Compensation in Part-Time Jobs versus Full-Time Jobs: What if the Job is the Same?

Michael K. Lettau

Office of Economic Research

Bureau of Labor Statistics

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Abstract

The paper uses data from the BLS' Employment Cost Index (ECI) Program to document differences in compensation between part-time and full-time jobs. The design of the ECI survey allows me to compare wage and nonwage compensation in jobs from the same establishment and occupation, but where one job is part-time and the other job is full-time.

I find that compensation per hour is substantially lower in part-time jobs than in full-time jobs, even when the jobs are from the same establishment and occupation. Supplementary results using data from the Current Population Survey suggest that human capital differences between part-time and full-time workers explain at most a minority of the large difference in expected compensation. Therefore, the results suggest that an individual can expect a lower wage rate if he or she decides to work part-time rather than full-time, and much lower benefits per hour.

I. Introduction and Previous Research

For September 1994, the U.S. Department of Labor estimates that about 23 million U.S. workers work part-time. That is, 23 million U.S. workers usually work between one and 35 hours per week, which represents 18.6% of all U.S. workers. About 11.4% of U.S. male workers work part-time, while 27.0% of U.S. female workers work part-time. Moreover, another 4.5 million U.S. workers work at a secondary part-time job in addition to a primary full-time job, and about 1.7 million U.S. workers work at a secondary part-time job in addition to a primary part-time job.[1] Certainly, part-time employment represents a nontrivial segment of the U.S. labor market. And given that part-time employment is such an important segment of the labor market, an important question is whether a worker who decides to work part time can expect to receive the same compensation per hour as the worker would have received had he or she decided to work full time. If not, why not?

Basic models of labor supply assume that an individual can choose any number of hours per week to work at a fixed market wage. However, previous empirical research suggests that average wage rates for part-time workers are significantly lower than average wage rates for full-time workers, even for workers with similar human capital characteristics. The difference in average wage rates between part-time and full-time workers is usually estimated by including a part-time dummy variable in a log wage regression similar to equation (1).

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[1]Statistics are from Employment and Earnings, October 1994. They refer to U.S. workers 16 years of age or older. Statistics other than for multiple job holdings are seasonally adjusted.

(1) $w_i = x_i'\beta + \delta PT_i + \varepsilon_i$

where: w_i = log wage rate for individual i

x_i = characteristics of individual i

PT_i = 1 if individual i works part time, 0 if individual i works full time

In general, previous regressions like equation (1) suggest that average wage rates for part-time workers are 10% to 30% lower than average wage rates for similar full-time workers. The magnitude of the difference depends on the particular demographic, industry, or occupation group sampled, but the difference is nearly always negative.

Whether this implies that a worker can expect a lower wage rate if he or she decides to work part time rather than full time depends on why average wage rates among part-time workers are lower than average wage rates among full-time workers with similar characteristics. Previous studies offer three explanations.

1. Endogeneity of the choice to work part-time:

Labor supply models suggest that individuals are not assigned randomly to part-time or full-time work. Individuals choose their hours per week by comparing their market wage to their reservation wage for working part-time and their reservation wage for working full-time. The part-time coefficient estimate from a regression like equation (1) may be biased downward because of the way in which individuals sort themselves between part-time and full-time work.

Previous studies account for correlation between the part-time dummy variable and ε_i in equation (1) by also modeling the individual's decision to work part-time. They generally include a correction term in equation (1) for the selection of the individual into part-time work. The effect of correcting for selection is not uniform across studies, however. Simpson (1986, using Canadian data) and Main (1988, using British data for women) find that correcting for selection slightly reduces the difference in average wage rates between part-time and full-time workers. Hotchkiss (1991) finds that correcting for selection slightly increases the difference in average wage rates between part-time and full-time workers. In contrast, Blank (1990) finds that accounting for selection sharply changes the difference in average wage rates between part-time and full-time workers from significantly negative to significantly positive for female workers.

