

Sources and centers of cyclical movement in real wages: evidence from panel data

Despite numerous empirical studies of real wages over the business cycle, economists have yet to reach a consensus on the direction or degree of cyclical movement in the real wage. Both classical and neo-Keynesian models predict a countercyclical pattern based on the diminishing marginal product of labor. However, observed patterns have frequently run counter to this prediction. Furthermore, the findings appear quite sensitive to the particular techniques of individual studies. Yet the debate remains lively, reflecting the central role that real wage movements play in discussions of both theory and policy. The dual significance of the topic is clear. In theoretical debates, neoclassical, Keynesian, and Post Keynesian schools are faced with the challenge of developing models consistent with observed cyclical patterns. In the world of policy, the consequences of restrictive and expansionary fiscal and monetary actions are crucially affected by the cyclical behavior of real wages.

Recently, statistical techniques and data availability have allowed a disaggregated approach to the empirical analysis. Although disaggregation provides valuable information, few studies of wage movements over the business cycle have used disaggregated data.¹ In

The author is Assistant Professor in the Department of Economics, Wesleyan University. She would like to thank Michael Lovell, William Barber, Stanley Lebergott, and William Butos for comments on an earlier draft. She would also like to thank Tyler Holt for his careful computer assistance.

¹Bils (1985) is the first to use panel data on individual workers to address this issue. His analysis is based on data from the National Longitudinal Survey. Mitchel (1985) uses data disaggregated by 18 demographic categories while Mehra (1982) uses data disaggregated by industrial sector.

this study, a micro-unit approach, based on data from the Michigan Panel Study of Income Dynamics, proves useful for demystifying the cyclical behavior of real wages. The research covers the years from 1967 to 1980 and explores variations in wage movements across workers with differing labor market experiences. The Michigan Panel Study is particularly suited for this investigation because it records annual changes in labor market status, follows workers of all ages, and provides detailed information on relevant employment characteristics. One such characteristic is the worker's tenure status, a variable that plays a significant role in this investigation.

The analysis first identifies sources of cyclical movement in real wage rates; these are events such as job change, change in full-time status, change in overtime status, and loss or gain of an extra job. The results indicate that much of the wage movement actually has its source in these quantity-driven changes. Next, the analysis identifies centers of cyclical sensitivity; these are specific labor markets with strongly cyclical wage patterns. In order to identify these sectors, the study examines labor markets for novice workers and for experienced workers in both low-skill and high-skill jobs.

The analysis sheds light on what Bosworth (1983, p. 121) has called "the basic issue that divides us today in the theory and practice of aggregate economic policy," the flex-price versus fix-price view of how microeconomic markets function. The results highlight both the value and the limitations of the flex-wage/fix-wage dichotomy. At the same time, the results are useful in analyzing the distributional impacts of recessions and in evaluating policies that operate by restricting aggregate demand.

I. Background

The empirical debate on the cyclical behavior of real wages dates back to Keynes's (1936) adoption of the neoclassical view that real wage rates move countercyclically in line with the diminishing marginal product of labor. When Dunlop (1938) and Tarshis (1939) provided evidence of a procyclical pattern, Keynes (1939) acknowledged the results without finding them disruptive of the analysis set forth in *The General Theory*. However, Ruggles (1940) and Tobin (1948) questioned the statistical significance of the Dunlop and Tarshis findings. In subsequent years, work by Kuh (1966) and Bodkin (1969) appeared to confirm the absence of a statistically significant countercyclical pat-

tern. Yet research by Neftci (1978) and Sargent (1978) suggested that misspecifications of the lag structure had masked a truly significant, although lagged, countercyclical relationship.

