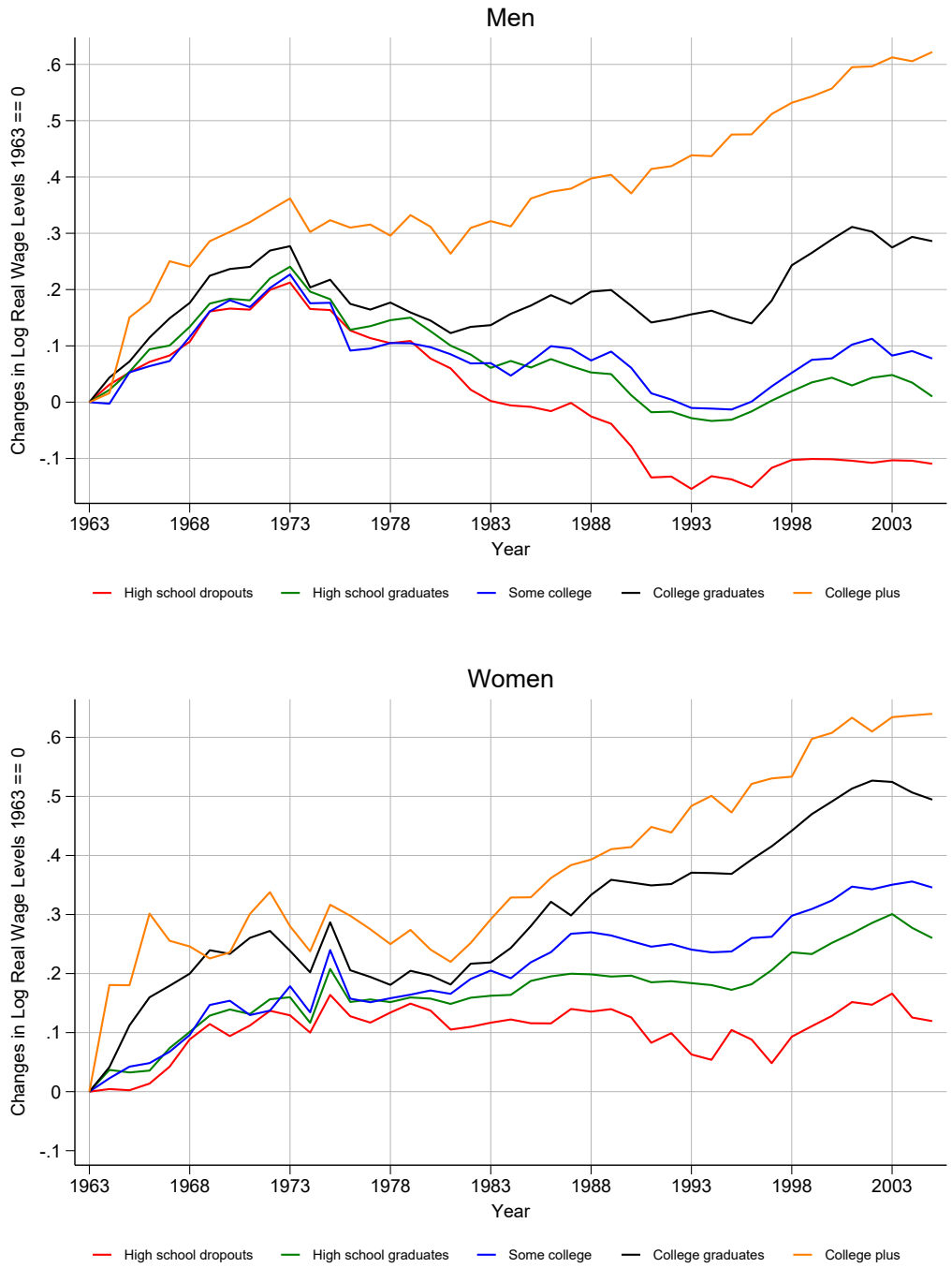
Card, David and John E. DiNardo. 2002. "Skill Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles." *Journal of Labor Economics* 20 (4): 733–783.