2. Dual labor markets

Dual labor markets are often suggested as a possible explanation for the difference in average wage rates between part-time and full-time workers that is not explained by human capital variables or by selection-correction terms (for example, the last sentence of Hotchkiss, 1991). In dual labor market models, the primary labor market contains good jobs that pay high wage rates and offer generous fringe benefits, while the secondary labor market contains bad jobs that pay low wage rates and offer little or no fringe benefits. Average wage rates among part-time workers are lower than average wage rates among full-time workers because part-time workers are disproportionately in jobs from the secondary labor market.

Although often cited, the dual labor market explanation has not received much direct empirical attention. Dual labor market models emphasize characteristics of the job rather than characteristics of the individual, so household data sets do not suit testing dual labor markets nearly as well as they suit testing the selection model. Indirect evidence supports the dual labor market explanation, however. Both Rebitzer and Taylor (1991) and Tilly (1992) hypothesize that part-time jobs in the primary labor market pay at least the same wage rate as full-time jobs, but that most part-time jobs are low-wage jobs in the secondary labor market. As support for their hypotheses, they cite Blank (1990). Blank notes that her finding that average wage rates for part-time workers exceed average wage rates for similar full-time workers, once she accounts for the endogeneity of the choice to work part-time, is particularly strong for female workers in professional and managerial occupations.

Rebitzer and Robinson (1991) also provide indirect support for the dual labor markets explanation. Using the switching regression methodology suggested by Dickens and Lang (1985), they estimate that only 5% of workers with a high probability of being in the primary labor market are part-time, while 31% of other workers are part-time. Moreover, Rebitzer and Taylor (1991) and Rebitzer (1993) give theoretic justification for why part-time workers are disproportionately in the secondary labor market. They apply the two-sector model from Bulow and Summers (1986) to show that workers who prefer shorter hours will disproportionately work in the secondary labor market. In Bulow and Summers' model, workers in the secondary workers perform relatively simple tasks, so their production is monitored costlessly. Workers in the primary market perform more complex tasks, so their performance is relatively costly to monitor. Therefore, workers in the primary labor market receive a higher wage to insure that they will not shirk. Rebitzer and Taylor show that firms in the primary labor market have an incentive to hire workers with preferences for longer hours, so part-time workers will be stuck disproportionately in the secondary labor market.

3. Technology

Selection models emphasize that individuals who choose full-time work tend to be inherently more productive than individuals who choose part-time work. They generally assume that the same worker is equally productive regardless of whether he or she works a part-time or a full-time schedule. In contrast, the technology model conjectures that a worker's output over the course of a day is an S-shaped function of hours worked. Productivity rises over low levels of hours due to setup costs, while productivity eventually declines at higher levels of hours due to boredom and/or fatigue. Full-time workers receive a higher wage rate per hour than part-time workers, not because full-time workers are inherently more able than part-time workers, but because a worker's output per hour is higher when he or she works a full-time rather than a part-time schedule.

Barzel (1973) and Rosen (1978) derive equilibrium hours and wage rates under the assumption that productivity per hour varies with the number of hours worked per day. However, to my knowledge, no study tests the technology explanation empirically.

To summarize, most empirical studies suggest that average wage rates are lower for part-time workers than for full-time workers with the same observable characteristics, even after accounting for the endogeneity of the individual's choice to work part-time. Blank's (1990) result for female workers is a major exception, however. Indirect empirical evidence supports the dual labor markets explanation. For example, Blank (1987,1990) finds that average wage rates for part-time workers exceed average wage rates for similar full-time workers for females in professional and managerial occupations, which others interpret as evidence that part-time workers earn at least the same wage rate as full-time workers in the primary labor market. Finally, Barzel (1973) and Rosen (1978) conjecture that a worker's productivity per hour is tied to the number of hours per day worked, which may explain why part-time workers receive lower wage rates than similar full-time workers. However, their conjecture has not been tested.

