

# Lecture 11 Slides: Wage Density Decompositions, Applied to Institutions and Wage Structure

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14.662 Spring 2013

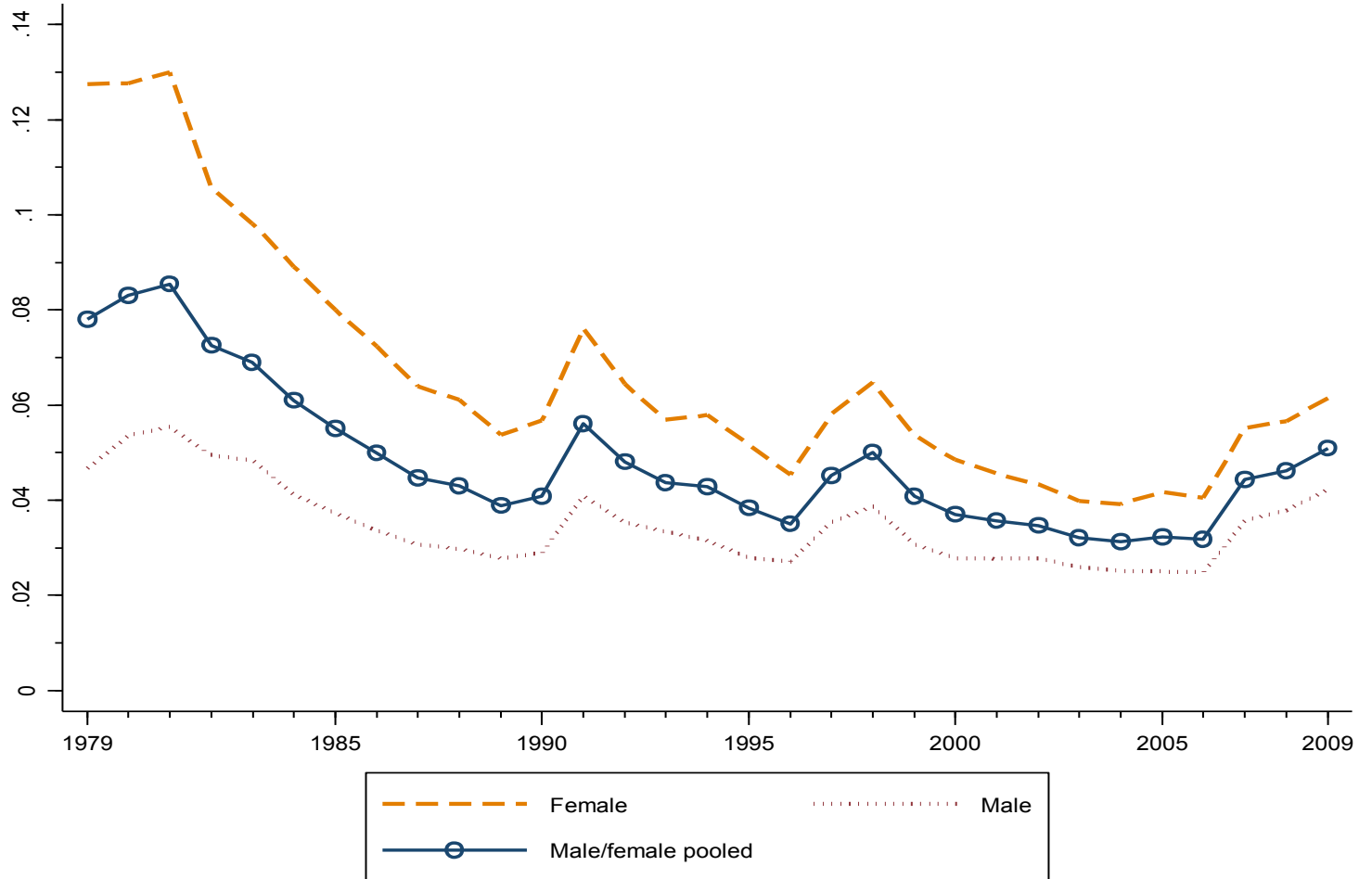
David Autor

Log Changes in the Real Federal Minimum Wage 1973-2005 (1973=0)



Source: Autor, Katz and  
Kearney 2008

# Share of hours at or below the minimum wage



Source: Autor, Manning and Smith, 2010

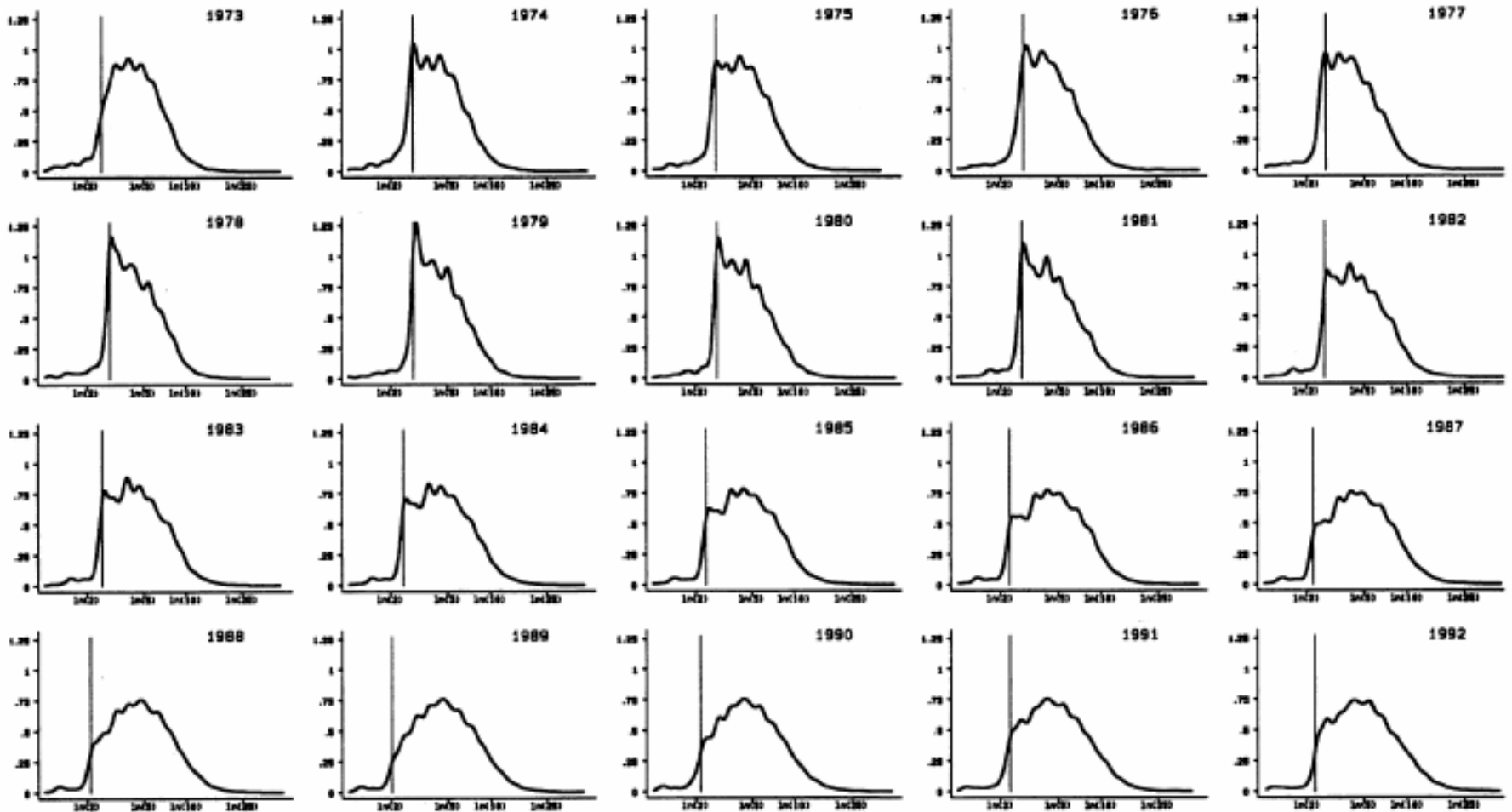


FIGURE 1B—Kernel density estimates of women's real log wages 1973–1992 (\$1979).