In efforts to explain the conflicting evidence for the United States, several studies suggest that the United States simply differs from the norm of real wage patterns. Examining 14 industrialized countries, Otani (1978) finds a significantly countercyclical pattern for most countries, but an insignificant positive correlation for the United States. Doubt is cast on the U.S.-as-exception theory by Chirinko (1980), who, using a modified form of Otani's method and using weights to correct for changes in industrial mix, finds a significant countercyclical pattern. Yet a subsequent study by Geary and Kennan (1982), based on data for the United States and 12 Organization for Economic Cooperation and Development (OECD) countries, is unable to reject the hypothesis of statistical independence. Furthermore, Schor (1985), by pooling data for 9 countries (including the U.S.) and by using theoretically defined cyclical turning points rather than chronological units as the units of observation, finds significant procyclical behavior for the United States and most other countries.

This review of prior research reveals that findings are highly sensitive to the methods employed including the sample period selected, the lag structure imposed, the choice of deflator, the country studied, and the degree of disaggregation, among other factors. Recently, the evidence suggesting a procyclical pattern has received support from research that uses disaggregated data and that demonstrates aggregation bias in the earlier studies (Bils, 1985; Mitchel, 1985). The source of this bias is two-fold. First, employment is more cyclical in some sectors than in others. If high-wage workers have more procyclical employment patterns, this adds a procyclical bias to studies based on aggregate data. Second, with different degrees of cyclical wage sensitivity across various sectors, there is no reason for the aggregate pattern to reflect the patterns in individual markets. Countercyclical wage behavior in some markets may be offset by procyclical behavior in others, making wages in the aggregate appear acyclical.

II. The framework for analyzing differential sensitivity in real wage rates

This study focuses attention on variations in the degree of cyclical wage sensitivity. Significant differences in wage sensitivity might well be

expected given the theorized presence of fixed-wage and flexible-wage arrangements in the labor market. For instance, in discussing the distinction between casual and career markets, Okun (1981, p. 82) argues that, in casual labor markets, "wages will be much more flexible than in career jobs because the employer may have no good alternatives to wage hikes in a strong labor market and need not have serious inhibitions about curbing wages in a weak one." An additional distinction, between experienced workers and novice workers, may also be relevant. According to Okun, "The inhibitions that apply to holding down or cutting back the pay of established workers are not directly relevant to new recruits. The offer of a reduced [wage] to a new worker does not raise problems of disappointment or breach of faith. And a weak labor market may provide a supply of willing applicants at very low [wages]" (p. 58). In other words, both the casual/career dichotomy and the novice/experienced distinction may be relevant in predicting differences in cyclical wage behavior. Moreover, the significance of the novice/experienced distinction for cyclical wage movements can be expected to increase with the skill level of the job. In Okun's words, "The restraining forces are bound to be larger in those firms for which toll costs are higher" (p. 107). This set of predictions provides a framework for analyzing cyclical wage movements. However, the theory has recently been criticized for failing to explain the variability observed across countries in the responsiveness of wages to changes in aggregate demand and supply (Gordon, 1983). While the criticism was originally intended to spur more cross-country research on institutional differences in the degree of cyclical wage sensitivity, the issue may also be addressed by taking a closer look at variations in the degree of wage sensitivity across different labor markets within the United States. This is the intent of the current investigation.

In particular, the research addresses the following questions: (1) Is there evidence of cyclical wage behavior that resembles the fix-wage/flex-wage framework described above? (2) What sources and centers of cyclical wage sensitivity can this framework identify? (3) What insights does the evidence provide for: (a) understanding cyclical movements in real wages? (b) determining the distributional impacts of cyclical wage behavior? (c) evaluating the wage-moderating effectiveness of demand management strategies?

Sources and centers of cyclical movement in real wages are analyzed by applying panel data to the following model:

$$\ln(W_{it}/W_{i,t-t}) = R_t + \alpha z(X_{it}) + \beta a(DU_t) + \gamma 4(X_t * AU_t) + v_{it}$$

where:

- W_{it} = the real wage rate of individual i in year t (annual labor income deflated by the Consumer Price Index (CPI) and divided by annual hours of work),
- X_{it} = matrix of individual-specific characteristics for individual i in year t ,
- AU = change in the aggregate unemployment rate in year t ,
- X_t = a subset of the individual-specific characteristics, and
- v_{it} = disturbance term.

