

Decomposing Wage Polarization

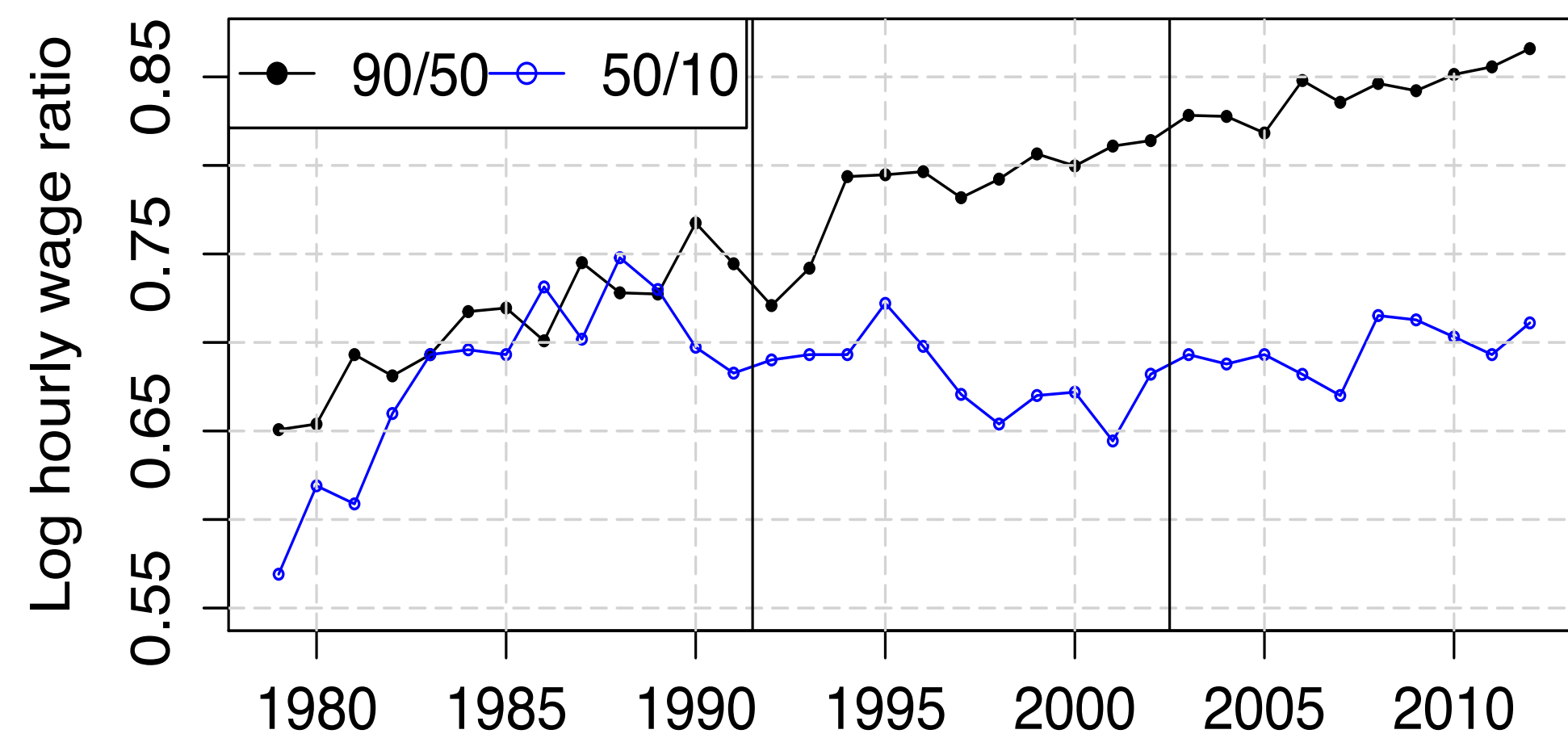
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Abstract

This paper argues that the decline of middle wages in the U.S. during the 1990s (“wage polarization”) is the result of asymmetric changes in inequality at different occupations. Inequality has relatively increased at occupations with higher wages and has decreased at occupations with lower wages. I show this using a new decomposition method based on the third moment (skewness), which quantifies the contributions of different factors to the total increase in wage polarization. The drop in occupational inequality at low paying occupations is concentrated among “routine” occupations and is unique for the period of the 1990s, while inequality at high paying occupations has steadily increased in the last three decades.