Source: DiNardo, Fortin and Lemieux 1996

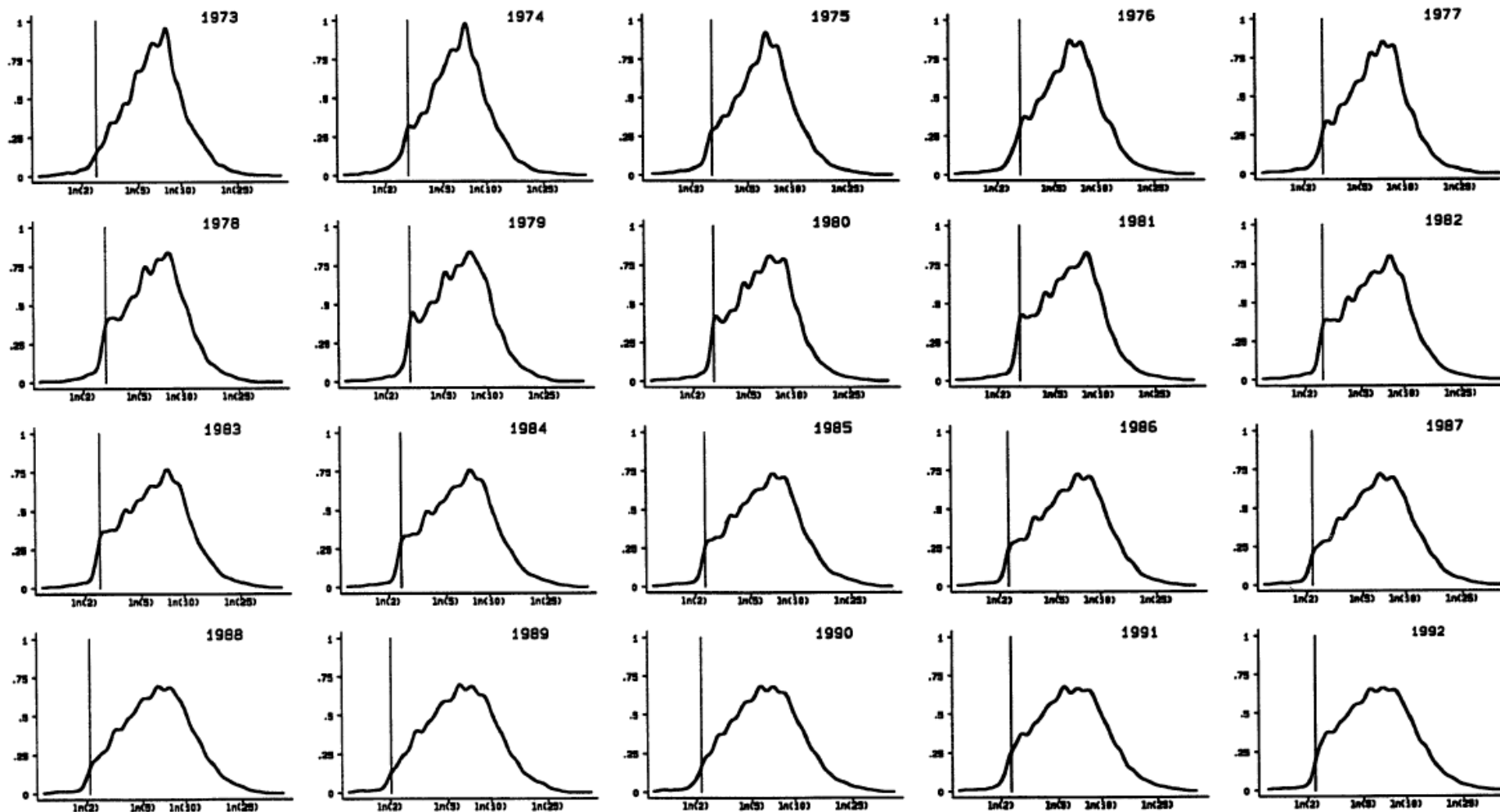
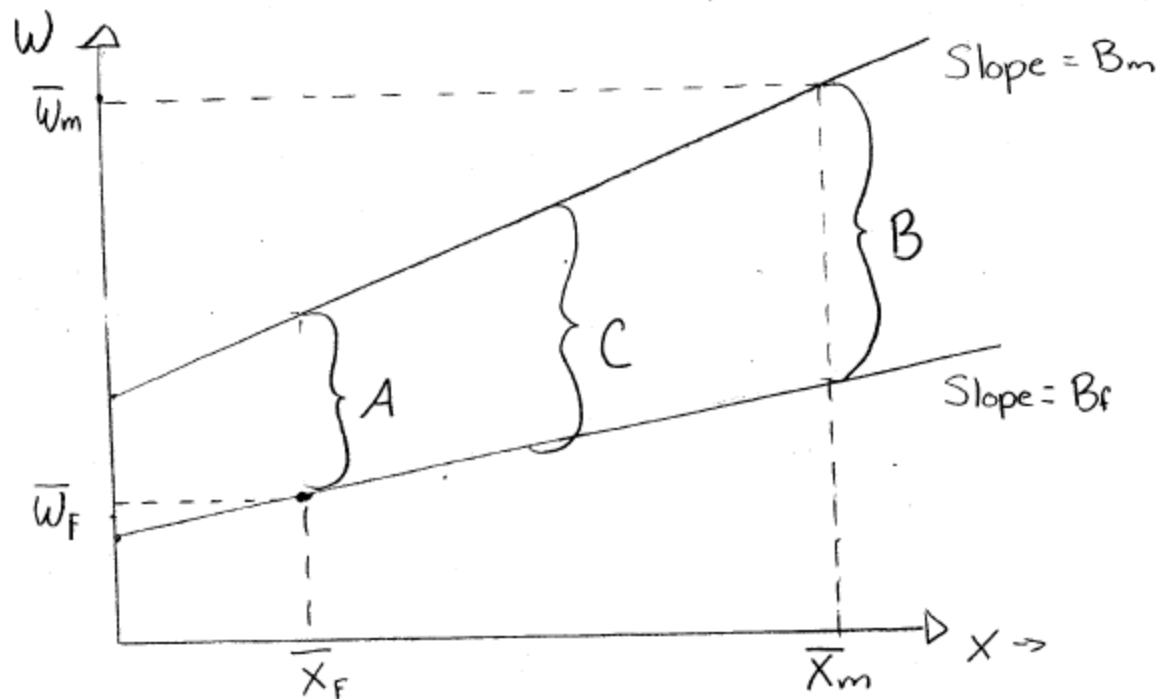


FIGURE 1A—Kernel density estimates of men's real log wages 1973–1992 (\$1979).

Source: DiNardo, Fortin and Lemieux 1996

# Oaxaca Decomposition



What is the true 'gender gap'?

A -  $\bar{X}_F (\beta_m - \beta_f)$

B -  $\bar{X}_m (\beta_m - \beta_f)$

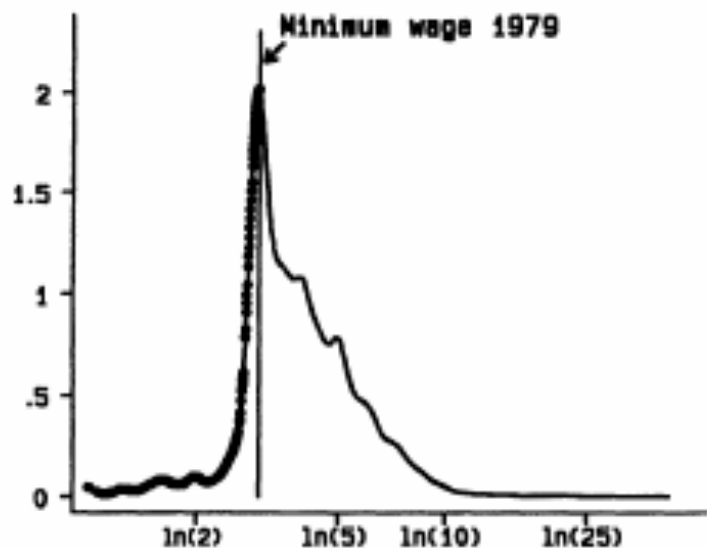
C -  $(\bar{X}_m - \bar{X}_F) \frac{1}{2} (\beta_m - \beta_f)$

DiNardo, Fortin and Lemieux, 1996

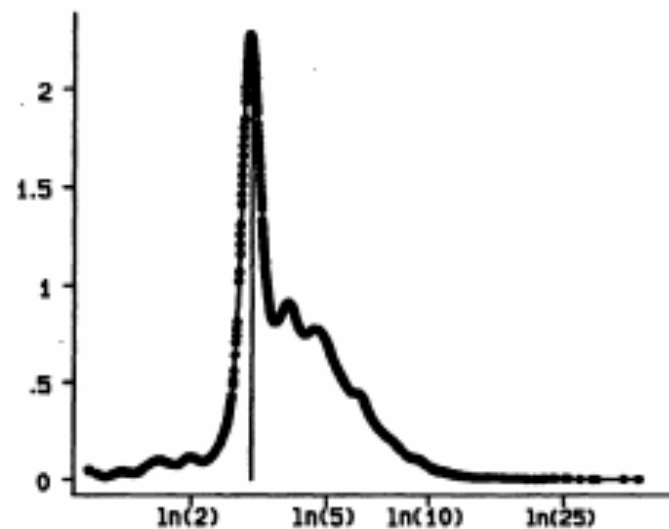
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a) Density Estimate of Real Log Wages in 1988



b) Density Estimate of Real Log Wages in 1979



c) Density Estimate of Real Log Wages in 1988  
Adjusted for 1979's Minimum Wage

-An illustration of the estimation of the effect of the minimum wage for male high school dropouts with 20 years or less of experience.



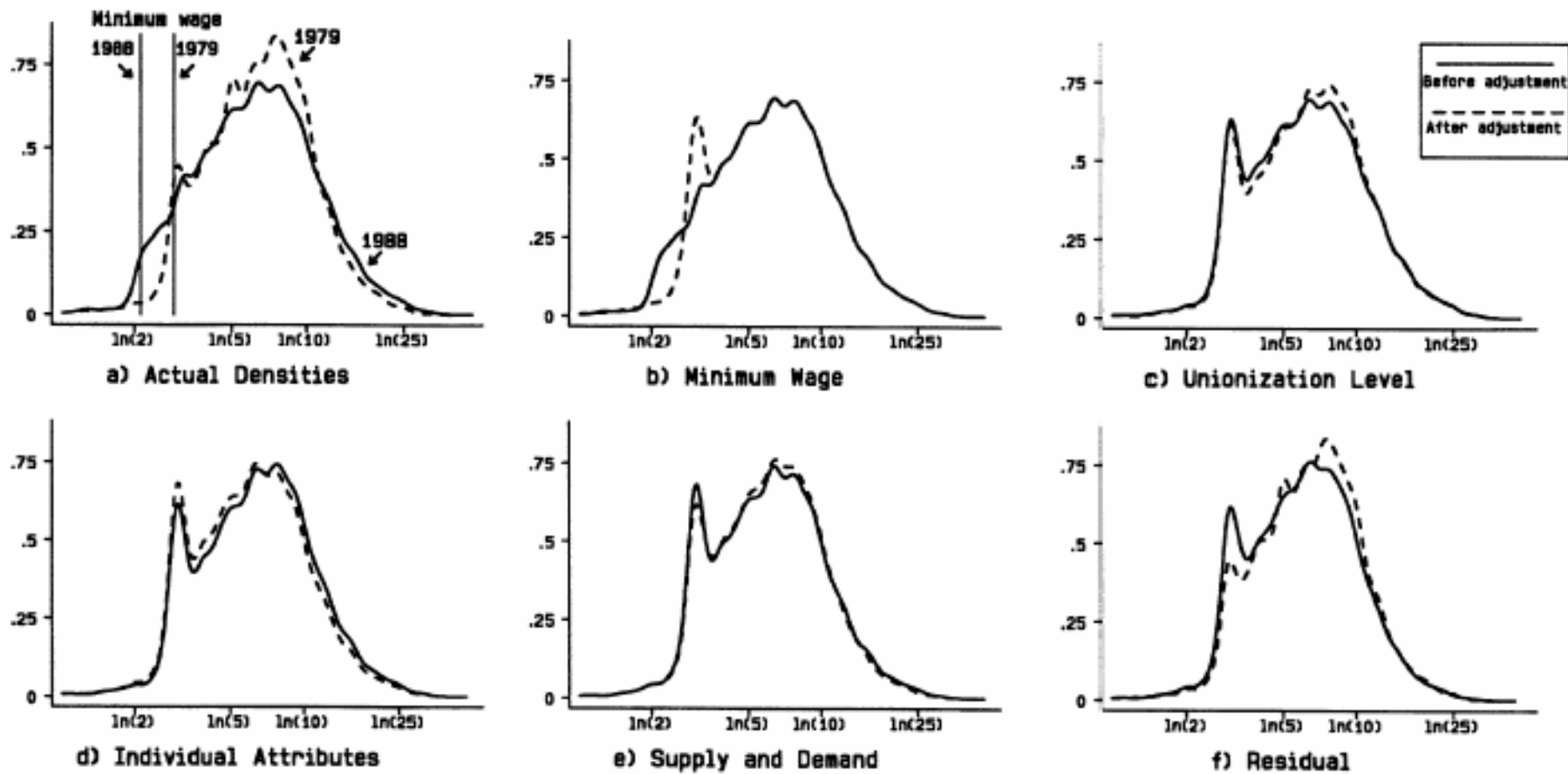


FIGURE 4—1988 density of men's real log wages (\$1979) adjusted for the indicated factors.