To explore differential wage sensitivity over the business cycle, the impact of the unemployment term is allowed to vary through the interaction term ($X_t * DU$). For example, in exploring sources of cyclical movement in an individual's real wage, the X ' matrix is defined by four dummy variables: one for job change, one for changes between full-time and part-time status, one for the change in overtime status, and one for loss or gain of an extra job. z

Centers of cyclical sensitivity in real wages are explored by redefining X_s to represent an individual's occupation and tenure status. If the fix-wage/flex-wage framework provides a reasonable approximation of reality, then the following results can be expected: (1) individuals in high-skill occupations will exhibit relatively acyclical real wages; (2) individuals with high tenure status will, likewise, be insulated from cyclical wage sensitivity; and (3) the insulation afforded by high tenure status will increase with the skill level of the occupation. Finally the distributional consequences of differential wage sensitivity are explored by interacting the unemployment term with dummy variables for income class of the individual.

III. The data

The analysis is based on data for white males, ages 25-65, from the Michigan Panel Study of Income Dynamics (MPSID). The information in the MPSID is derived from interviews which began in 1968 and recurred each year, tracking the same families and individuals from one

²Details on the specific variables used in the analysis are provided in the Appendix.

Table 1

The wage equation-before (1) and after (2) the addition of the slope dummy for periods of falling unemployment rates

	(1)	(2)
Constant	.0637 (5.981)	.063 (5.749)
Schooling	.011 (1.682)	.001 (1.681)
Time	.001 (1.347)	.001 (1.162)
Experience	-.003 (-5.513)	.00003 (3.329)
(Experience) ²	.00004 (3.328)	-.003 (-5.512)
Unemployment rate	-.0128 (-4.929)	-.012 (-2.751)
D - (A Unemployment rate)	-	-.003 (-.170)
P2	.0032	.003
Number of observations	27,724	27,724

Note: The dependent variable is $\ln(W_{i,t}/W_{i,t-1})$. All estimates are ordinary least squares; t -statistics are in parentheses; D = 1 for periods of falling unemployment rates and 0 otherwise.

suggests that real wages tend to move procyclically and that much of the cyclical wage pattern actually has its source in quantity adjustments (i.e., changes in overtime status, changes in full-time or part-time status, movement between high-wage and low-wage jobs, and loss or gain of an extra job). These results suggest a process of wage adjustment that is very different from the neoclassical view. They are consistent with theories that describe the cyclical adjustment as a quantity-dominated process, a process characterized by a downgrading and upgrading of employment opportunities.⁴

Table 2 highlights sources of cyclical movement in the real wage. The results again indicate a significantly procyclical pattern. Of the

⁴ See Vroman (1977), Okun (1973), and Reder (1969) on this cyclical upgrading and downgrading process.

Table 2

Percentage change in the real wage per percentage point rise in the unemployment rate by source of wage decline (by occupation)

	All	Professional/ technical workers	Managers/ officials	Clerical/ sales	Craft and kindred workers	Operatives	Laborers/ service workers
AJob	-2.9 (-5.018)	1.2 (.104)	-5.8 (-4.324)	-2.3 (-1.591)	-1.9 (-2.038)	-3.6 (-3.183)	-3.9 (-1.492)
AOvertime status	-2.0 (-2.778)	-1.3 (-1.238)	-1.5 (-.816)	-2.1 (-1.029)	-1.9 (-1.846)	-2.9 (-2.013)	-0.2 (-.0472)
AExtra job	-1.1 (-1.545)	-1.0 (-.736)	-3.1 (-1.888)	0.5 (.217)	0.1 (.0415)	-2.4 (-1.3798)	-3.8 (-.867)
AFull-time status	-1.7 (-2.479)	1.2 (.826)	-0.6 (-.309)	-2.4 (-1.058)	-2.8 (-2.3098)	-3.2 (-2.1399)	-0.7 (-.283)
Fz	.032	.060	.055	.030	.044	.038	.043
Number of observations	27,724	4,611	4,759	2,743	5,983	4,081	1,352