Wage Polarization

While inequality at the top keeps rising, inequality at the bottom drops and stabilizes during the 1990s. A broad literature attributes this to the decline in demand for “routine” occupations, that are concentrated at the middle of the wage distribution (Autor et al. 2006, 2008).

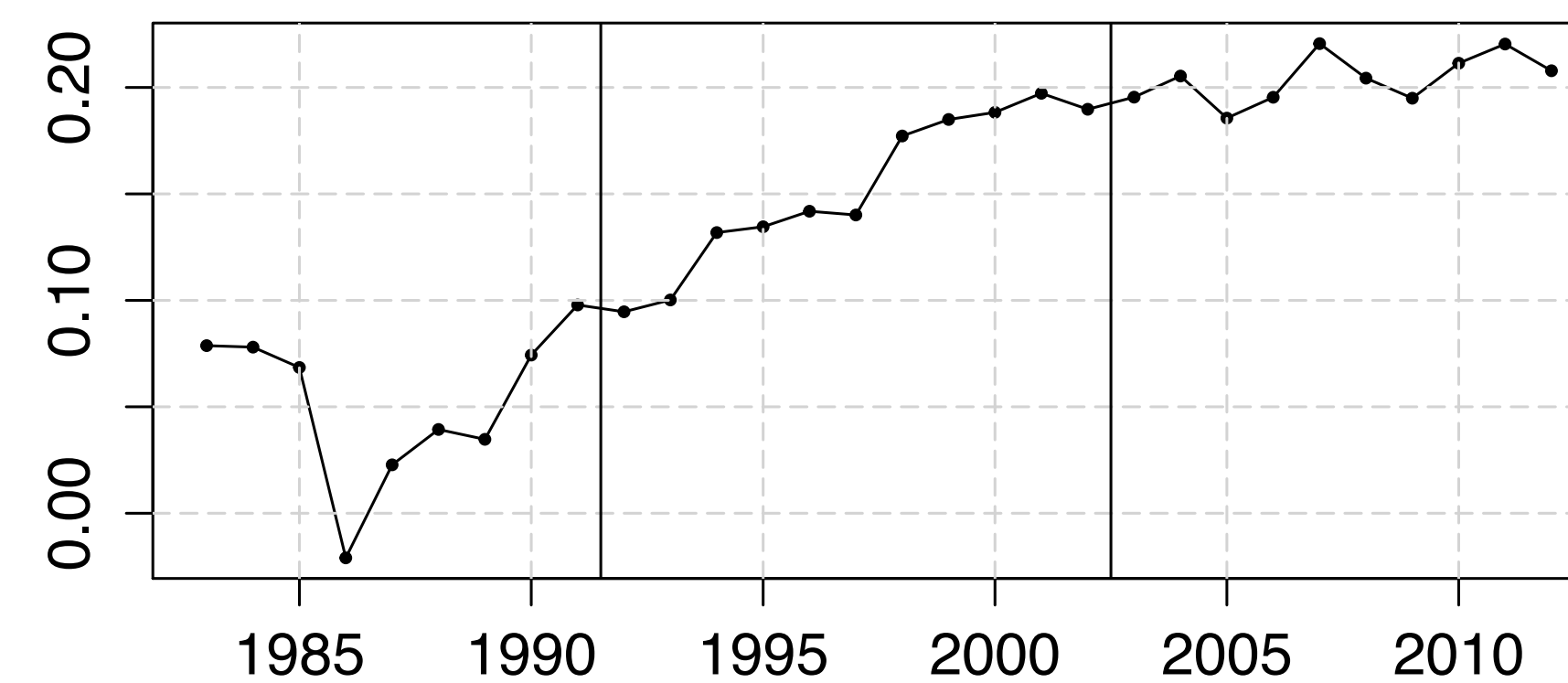


If this is indeed a trend that occurs **between** occupations, can we test this with a decomposition method?

Skewness

Challenge: Overall inequality is not increasing. Therefore, standard decomposition methods such as variance decomposition will not apply in here.