Source: DiNardo, Fortin and Lemieux 1996

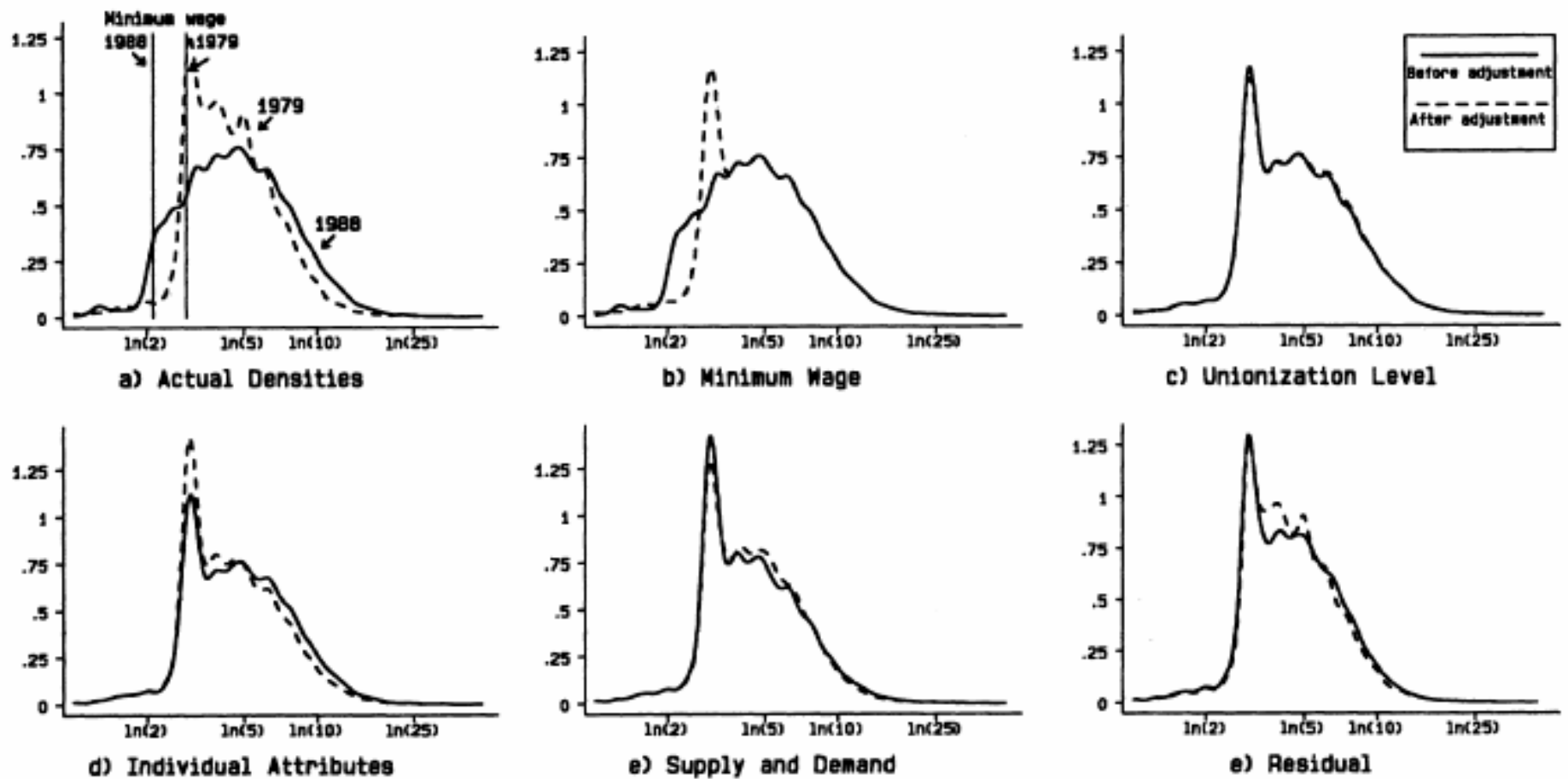
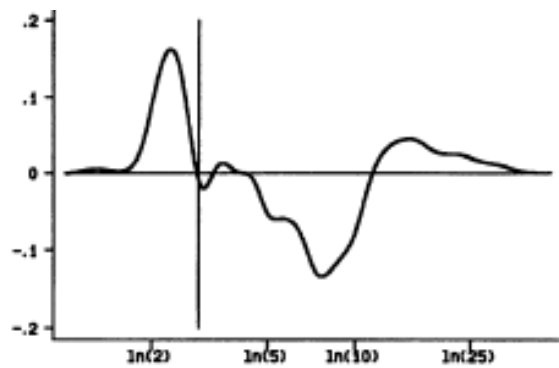
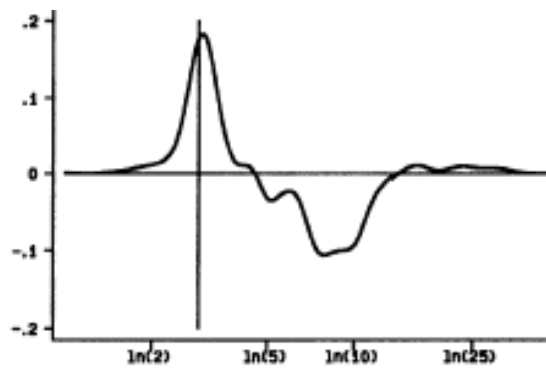


FIGURE 5—1988 density of women's real log wages (\$1979) adjusted for the indicated factors.

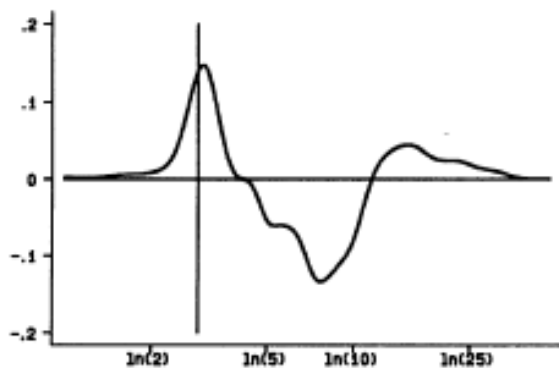
Source: DiNardo, Fortin and Lemieux 1996



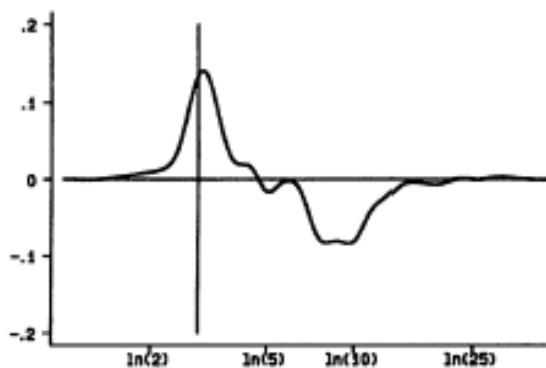
a) Actual Difference



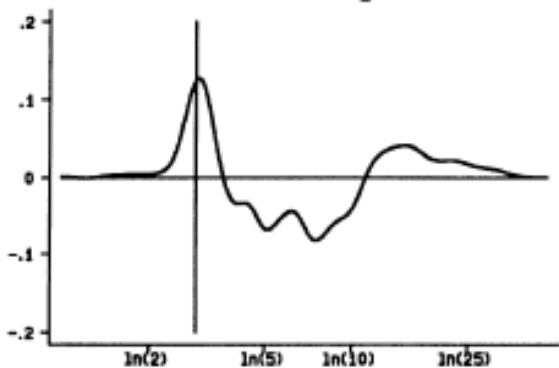
d) Individual Attributes and c)



b) Minimum Wage



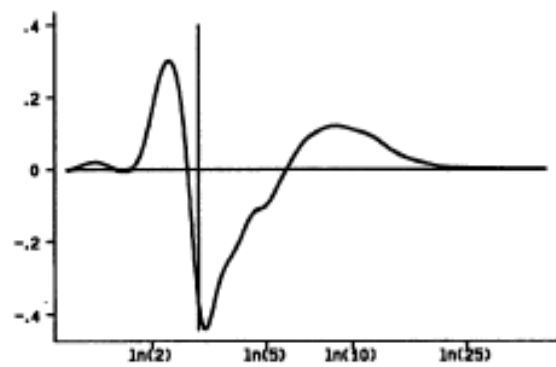
e) Supply and Demand and d)



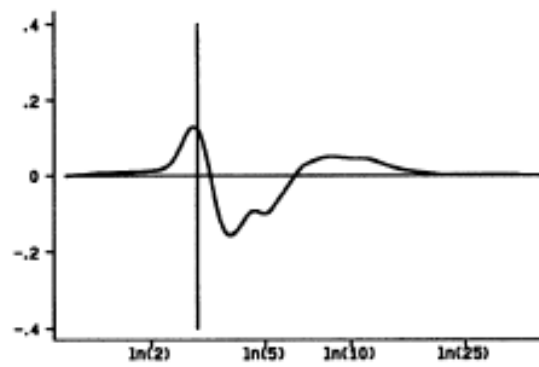
c) Unionization Level and b)

FIGURE 6.—Smoothed differences between the 1988 density adjusted for indicated factors and the 1979 density for men.