II. Overview of the paper

Previous studies address the question of whether a worker can expect a lower wage rate if he or she works part time rather than full time by comparing average wage rates for part-time workers with average wage rates for full-time workers with the same human capital characteristics, through a regression like equation (1). In other words, average wage rates among full-time workers with the same age, education, etc. estimate the wage rate a part-time worker would receive if he or she works full-time. When the study also corrects for selection, average wage rates among full-time workers with the same human capital characteristics and the same characteristics that affect the individual's reservation wage (number of children, other income in family, etc.) estimate the wage rate the part-time worker would receive as a full-time worker.

In contrast, this paper addresses whether a worker can expect a lower wage rate if he or she works part-time by comparing compensation in part-time jobs with compensation in full-time jobs from the same establishment and occupation. I use data from the BLS' Employment Cost Index (ECI) program. The design of the ECI survey allows me to compare both wage and nonwage compensation per hour in jobs from the same establishment and the same occupation, but where one job is part-time while the other job is full-time. In other words, compensation per hour in a full-time job from the same establishment and occupation estimates the compensation per hour a part-time worker would receive as a full-time worker. Certainly, a full-time job from the same establishment and occupation provides a plausible estimate of the type of job the part-time worker would hold if he or she worked full-time. Therefore, it should provide a plausible estimate of the compensation per hour the part-time worker would receive as a full-time worker. Moreover, comparing compensation in part-time jobs with full-time jobs from the same establishment and occupation allows me to consider previous explanations for lower average wage rates among part-time workers more broadly.

I find that compensation per hour is substantially lower for part-time jobs than for full-time jobs, even for jobs from the same establishment and occupation. Supplementary results using data from the Current Population Survey (CPS) suggest that human capital differences between part-time and full-time workers explain at most a minority of the part-time/full-time difference in expected compensation. Therefore, the ECI results suggest that an individual can expect a lower wage rate as a part-time worker than as a full-time worker, and much lower benefits per hour.

This paper is organized as follows. Section III describes the ECI micro data used in this paper. Section IV presents the ECI results, some extensions to the ECI results, and supplementary results using CPS data. Section V discusses what the ECI and CPS results imply regarding previous explanations for lower average wage rates among part-time workers.

III. Data

I use March 1994 micro data from the BLS' Employment Cost Index program. The Employment Cost Index measures quarterly movement in wage and nonwage compensation among private and state and local government workers in the United States. (The ECI excludes federal government workers and the self employed.) The ECI micro data contain detailed information on employers' expenditures for nonwage as well as wage compensation. Moreover, the design of the ECI survey makes it particularly well-suited to comparing compensation in part-time versus full-time jobs.

The ECI is an survey of jobs within establishments.[2] For each establishment in the survey, the ECI collects data for four, six, or eight jobs. The number depends on the establishment's size. A job refers to the most detailed level of job recognized by the establishment. Within each establishment, the jobs sampled are chosen randomly with the probability of selection proportional to the job's employment.

Because the unit of observation for the ECI is a job within an establishment, the ECI micro data are average data for the group of employees who hold the sampled job. Note, however, that when the ECI matches employees to a job in an establishment, employees with a different part-time/full-time status, union/nonunion status, or time-paid/incentive-paid status are never matched to the same job. For example, the ECI considers full-time, nonunion, and time-paid cashiers in Establishment X to be a separate job from part-time, nonunion, and time-paid cashiers in Establishment X. Therefore, the ECI micro

[2]Note that the BLS' Employee Benefits Survey program uses the same sample as the BLS' Employee Cost Index program. (See BLS Handbook of Methods, 1992.) Also, what I refer to as a job within an establishment, BLS documentation sometimes refers to as an occupation within an establishment or a quote within an establishment. I use the term job rather than occupation to avoid confusion with occupations as defined by the 3-digit Census codes, which do not necessarily correspond to how the ECI defines a detailed job within an establishment.

data provides multiple observations from the same establishment and 3-digit Census occupation but with a different part-time/full-time status.