Solution: Use the third moment of the distribution - Skewness. This moment fits perfectly to describe the trend of wage polarization as it increases exactly when the distribution becomes more asymmetric. When inequality is increasing at the top, but decreases/stabilizes at the bottom the distribution becomes positively skewed. The following figure plots the **Skewness of log wages 1983-2012**:

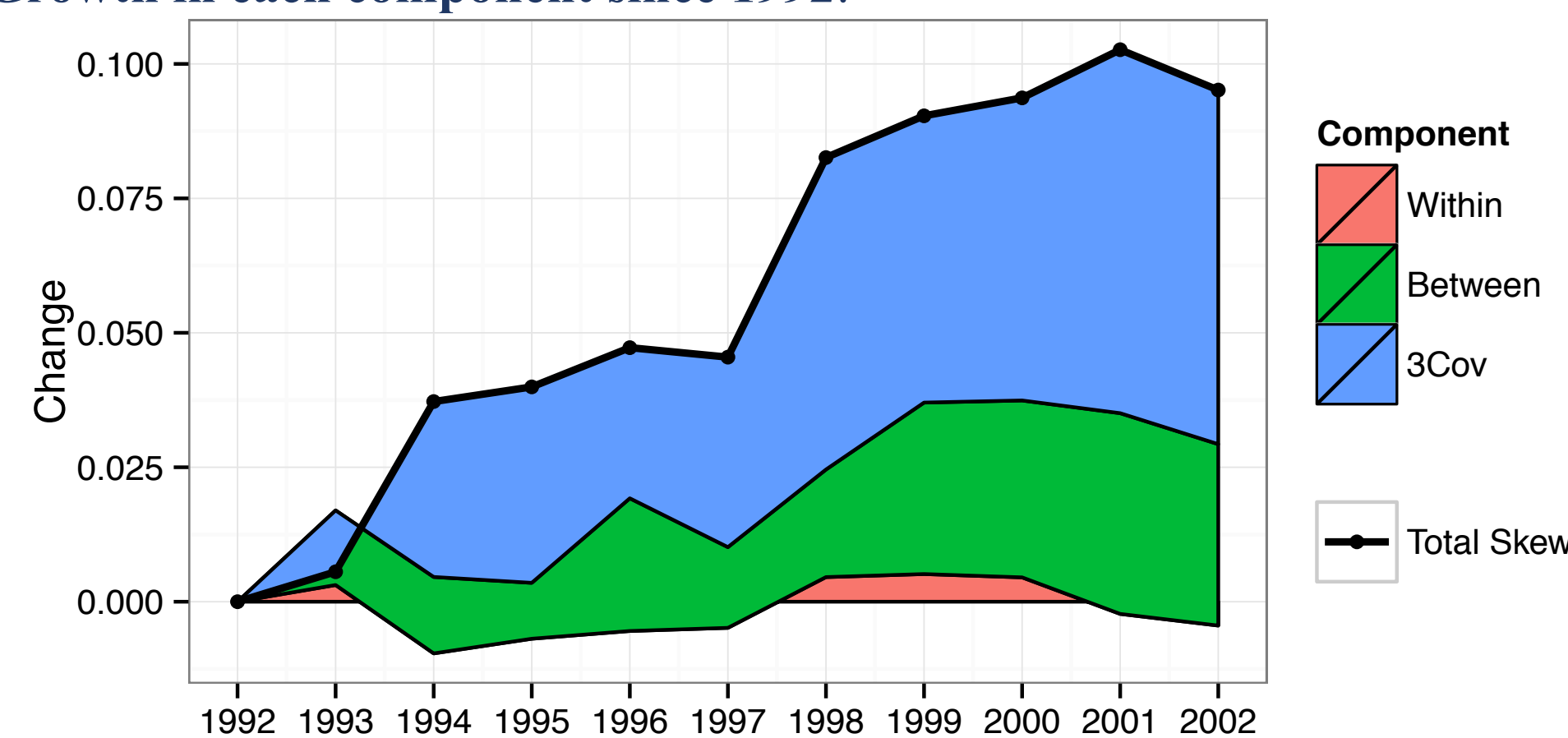


Just like with variance, there is a simple decomposition formula for Skewness:

$$E[Skew(Y|X)] + Skew(E[Y|X]) + 3COV(E[Y|X], Var[Y|X])$$

The first component captures the skewness **within** groups. The second is the skewness **between** groups. This is completely identical to variance decomposition. The third component is new, and captures the correlation between variance and expectation. In our context, this is the correlation between wage *level*, and wage *inequality*.