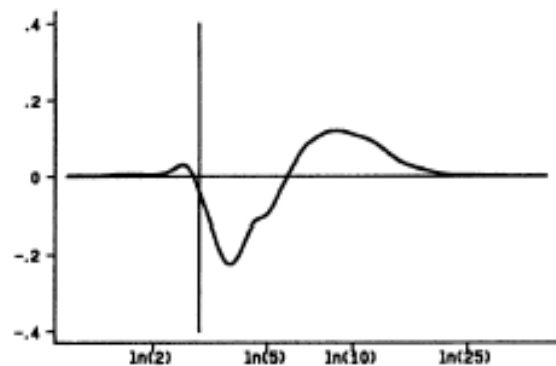
Source: DiNardo, Fortin and Lemieux 1996



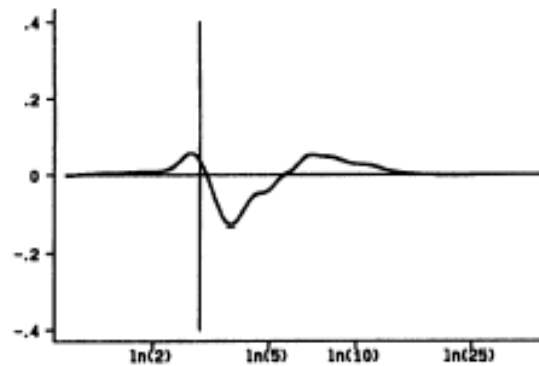
a) Actual Difference



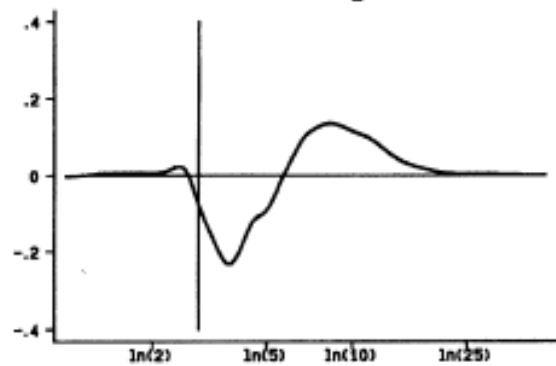
d) Individual Attributes and c)



b) Minimum Wage



e) Supply and Demand and d)



c) Unionization Level and b)

FIGURE 7.—Smoothed differences between the 1988 density adjusted for indicated factors and the 1979 density for women.

Source: DiNardo, Fortin and Lemieux 1996

**Some key results of DFL for Males:**

	Measure	Change	MinWg	Unions	X's	S&D	Unexplained
MinWg 1st	90-10	0.195	25.3%	10.7%	20.7%	20.7%	22.6%
S&D 1st			16.0%	24.1%	4.8%	32.6%	
MinWg 1st	50-10	0.076	65.7%	-25.6%	49.7%	10.9%	-0.7%
S&D 1st			43.5%	-5.5%	26.9%	33.9%	

**Key results of DFL for females:**

	Measure	Change	MinWg	Unions	X's	S&D	Unexplained
MinWg 1st	90-10	0.328	45.1%	1.3%	25.6%	11.1%	16.9%
S&D 1st			41.6%	0%	14.6%	26.8%	
MinWg 1st	50-10	0.243	61.7%	-4.1%	32.1%	-4.5%	14.8%
S&D 1st			56.5%	-3.0%	18.7%	13.0%	