Table 2. Changes in Composition Adjusted Real Weekly Log Wages(*100), 1963–2005

| | 1963-71 | 1971-79 | 1979-87 | 1987-95 | 1995-2005 | 1963-2005 |
|---|---|---|---|---|---|---|
| **All** | 19.0 | -2.5 | 0.5 | -4.1 | 9.0 | 21.9 |
| ***Sex*** | | | | | | |
| Men | 20.3 | -4.7 | -3.6 | -6.8 | 8.1 | 13.3 |
| Women | 17.0 | 0.9 | 7.0 | 0.1 | 10.2 | 35.3 |
| ***Education (in years)*** | | | | | | |
| 0-11 | 14.9 | -2.8 | -8.0 | -10.6 | 2.4 | -4.1 |
| 12 | 16.1 | -0.7 | -3.5 | -6.8 | 6.0 | 11.1 |
| 13-15 | 15.2 | -2.3 | 3.8 | -7.5 | 9.8 | 19.0 |
| 16-17 | 24.8 | -7.1 | 4.6 | 1.3 | 13.2 | 36.8 |
| 18+ | 31.3 | -0.1 | 6.9 | 9.4 | 15.4 | 62.8 |
| ***Experience (men)*** | | | | | | |
| 5 years | 16.4 | -6.5 | -6.6 | -6.8 | 9.9 | 6.3 |
| 25-35 years | 21.5 | -1.9 | -1.0 | -7.5 | 6.2 | 17.2 |
| ***Education 12 (men)*** | | | | | | |
| Experience 5 | 16.5 | -4.6 | -15.8 | -8.8 | 8.4 | -4.3 |
| Experience 25-35 | 17.2 | -0.9 | -3.2 | -8.1 | 1.2 | 6.2 |
| ***Education 16+ (men)*** | | | | | | |
| Experience 5 | 26.7 | -7.6 | 11.0 | 6.7 | 10.9 | 23.8 |
| Experience 25-35 | 34.7 | 7.7 | 3.4 | 5.5 | 15.5 | 60.0 |

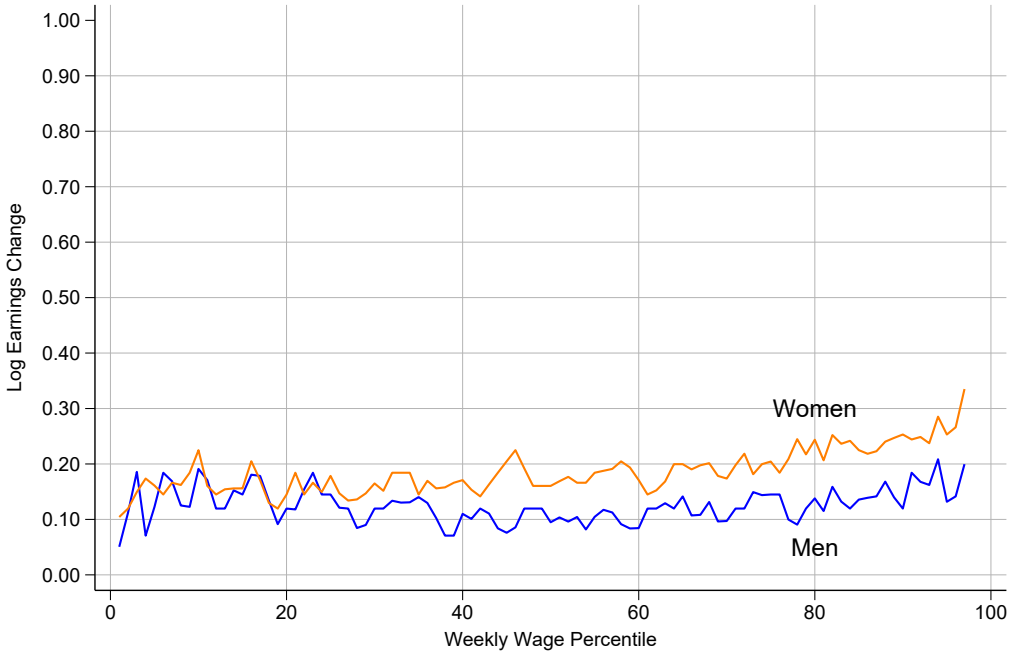
This table shows the change in composition adjusted real weekly log wages*100. Initially, I run OLS regressions on log of real weekly wages by on five education groups, a quartic in experience and interactions of experience quartic and three education groups, dummy variable for race, and four geographic regions. ASEC sample weights used as analytic weights on the regression estimates. The composition-adjusted wage data is the predicted values (using regression coefficients) on an auxiliary data set composed of whites alone, living in a mean geographic region, with five education groups, and four experience groups, separately calculated for each sex and for each year from 1963 to 2005. This generates 20 cells each for men and women, for 43 years, resulting in 1720 observations. To compare across broader groups a fixed set of weights are created, equal to the average share of total hours worked by each group over 1963-2005. The first 10 rows show the composition of adjusted wages for broader groups, which are calculated based on weighted sums of composition-adjusted wages for the relevant subgroups adjusted by total hours worked weight.