Note: All estimated changes in wage rates are calculated from the coefficient on the change in the unemployment rate plus the coefficient on the appropriate interaction term. Joint *t*-statistics are in parentheses.

four sources that are examined in the first column, job change produces the most pronounced cyclical pattern with real wages falling by nearly 3 percent for every 1 percentage point increase in the unemployment rate. Among the four factors considered, it is the primary source of real wage erosion during recessions and the key source of real wage gains during booms.⁵ Table 2 also shows how cyclical movements in the real wage are related to changes in overtime, full-time, and part-time status. The significant contribution of lost overtime is predictable. However, the significance and magnitude of the coefficient on lost full-time status is surprising. According to the results, downgrading from full-time to part-time status is nearly as important as lost overtime in explaining recession-induced erosion of the real wage.

Further disaggregation reveals that the significance of the four factors differs considerably by occupation. Among craft workers, switching from full-time and part-time status is the major source of cyclical sensitivity in real wages. In contrast, for managers and officials, cyclical movement between high-wage and low-wage jobs is the primary factor. Workers in this group who change jobs when the unemployment rate rises by 1 percentage point experience a 5.8 percent drop in their real wage rate. This is significantly larger than the 1.5 percent wage erosion experienced by their job-retaining counterparts. In contrast, operatives exhibit cyclical wage sensitivity from three sources. Job changing, change in overtime status, and movement between full-time and part-time status all make a significant contribution to cyclical wage sensitivity for this group.

The results described above identify several factors contributing to procyclical behavior in an individual's real wage. While our traditional view of cyclical adjustments pictures a world in which real wages fluctuate countercyclically for a given employment status, the focus here suggests an alternate interpretation. In particular, the results suggest a world in which the structure of real wage rates is relatively acyclical while the distribution of employment opportunities shrinks or expands. In such a world, the upgrading or downgrading of employment status makes a significant contribution to the cyclical behavior of real wages.

⁵Using panel data from the National Longitudinal Survey, Bills (1985) also identifies job switching as a significant factor associated with procyclical movements in the real wage.

Occupation and cyclical movement in real wage rates

Table 3 displays the percentage change in the real wage by occupation category of the worker. The distinction between casual labor markets and career labor markets suggests that wage sensitivity will be centered in and perhaps limited to the lower-skill occupations while the higher-skill occupations will more closely resemble a fixed-wage sector.

In fact, little evidence of a fixed-wage sector is found. Five of the six occupations exhibit real wage movements that are significantly procyclical. Only for the remaining category (professional and technical workers) do real wages appear acyclical. In other words, a clear-cut distinction between rigid-wage and flexible-wage sectors is not apparent. Perhaps this is not surprising given the broad occupation categories considered here. However, it does highlight the fact that, while the career-casual distinction is useful on a theoretical level, real world complexities do not fit neatly into the simple rigid-wage/flexible-wage framework.

Although most occupations share in the wage moderation that occurs in a downturn and in the wage gains achieved during booms, the sharing is far from equal. As Table 3 reveals, the pattern is more pronounced for workers in the lower-skill occupations. These workers contribute considerably more to wage moderation during recessions and gain considerably more from expansion-induced wage increases during booms.

These observations are of interest for evaluating the relevance of the fix-wage/flex-wage distinction. Yet the findings are also relevant for two other purposes. First, they are useful for evaluating the consequences of anti-inflationary demand management. The results indicate that policies based on restricting aggregate demand will extract the greatest wage moderation from those with the lowest wages. By placing the burden of wage moderation on those with the least capacity to contribute and by leaving the more substantial resources of the high-wage workers relatively untapped, this tendency undermines both the probable success and the vertical equity of such inflation-fighting tactics.