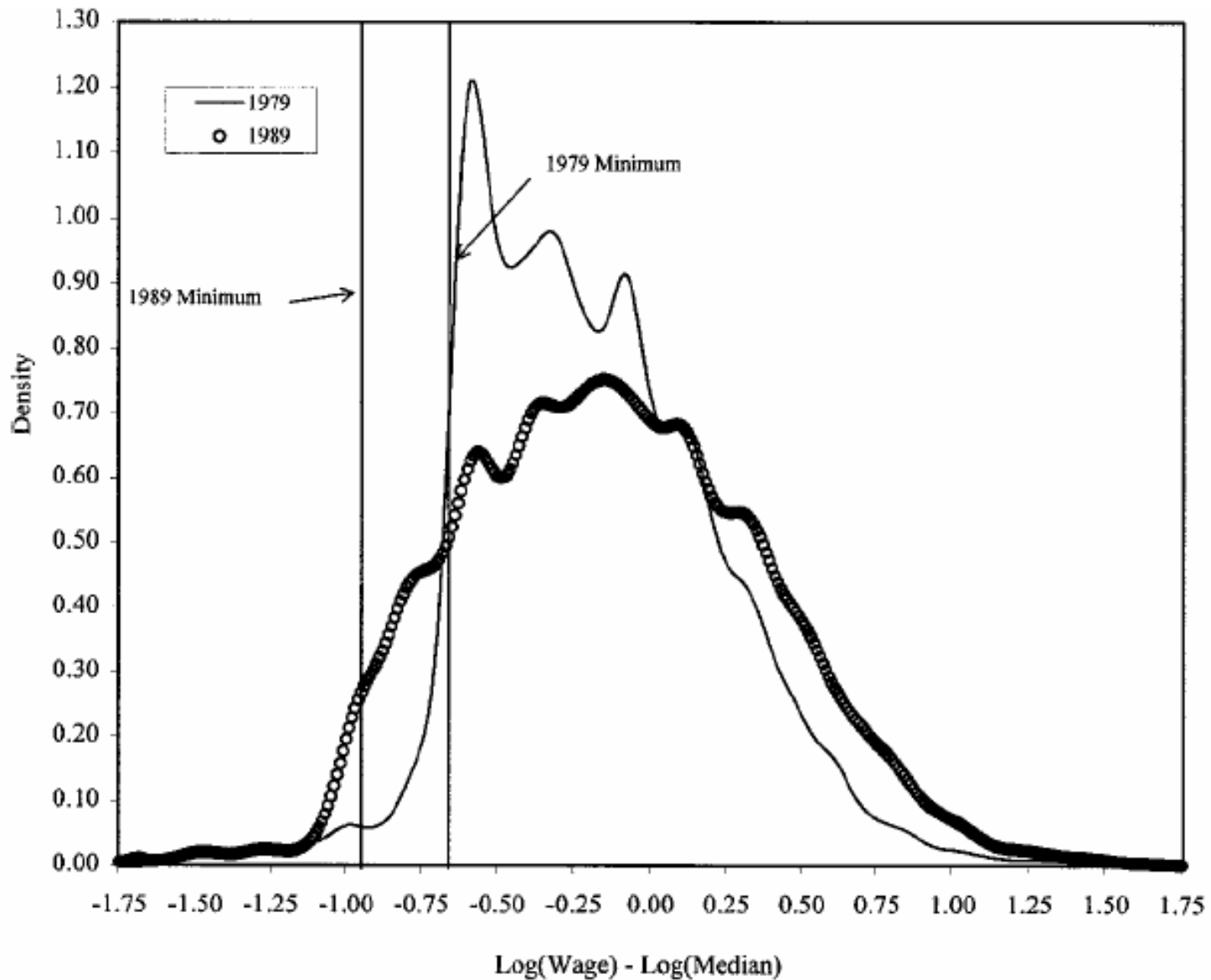


FIGURE Ib  
 Wage Distribution Density Estimates: Women, 1979–1989

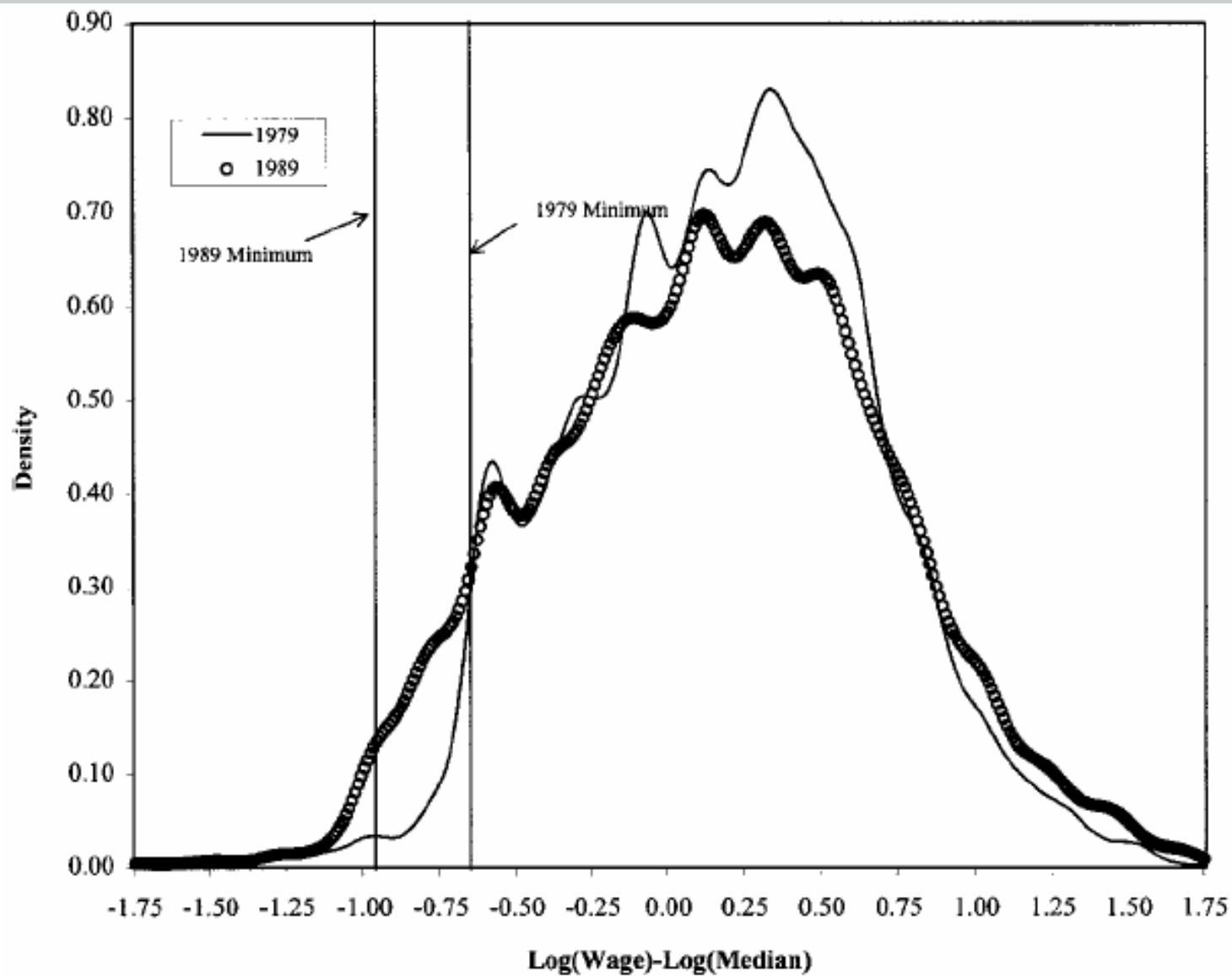


FIGURE Ia  
Wage Distribution Density Estimates: Men, 1979-1989

# Estimating the Effects of Unions, Job Tasks, and Labor Market Composition on the Changing Wage Distribution

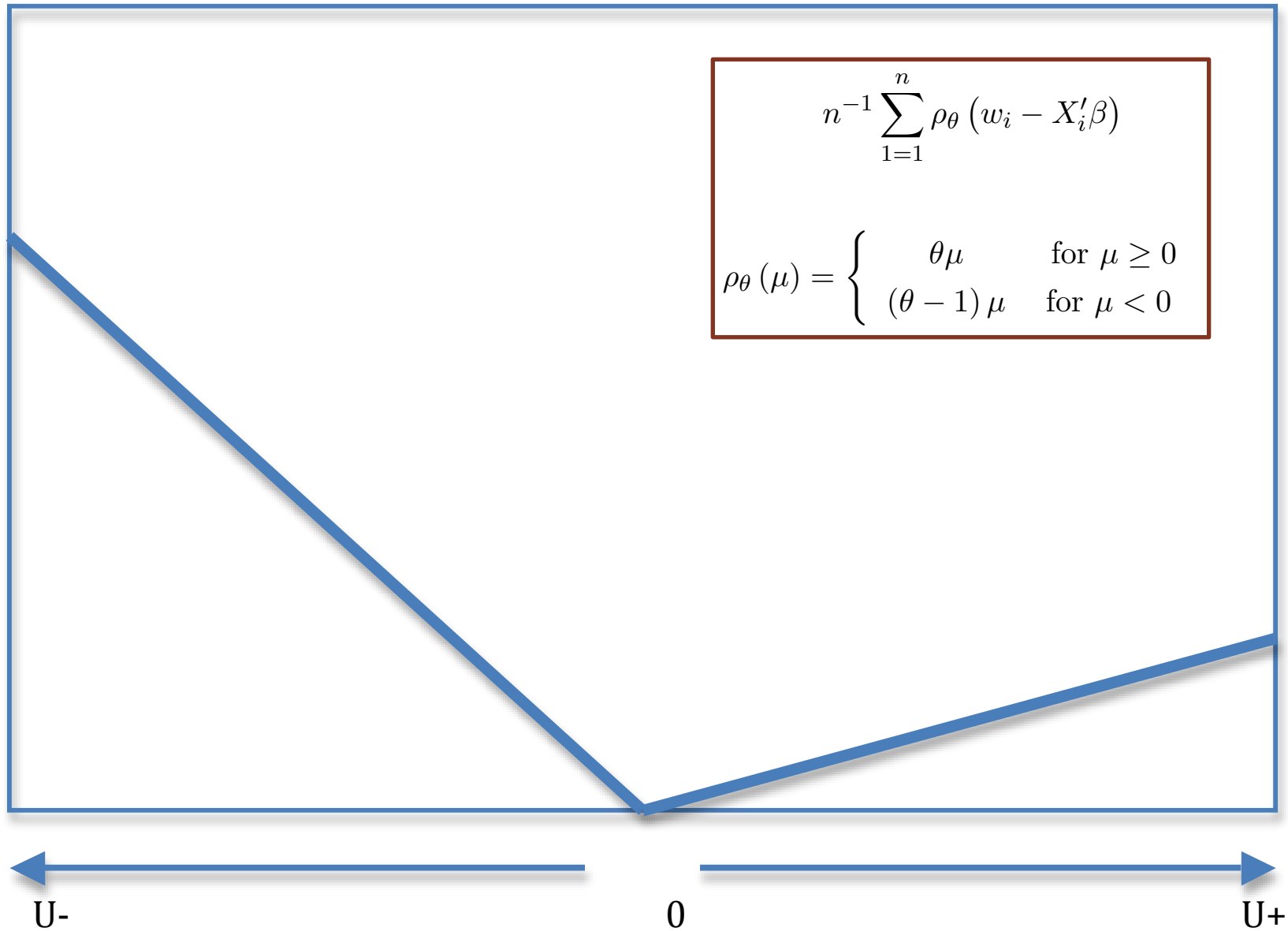
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Firpo, Fortin and Lemieux 2011 (working paper)

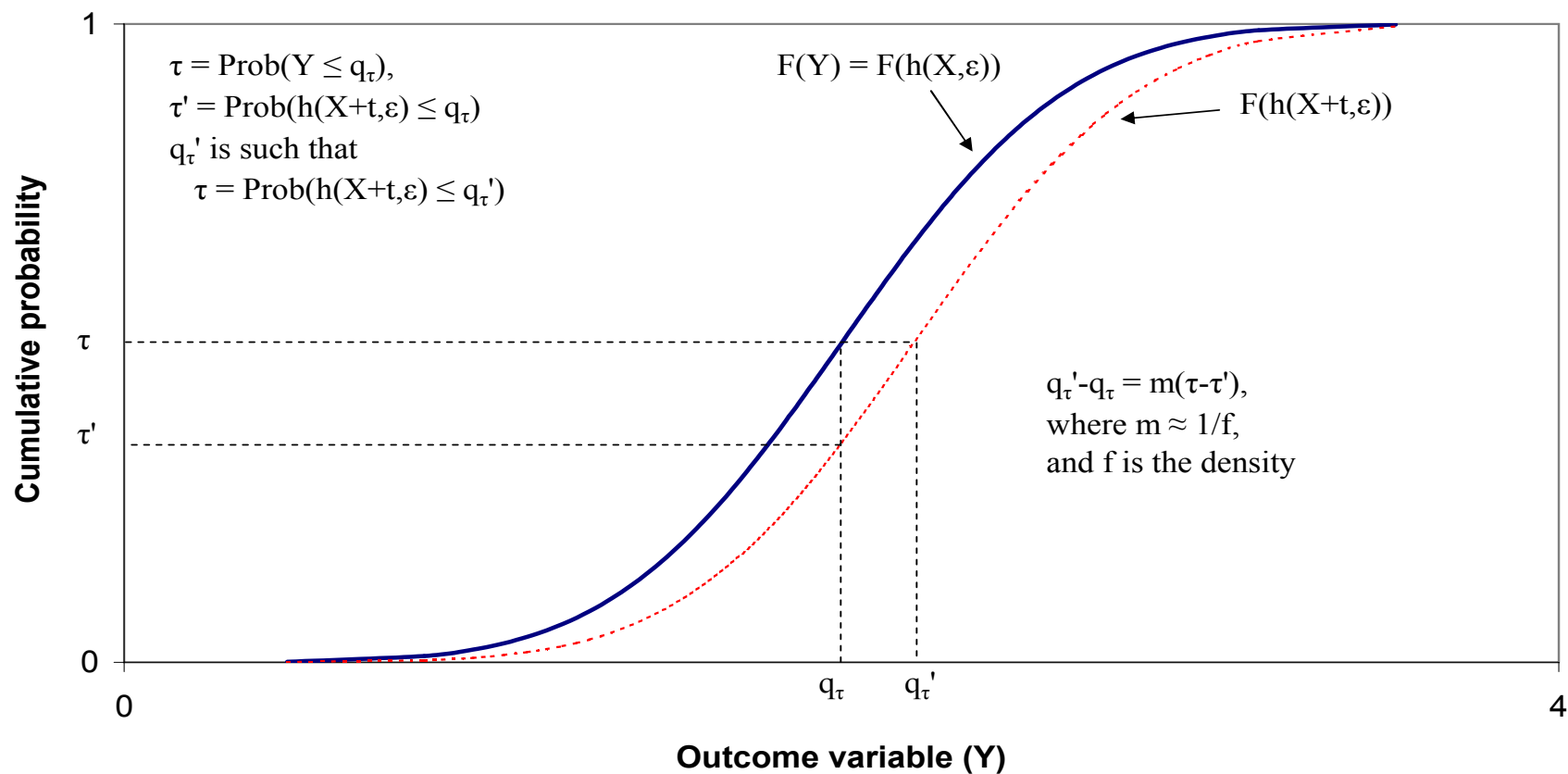
Firpo, Forin and Lemieux 2009 (*Econometrica*)