Figure 5. Trends in Composition-Adjusted Real Log Weekly Wages by Gender and Education, 1963–2005



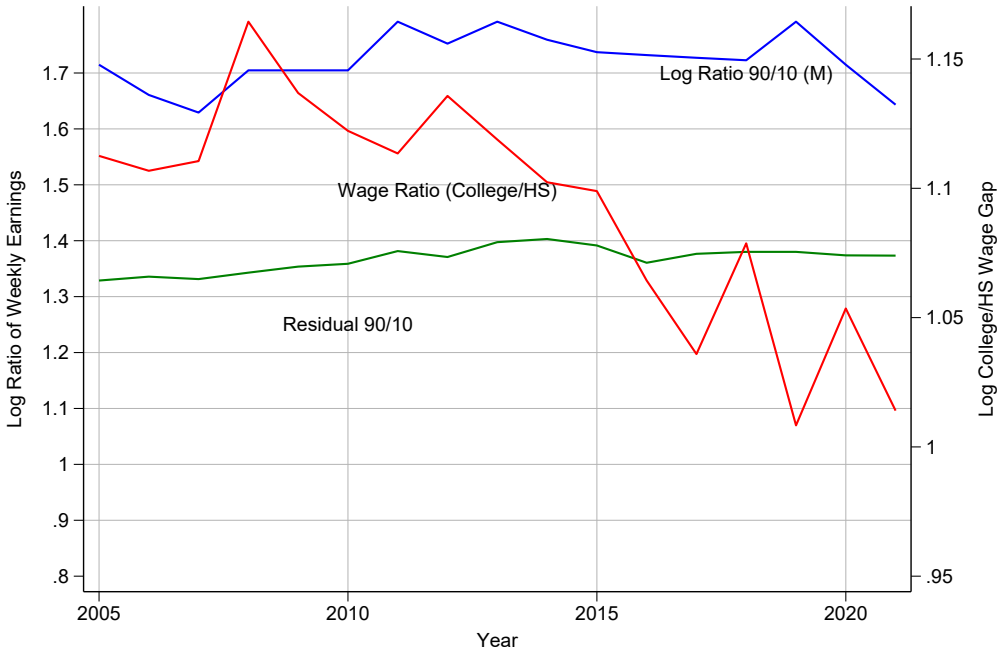

Notes: Indexed plots are based on composition-adjusted data (refer to table 1) adjusted by a fixed set of weights, equal to the mean share of total hours worked by each group over 1963-2005

Figure 6. Change in Log Real Weekly Wages by Percentiles and Gender 2005-2021




Source: Current Population Survey, ASEC supplements, 2006-2022. The sample contains full-time employees working at least 35 hours a week, working at least 40 per year, In the private and government sectors, ages 16-64, with up to 39 years of potential work experience.

Figure 7. Three Measure of Wage Inequality: Men's Overall 90/10 Inequality, College/High School Wage Gap, and Men's 90/10 Residual Inequality, 2005-2021