Second, the findings are useful for evaluating the distributional impacts of recessions. According to the results, research that ignores cyclical behavior of wages is likely to understate both the magnitude and the regressivity of recession-induced losses in earnings. Past studies of recession incidence have tended to focus on the hours component

Table 3

Percentage change in the real wage and percent wage-loss per percentage point rise in the unemployment rate (by occupation)

	Estimated percent change in the real wage	w	h	(Estimated change in wage) •(h)	Estimated percent wage-loss
Professional/ technical workers	-0.8 (-1.374)	8.31	2,195	-\$143	-1.0
Managers/ officials	-1.3 (-2.389)	7.89	2,472	-272	-1.5
Sales/clerical workers	-1.6 (-2.202)	6.51	2,242	-240	-1.7
Craft and kindred workers	-0.9 (-2.030)	6.20	2,161	-125	-1.0
Operatives	-2.1 (-3.4997)	5.43	2,174	-250	-2.2
Laborers/ service workers	-3.0 (-2.798)	4.11	2,039	-249	-3.0
FR2	.006				
Number of observations	22,010				

Note: Occupation category is defined by the individual's occupation in year $(t - 1)$. The lagging assures exogeneity; w = average wage rate in 1973; h = average hours in 1973.

Table 4

Percentage change in the real wage per percentage point increase in the unemployment rate by family income class

Income-needs class	Percentage change in the real wage rate	t-Statistic
Low		
Under 2.00	-1.8	-3.558
(Under 1.00)	(-3.0)	(-2.362)
(1.00-1.50)	(-1.9)	(-2.210)
(1.50-2.00)	(-1.3)	(-1.926)
Middle		
2.0-4.00	-1.1	-2.928
(2.00 -2.50)	(-0.6)	(-0.957)
(2.50 -3.00)	(-1.3)	(-1.890)
(3.00-3.50)	(-1.3)	(-1.737)
(3.50-5.00)	(-1.2)	(-1.430)
High		
4.00-up	-1.2	-2.308
(4.00-4.50)	(-0.4)	(-0.399)
(4.50-5.00)	(-2.1)	(-1.829)
5.00-up	(-1.7)	(-2.294)

Note: Income class is defined as the five-year average of (family income)/(family need) where need is the poverty-line level of income for the family.

of the recession-induced loss in earnings. In these studies, the wage is assumed constant and changes in the wage are assumed small enough to be ignored (see Gramlich, 1974, and Gramlich and Laren, 1984). However, Table 3 reveals that the wage loss can be considerable when evaluated at the pre-recession level of hours (see the right-hand column). Through wage-loss alone, laborers and unskilled workers lose about 3 percent of their earnings for every 1 percentage point rise in the unemployment rate. For operatives, the loss is also high at 2.2 percent, while, for the higher-wage occupations, losses range from 1 to 1.7 percent.

The distributional consequences of this tendency by family income class are shown in Table 4. For males categorized by the income-to-needs ratios of their family, the table displays the percentage change in the real wage rate per percentage point increase in the unemployment rate. The most severe erosion of the husband's wage rate is experienced by the poor households. For this group, wage rates fall by about 3

percent. For the near poor, the decline is about 2 percent, while for the vast majority of the individuals (those in households with higher income status) the percentage wage decay is smaller, approximately 1 percent.

Tenure status and cyclical movement in real wages

Table 5 presents the cyclical sensitivity of real wages by tenure status of the worker. According to the fix-wage/flex-wage dichotomy described above, the wages of novice workers and experienced workers should exhibit different degrees of cyclical sensitivity. Two predictions in particular can be identified. First, cyclical wage movements should be more pronounced among workers with low tenure status. Second, tenure status should matter most in occupations requiring a high degree of firm-specific human capital.