# 'Check Function' for 25<sup>th</sup> Percentile

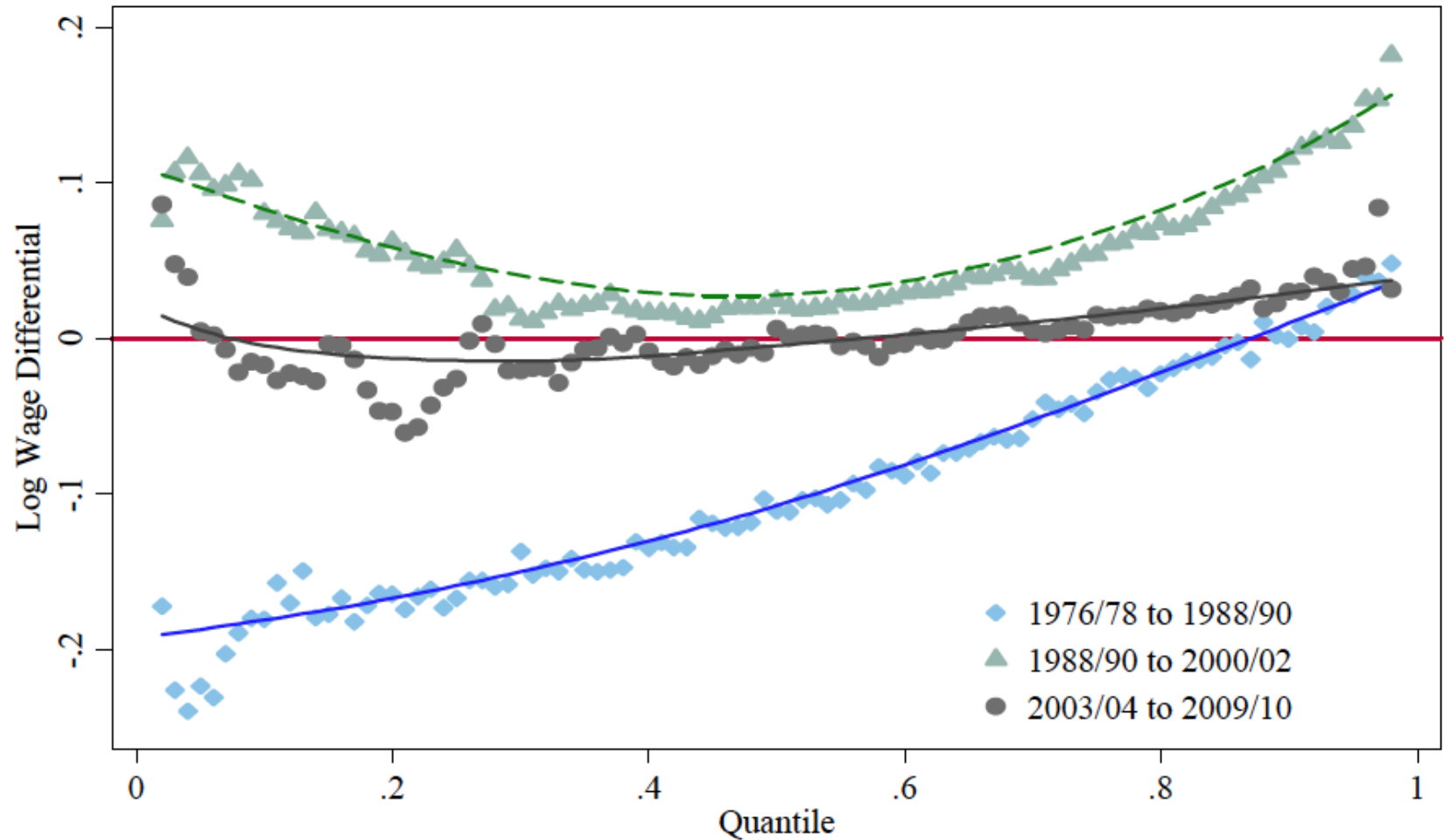


# Local CDF Inversion as in FFL



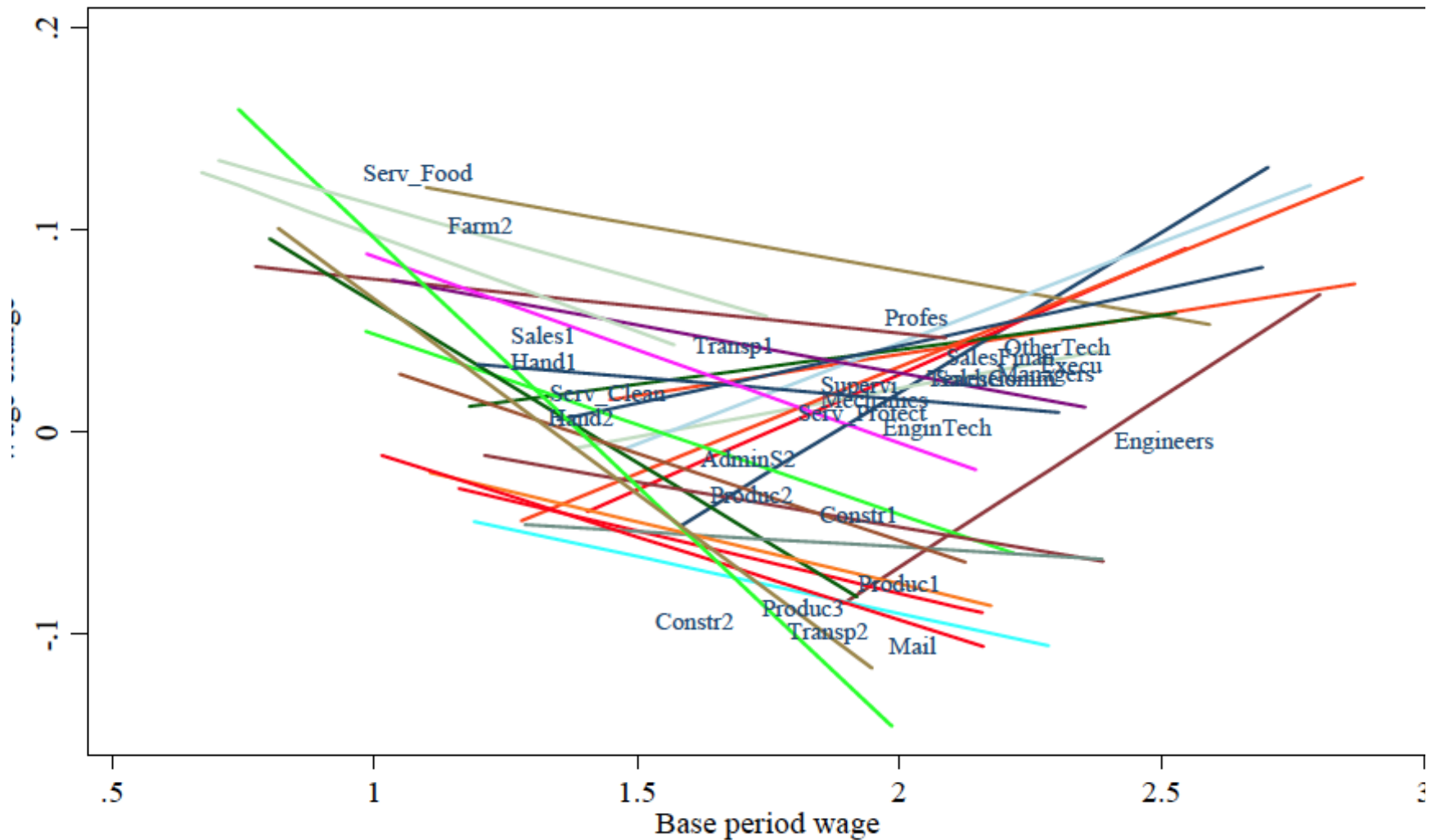
# Wage Density Changes for Males 1977- 2009

Figure 1. Changes in Real Wages (\$1979) by Percentile, Men



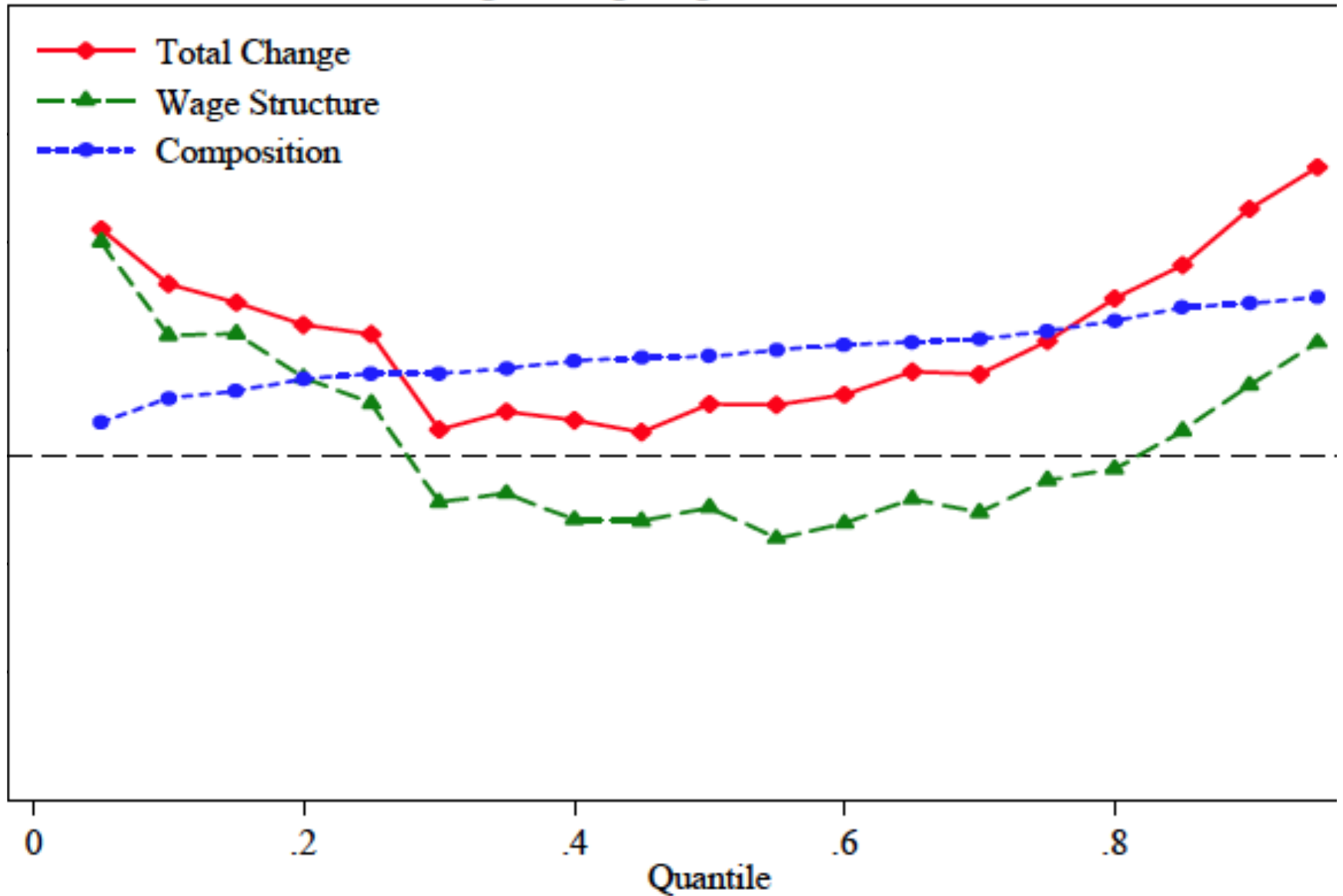
# Occupational Wage Changes 1989-2001: Plotted Lines Correspond to Level (x-axis) and Change (y-axis) of 10<sup>th</sup> and 90<sup>th</sup> Quantile

Figure 2. Fitted Changes in Wages from 1988/90 to 2000/02 in Top 30 2-Digit Occupations