Results for decomposing by occupations (Y=log wages, X= 3-dig occupation), **Growth in each component since 1992**:

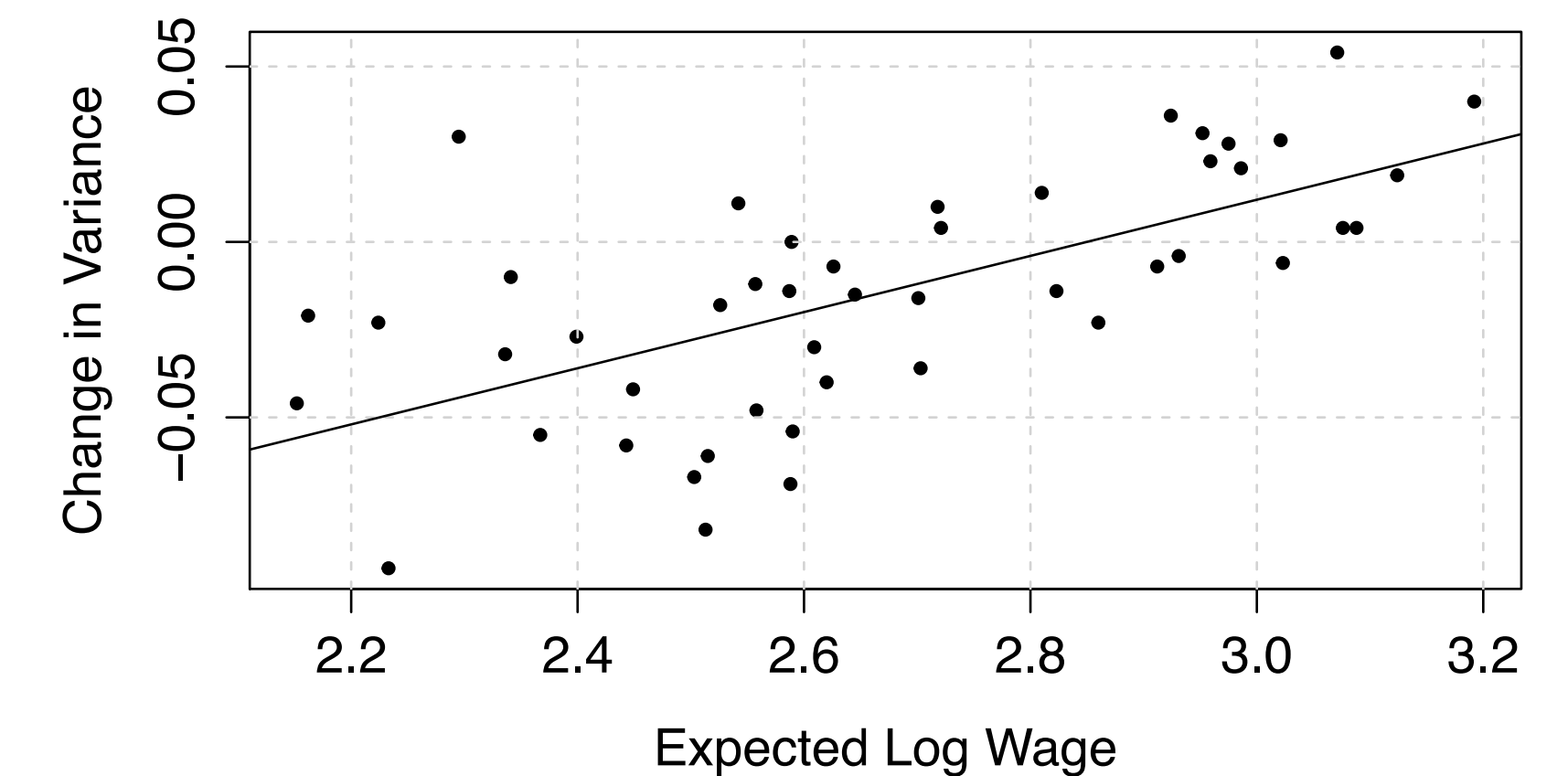


These results are surprising. If wage polarization was a result of drop in wage in middle paying, routine occupations, the between component should have been dominant.