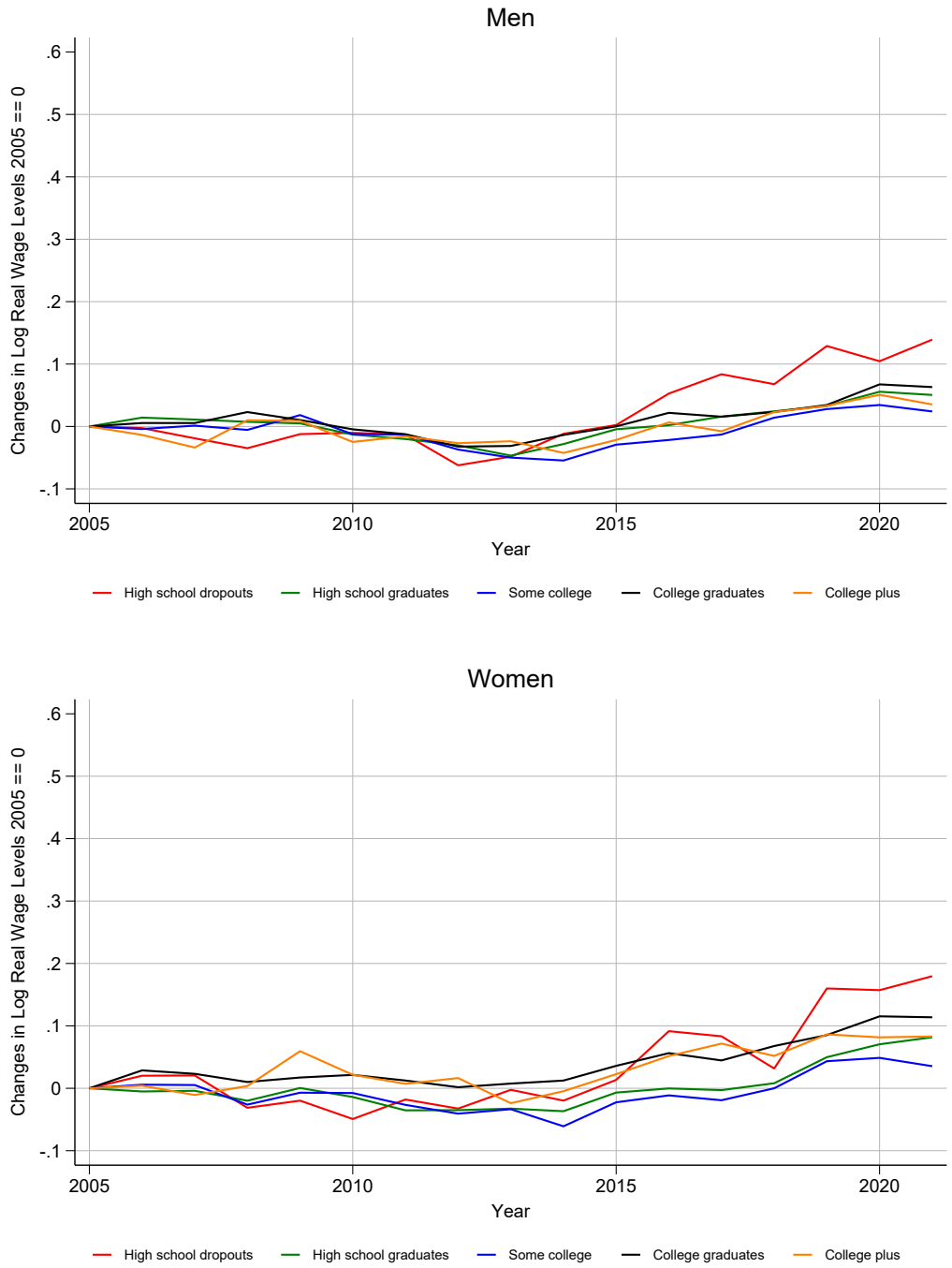



Notes: Overall 90/10 is based on March CPS data for men. College/HS dropout gap is based on composition-adjusted data ( refer to notes under Table 1). Residual inequality is based on predicted residuals from a regression of log wages on dummy variables for age, nine schooling groups, and interactions between a quartic in age and school dummy variables.

Figure 8. Upper-half and Lower-half Wage Inequality: 90/50 and 50/10 Inequality for Men and Women, 2006-2022


Source: Current Population Survey, ASEC supplements, 2006-2022. The sample contains full-time employees working at least 35 hours a week, 40 weeks in the previous year, In the private and government sectors, ages 16-64 with up to 39 years of potential work experience.

Figure 9. Trends in Composition-Adjusted Real Log Weekly Wages by Gender and Education, 2005–2021




Notes: Indexed plots are based on composition-adjusted data (refer to Table 1) adjusted by a fixed set of weights, equal to the mean share of total hours worked by each group over 2005-2022.

Table 3. Regression Models for the College/High School Log Wage Gap, 1963-2005

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| CLG/HS relative supply | 0.011 | -0.023 | -0.052 | -0.048 | -0.036 | 0.009 | |
| | (0.021) | (0.018) | (0.018) | (0.023) | (0.023) | (0.017) | |
| Log real minimum wage | | | | | -0.073 | -0.072 | -0.068 |
| | | | | | (0.057) | (0.057) | (0.056) |
| Male prime-age unemp. rate | | | | | -0.008 | -0.016 | -0.016 |
| | | | | | (0.003) | (0.003) | (0.003) |
| Time | 0.007 | 0.005 | -0.001 | -0.002 | 0.002 | 0.010 | 0.010 |
| | (0.000) | (0.001) | (0.001) | (0.004) | (0.004) | (0.001) | (0.001) |
| $\text{Time}^2/100$ | | | 0.022 | 0.028 | 0.015 | | |
| | | | (0.003) | (0.020) | (0.022) | | |
| $\text{Time}^3/1000$ | | | | -0.001 | 0.000 | | |
| | | | | (0.003) | (0.004) | | |
| Time X post-1992 | | 0.000 | | | | | |
| | | (0.000) | | | | | |
| Constant | 0.340 | 0.351 | 0.369 | 0.375 | 0.547 | 0.575 | 0.562 |
| | (0.018) | (0.014) | (0.013) | (0.024) | (0.099) | (0.111) | (0.107) |
| $N$ | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| $R^2$ | 0.881 | 0.927 | 0.944 | 0.944 | 0.954 | 0.933 | 0.932 |

Standard errors in parentheses. Each column displays an OLS regression coefficient, focusing on the fixed-weight difference between college and high school wages based on specific variables.