Before disaggregation by occupation category, all workers appear to experience real wage movements that are significantly procyclical regardless of tenure status. After disaggregation, however, more interesting results emerge. Again, the picture is more complex than the fix-wage/flex-wage dichotomy suggests. For example, among professional and technical workers, cyclical sensitivity in the real wage is greatest for the middle tenure category. However, in the two remaining high-skill categories (managers and officials; craft and kindred workers) high tenure status does insulate workers from cyclical sensitivity in the real wage as predicted. In these occupations, the real wage is basically acyclical. Only workers with low tenure status in these occupations experience significant wage gains during booms.

Results are quite different for workers in occupations that require less skill. In the operatives category, workers in all tenure groups experience significantly procyclical wage behavior. Furthermore, the estimated wage changes are similar in magnitude (about 2.2 percent) across the three tenure groups. In other words, for operatives, real wages are equally procyclical regardless of tenure status.

Yet a third pattern emerges for two of the lower skill categories (clerical and sales workers; unskilled laborers and service workers). Here, cyclical wage sensitivity appears to rise with tenure status. Rather than being insulated from cyclical changes, real wages for experienced workers in these occupations are actually more sensitive to cycles than the wages of their novice co-workers. The difference, however, is not statistically significant.

Table 5

Percentage change in the real wage per percentage point increase in the unemployment rate (by tenure status and occupation)

	All	Professional/ technical workers	Managers/ officials	Clerical/ sales	Craft and kindred workers	Operatives	Laborers/ service workers
Low tenure (0-3.9 years)	-1.5 (-4.187)	-0.4 (-.5196)	-3.6 (-4.073)	-1.1 (-1.110)	-1.2 (-1.828)	-2.3 (-2.915)	-0.6 (-.3909)
Middle tenure (4.0-9.9 years)	-1.3 (-2.856)	-2.1 (-2.171)	-0.7 (-.681)	-1.6 (-1.086)	-0.8 (-1.053)	-2.2 (-1.884)	-1.0 (-.3874)
High tenure (10 years-up)	-1.6 (-3.448)	-0.8 (-.777)	-1.4 (-1.412)	-2.3 (-1.642)	-0.2 (-.273)	-2.2 (-1.940)	-3.0 (-.981)
R2	.005	.008	.006	.005	.003	.006	.004
Number of observations	24,990	4,540	4,618	2,690	5,886	4,033	1,289

Note: Tenure status is defined by the individual's number of years with the present employer. In the analysis, the tenure variable is lagged by one year to assure exogeneity.

The results on tenure status identify centers of cyclical sensitivity in the real wage while illustrating both the value and the limitations of the fix-wage/flex-wage framework. In line with this framework, there appear to be "tenure-ignoring" sectors and "tenure-rewarding" sectors where the reward is a relatively stable real wage over the business cycle. As the fix-wage/flex-wage framework would predict, the tenure-rewarding arrangements are concentrated in the higher-skill occupations. However, the distinction is not as clear-cut as the framework implies. Not all high-skill sectors shift wage sensitivity to the lowest tenure groups, and some evidence is found of "tenure-penalizing" sectors, though the evidence is weak. In sum, the analysis highlights a greater diversity in patterns of wage adjustment than the theoretical framework suggests.

V Conclusion

Economists interested in understanding the cyclical behavior of real wages can learn much from exploring variations in the degree of cyclical wage sensitivity across workers with different labor market experiences. The results here highlight both the value and the limitations of the fix-wage/flex-wage framework for this type of investigation. The framework is useful for identifying centers of cyclical sensitivity in the real wage. However, it suggests a sharper distinction between fix-wage and flex-wage sectors than the evidence supports. While the career/casual framework describes occupations that are insulated from cyclical wage movements, the results find little evidence of occupations that are clearly characterized by acyclical wage rates. On the other hand, procyclical wage movements are indeed more pronounced in the lower-skill occupations as the theory predicts. The evidence also provides qualified support for the novice-wage/experienced-wage distinction. Cyclical wage sensitivity is not consistently more pronounced among novice workers. Yet, in line with the theory, tenure status does matter most in the higher-skill occupations and, in these sectors, high tenure does promote a relatively insulated wage.