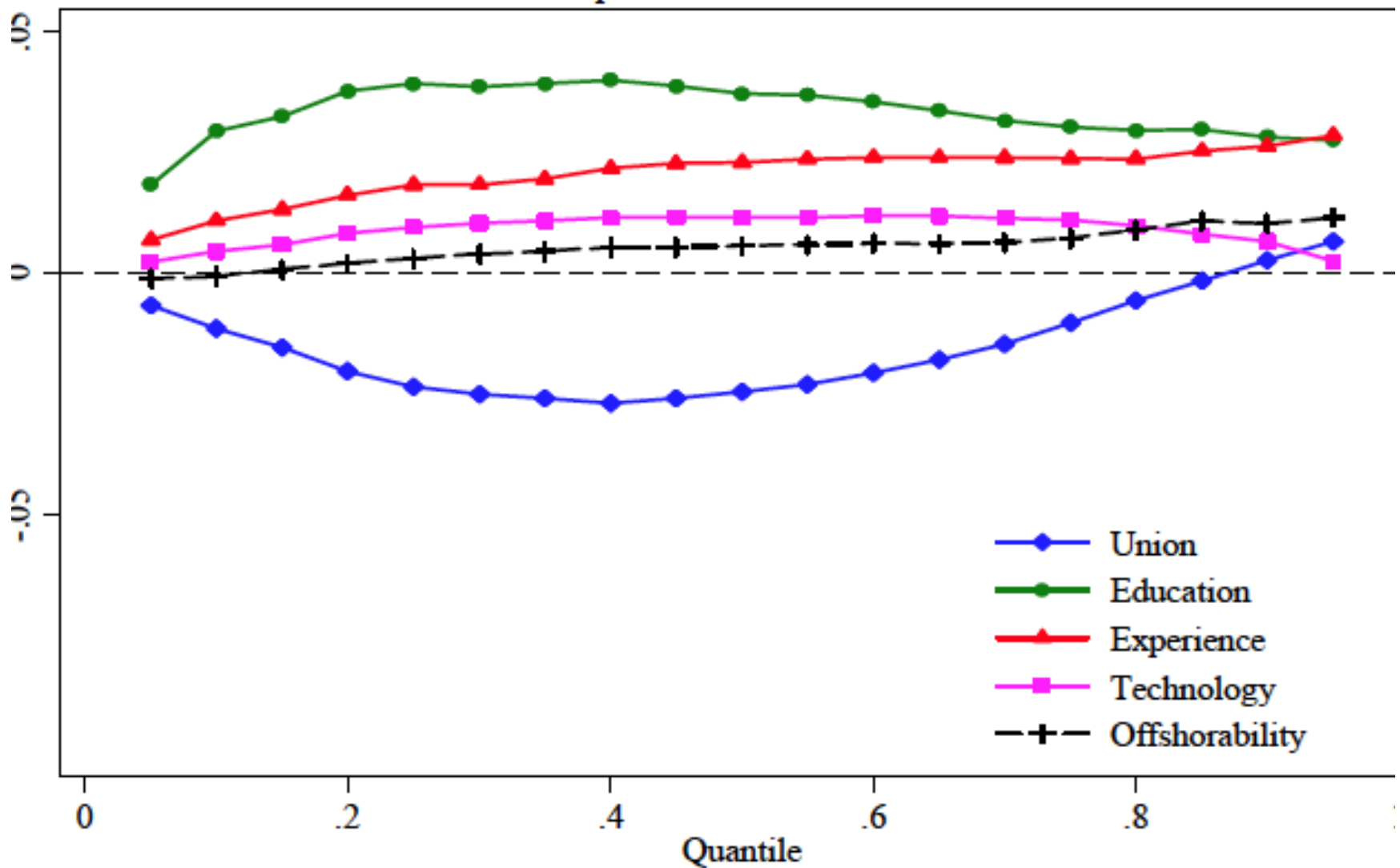
# Effects of $\Delta$ Prices and $\Delta$ Quantities on $\Delta$ Wage Structure: 1989 - 2001

## B. Change in Log Wages 1988/90 to 2000/02



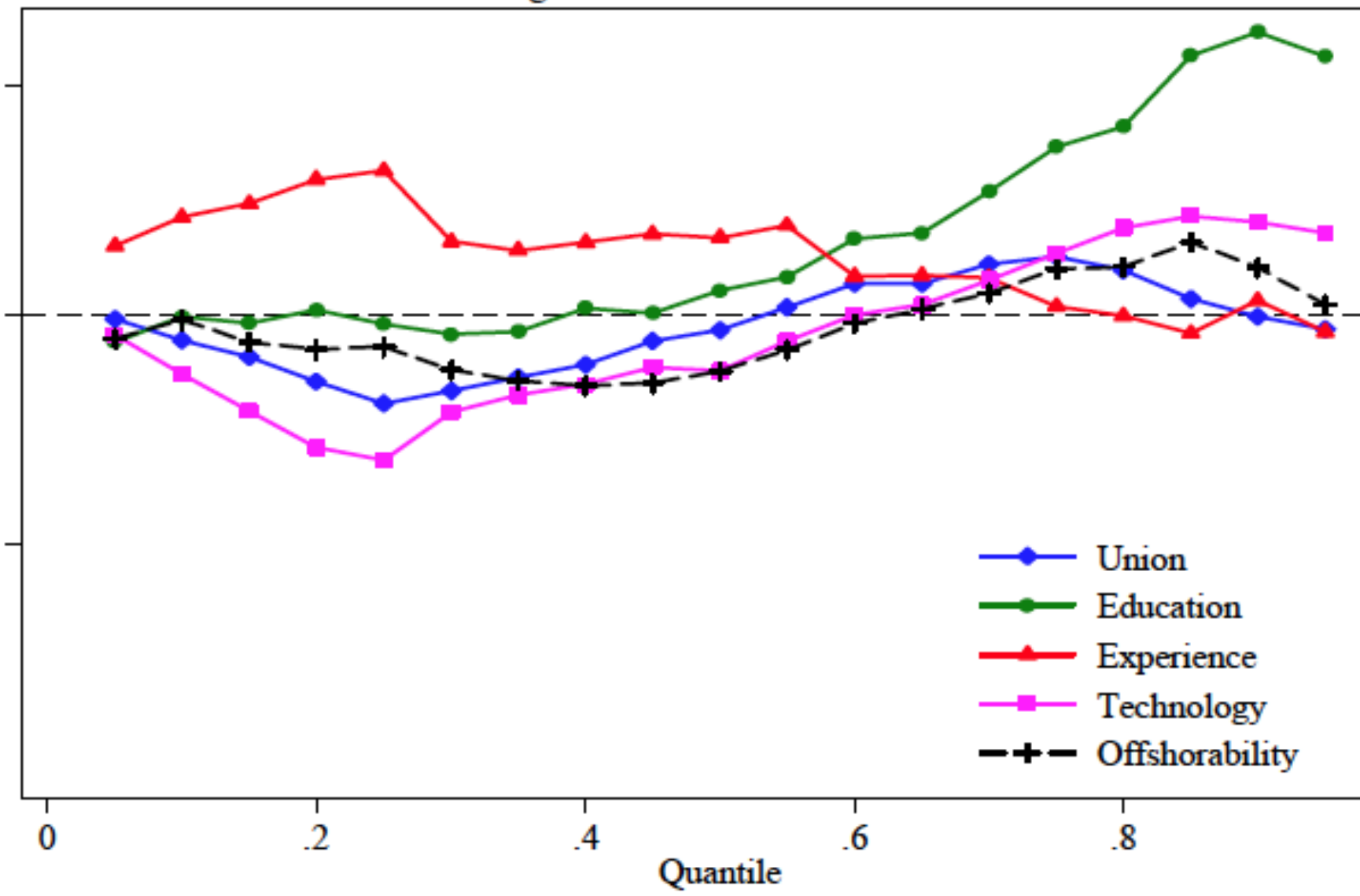
# Decomposition of Estimated Quantity Effects: 1989 - 2001

## B. Detailed Composition Effects 1988/90 to 2000/02



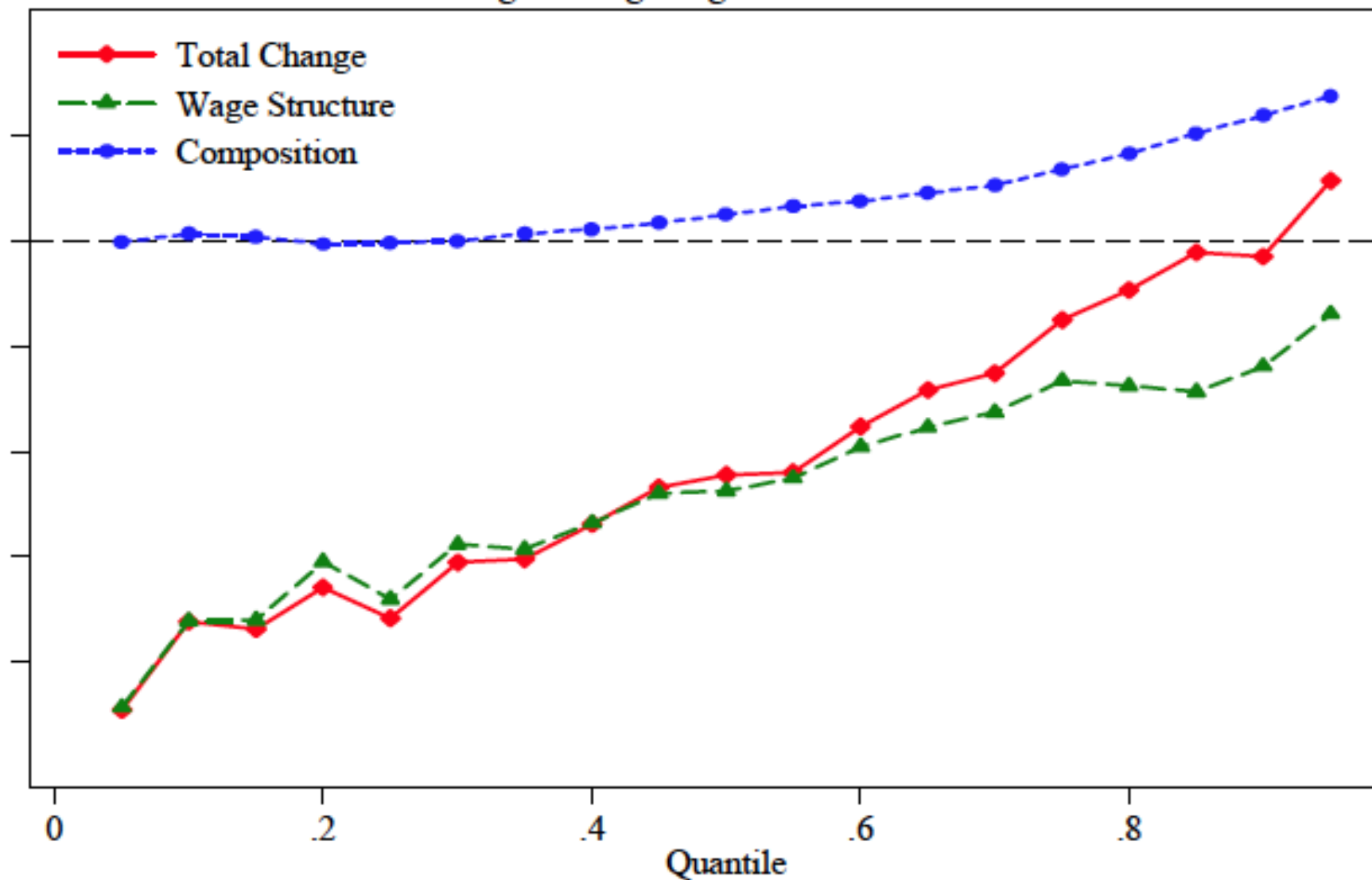
# Decomposition of Estimated Price Effects: 1989 - 2001