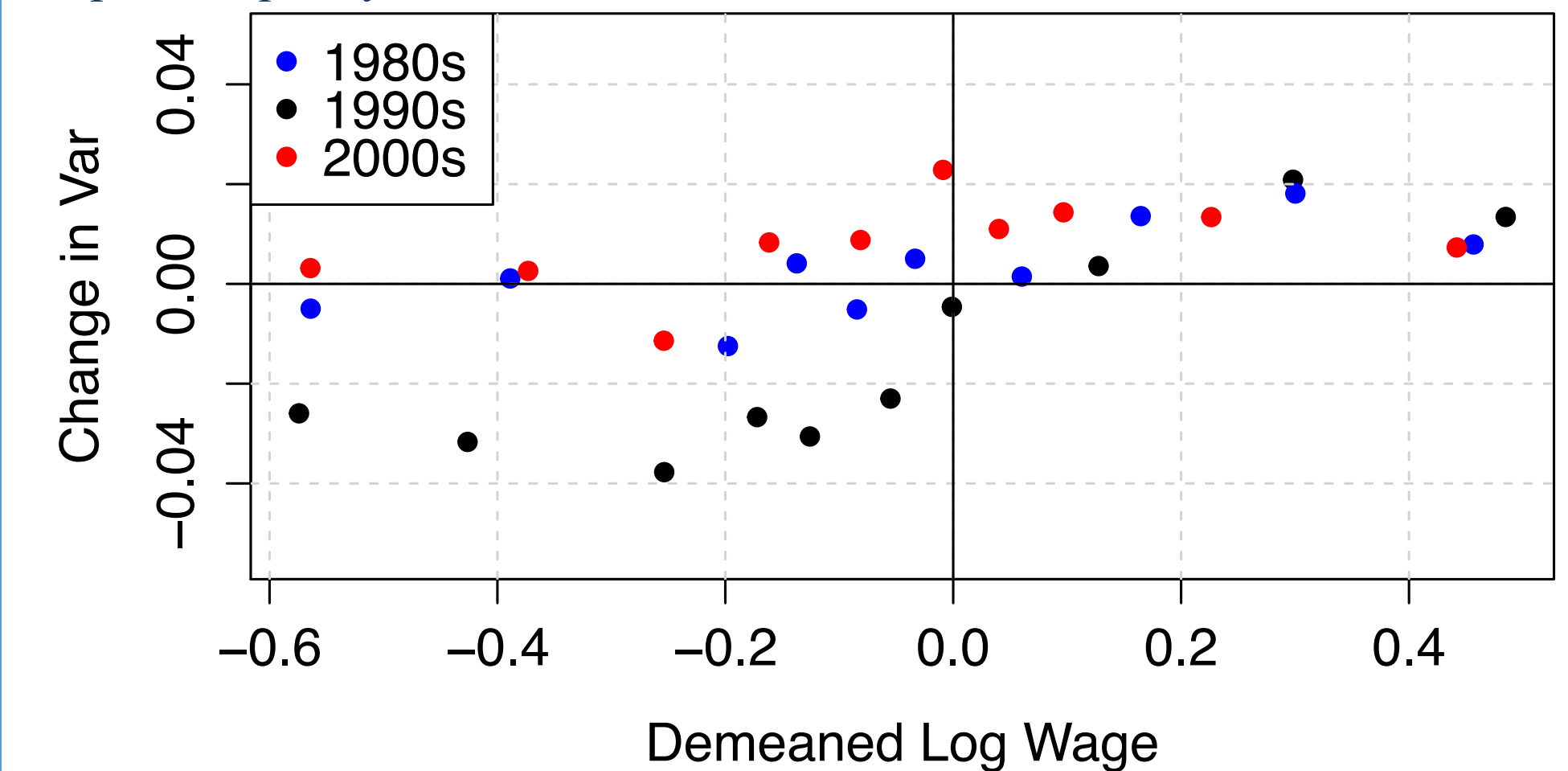
Instead the results are driven by the covariance component. Why?

Inequality Within Occupations

The following graph shows why we saw a rise in the covariance component. Inequality is rising in high-paying occupations, but is declining in low paying occupations.



The rise in inequality is stable across 3 decades. The 1990s are unique for the drop in inequality at the bottom.



The drop in inequality is stronger in routine occupations. Hence, this method is able to prove part of the leading hypothesis about wage polarization. It is driven by occupations, and mostly by routine occupations.

But it also teaches us something new. There is no general drop in wages in routine occupations. Instead, there is a drop in **inequality** within those occupations.