The findings on centers of cyclical sensitivity in the real wage suggest that cyclical wage behavior, in the aggregate, will depend on the mix of fix-wage/flex-wage sectors and thus on the distribution of workers across various skill and tenure categories. Indeed, this mix itself should not be thought of as exogenous. The degree of economic

flux and uncertainty, among other factors, may well influence the mix of fix-wage and flex-wage arrangements in any given economic system. With this in mind, the fact that studies continue to find evidence of procyclical, countercyclical, and acyclical wage patterns is not surprising. Results here support the view that the cyclical behavior of real wages is not an economic given. Any theory that takes it as such risks being faced with contradictory empirical evidence.

The analysis also reveals that cyclical wage sensitivity in the aggregate may reflect relative stability in the structure of real wage rates combined with major fluctuations in employment status. In fact, the results show that even the simple distinction between wage adjustments and quantity adjustments is misleading given the evidence that much of the wage adjustment itself has its origins in quantity-based downgrading and upgrading of employment status over the business cycle. The findings are consistent with a model in which real wages are fairly acyclical while employment opportunities fluctuate, making the aggregate real wage appear more flexible than it is. In such a world, attempts at wage moderation will have costly quantity effects.

Finally, the results are useful for determining the distributional impacts of cyclical wage changes and for evaluating the wage-moderating effectiveness of restrictive demand policies. The findings indicate that recession-induced wage erosion is both significant and regressively distributed. Thus, studies of recession incidence that assume a constant wage rate will understate both the magnitude and the regressivity of recessions. The significantly procyclical pattern might appear to suggest that restrictive policies can be quite effective in producing substantial moderation of real wages. However, this argument is undermined if, as the results suggest, much of the observed cyclical behavior has its source in quantity-driven adjustments. Such policies are further undermined (in terms of vertical equity and wage-moderating potential) if their success, as suggested here, hinges upon substantial wage moderation among the lowest-wage workers.

APPENDIX

Variables used in the empirical analysis

Income class: A five-year average of the individual's family income divided by the family's need, where need is defined by the federal poverty level for that family. The figure is based on the interview years of 1968-72. The

analysis uses several 0-1 dummy variables representing income class category of the worker.

Experience: Years worked since age 18 for person i in year t .

DExtra job: Dummy variable equal to 1 if the individual left an extra job in year t , equal to -1 if the individual added an extra job, and equal to 0 otherwise.

A Full-time status: Dummy variable equal to 1 if the individual moved from full-time to part-time status in year t , equal to -1 if the reverse, and equal to 0 otherwise.

A Job: Dummy variable equal to 1 if the individual changed jobs in year t and equal to 0 otherwise.

D: Dummy variable equal to 1 for periods of falling aggregate unemployment rates and equal to 0 otherwise.

Occupation: The analysis uses several 0-1 dummy variables representing occupation category of the worker in year $t - 1$.

Overtime status: Dummy variable equal to 1 if the individual moves from overtime to full-time status in year t , equal to -1 if the reverse, and equal to 0 otherwise.

Schooling: Years of schooling for individual i in 1967. The analysis uses a 0-1 dummy variable equal to 1 if the individual has a high school diploma and 0 otherwise.

Tenure: Number of years with present employer for individual i in year t . The analysis uses 0-1 dummy variables representing the tenure category of the individual in year $t - 1$.

Time: A time trend equal to 1 in 1967.

A Unemployment rate: The change in the aggregate unemployment rate in year t .

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