## B. Detailed Wage Structure Effects 1988/90 to 2000/02



# Effects of $\Delta$ Prices and $\Delta$ Quantities on $\Delta$ Wage Structure: 1977 - 1989

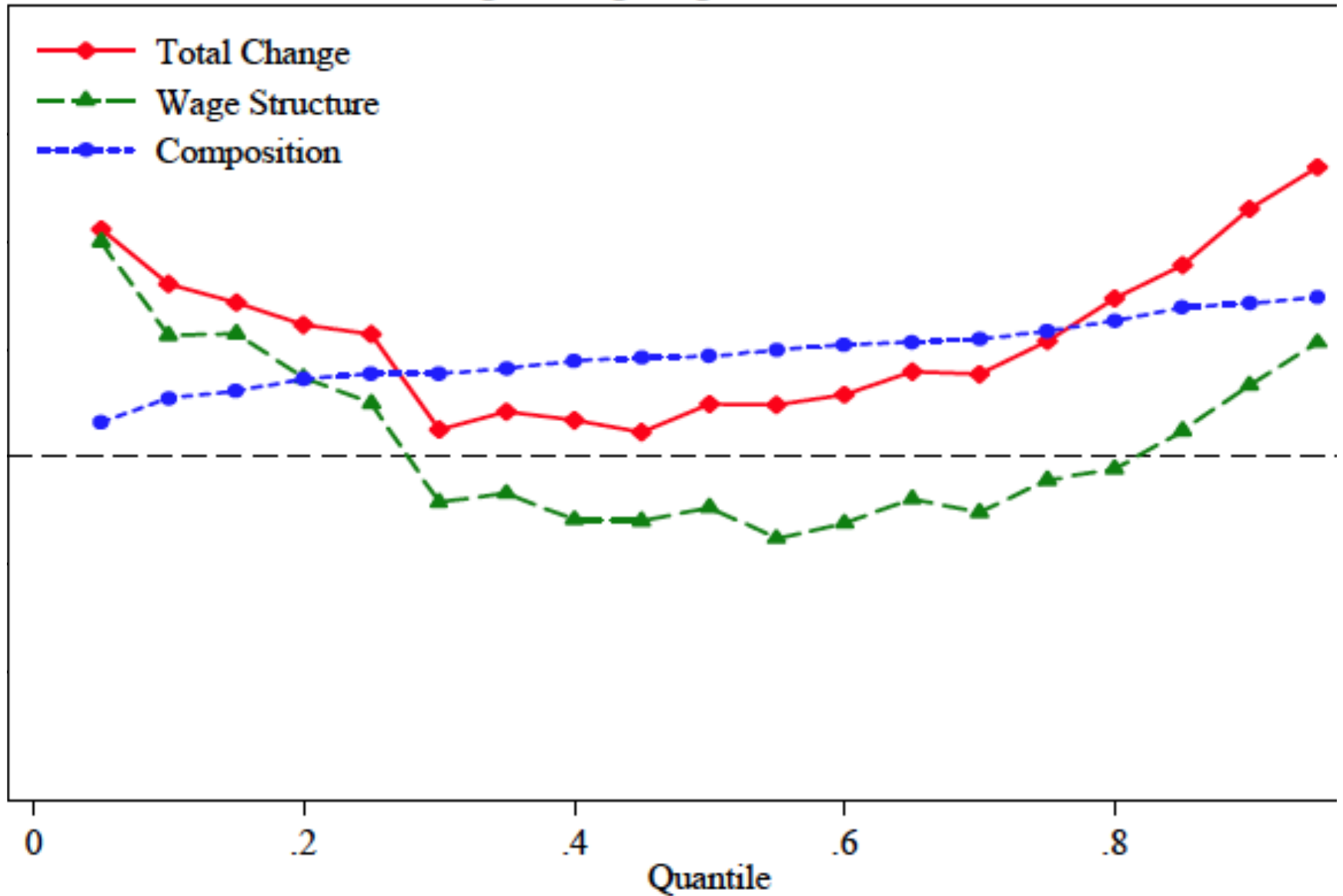
## A. Change in Log Wages 1976/78 to 1988/90





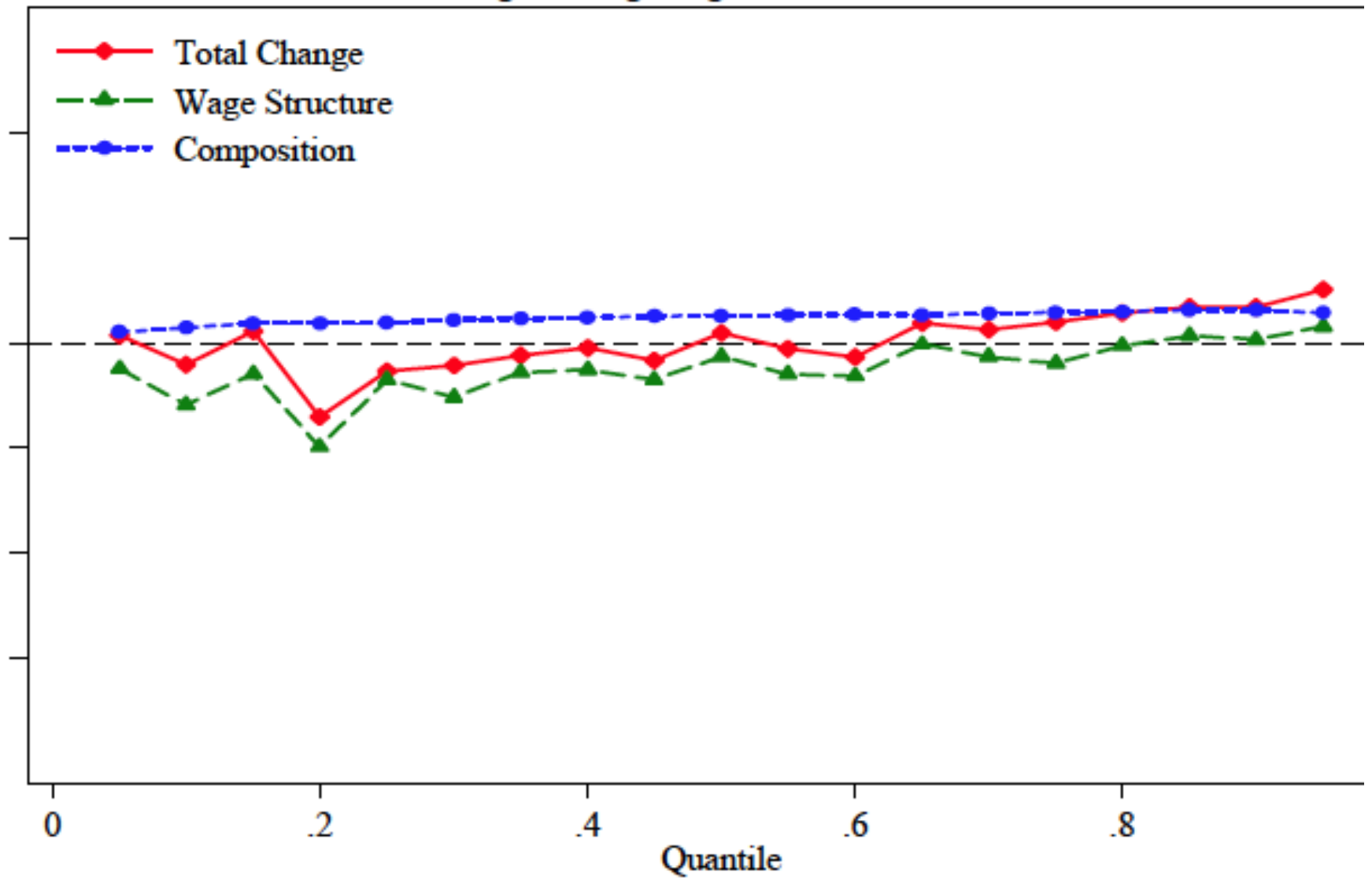
# Effects of $\Delta$ Prices and $\Delta$ Quantities on $\Delta$ Wage Structure: 1989 - 2001

## B. Change in Log Wages 1988/90 to 2000/02



# Effects of $\Delta$ Prices and $\Delta$ Quantities on $\Delta$ Wage Structure: 2003 – 2009

## C. Change in Log Wages 2003/04 to 2009/10



# Regression of $\Delta$ Slopes and $\Delta$ Intercepts on Task Measures

Table 2. Estimated Effect of Task Requirements on Intercept and Slope of Wage Change Regressions by 2-digit Occupation

O*NET Indexes	Tasks Entered Separately				Tasks Entered Together			
	Intercept		Slope		Intercept		Slope	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Information content	0.004 (0.007)	0.035 (0.009)	0.059 (0.009)	0.031 (0.013)	0.005 (0.011)	0.030 (0.011)	0.020 (0.012)	-0.008 (0.013)
Automation /routine	-0.023 (0.009)	-0.034 (0.008)	-0.070 (0.014)	-0.045 (0.010)	-0.016 (0.011)	-0.030 (0.010)	-0.028 (0.013)	-0.013 (0.012)
No on-site work	0.012 (0.010)	0.015 (0.004)	0.034 (0.007)	0.026 (0.004)	0.003 (0.006)	0.002 (0.005)	0.019 (0.007)	0.021 (0.006)
No face-to-face	-0.030 (0.010)	-0.035 (0.009)	-0.067 (0.018)	-0.051 (0.011)	-0.036 (0.015)	0.002 (0.015)	0.027 (0.017)	-0.014 (0.018)
No decision making	-0.003 (0.009)	-0.035 (0.012)	-0.078 (0.012)	-0.051 (0.015)	0.032 (0.017)	0.001 (0.015)	-0.045 (0.019)	-0.012 (0.018)
Base wage	No	Yes	No	Yes	No	Yes	No	Yes
Adj. R-square	---	---	---	---	0.27	0.51	0.73	0.81

# Regression of $\Delta$ Slopes and $\Delta$ Intercepts on Task Measures

Table 2. Estimated Effect of Task Requirements on Intercept and Slope of Wage Change Regressions by 2-digit Occupation

O*NET Indexes	Tasks Entered Together			
	Intercept		Slope	
	(5)	(6)	(7)	(8)
Information content	0.005 (0.011)	0.030 (0.011)	0.020 (0.012)	-0.008 (0.013)
Automation /routine	-0.016 (0.011)	-0.030 (0.010)	-0.028 (0.013)	-0.013 (0.012)
No on-site work	0.003 (0.006)	0.002 (0.005)	0.019 (0.007)	0.021 (0.006)
No face-to-face	-0.036 (0.015)	0.002 (0.015)	0.027 (0.017)	-0.014 (0.018)
No decision making	0.032 (0.017)	0.001 (0.015)	-0.045 (0.019)	-0.012 (0.018)
Base wage	No	Yes	No	Yes
Adj. R-square	0.27	0.51	0.73	0.81