The ECI collects average hourly earnings and expenditures for the 22 benefits listed in Table A1. The ECI converts all benefit expenditures to the average cost per hour worked among employees in the job. The ECI micro data also reports the job's 3-digit Census occupation code and the job's work schedule: scheduled hours per day, scheduled hours per week, and scheduled weeks per year. Also available are characteristics of the establishment: its size, industry, and location. No demographic characteristics of individual workers are collected, however.

The ECI regressions in this paper use the following specification, where j indexes for jobs.

(2) $c_j = x_{1j}'\beta_1 + \delta PT_j + \varepsilon_j;\ \omega_j$

where: c_j = log compensation per hour in job j

x_{1j} = characteristics of job j

PT_j = 1 if the job is part-time, 0 if the job is full-time

ω_j = sample weight for job j

I define a job as part time if scheduled hours per week is less than 35, and full time if scheduled hours per week is 35 or greater. The ECI sample weights account for the ECI's sampling scheme.[3]

I estimate equation (2) using weighted least-squares. Unfortunately, the ECI micro data file does not have the number of employees within each job, so any correction to equation (2) for the number of employees in each job is

[3]The ECI sample weights used in this paper are the same sample weights used to calculate the Employer Cost for Employee Compensation estimates reported each March by the BLS.

not feasible.[4] Therefore, because the variance of ε_j may depend on the number of employees in job j, I use the procedure suggested by White (1980) to calculate asymptotic standard errors for the weighted least-squares estimates. White's procedure allows for general forms of heteroskedasticity in ε_j. I use a block form of White's procedure to allow also for general forms of covariance between jobs from the same establishment. Section IV.C discusses the CPS data used in supplementary regressions.

IV. Empirical Results

I use two samples from the March 1994 ECI micro data. The top left of Table 1A shows the size of the first sample, which I refer to as the full sample. The full sample contains all jobs for which scheduled hours per week is available and for which the job's average hourly earnings is not imputed.[5] Of 21,642 total jobs, 18,287 are full-time and 3,355 are part-time. Much of the analysis compares compensation within occupations, so note that the full sample contains at least one observation from 465 occupations and two or more observations from 443 occupations. Table 1B lists the 20 most frequent occupations in the full sample.

The bottom left of Table 1A shows the distribution of part-time and full-time jobs among nine occupation groups for the full sample. (All statistics in this paper other than sample-size counts are calculated using the ECI sample weights.) About 22% of all jobs are part-time. Part-time jobs

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[4]Section AI of the appendix reports some information regarding the number of employees in jobs from the March 1994 ECI sample.

[5]For the March 1994 ECI, 3,738 jobs had a positive sample weight but no information on scheduled hours. In addition, 468 jobs have a positive sample weight and information on scheduled hours but the job's average hourly earnings is imputed.

I do not delete observations for which benefit costs are in part or fully imputed. Section AII of the appendix discusses the frequency with which benefit costs are imputed for the two samples.

are concentrated in professional and technical, sales, administrative support, and service occupations. There are few part-time jobs in the executive and managerial, precision, craft, and machine operator occupations.

The second sample from the ECI micro data is a subset of the full sample. I refer to the second as the same-job sample. Observations are included in the same-job sample if there are corresponding part-time and full-time jobs from the same establishment and 3-digit occupation. For example, a part-time cashier from establishment X is included if there is at least one full-time cashier from establishment X in the sample. The corresponding part-time and full-time observations make up the same-job sample. The same-job sample allows regressions like equation (2) to include a dummy variable for each establishment/occupation combination.

The top right of Table 1A shows the size of the same-job sample. Of the 21,642 observations in the full-sample, 1,138 qualify for the same-job sample. The same-job sample has 567 part-time jobs and 571 full-time jobs from 495 distinct occupation/establishment combinations. The bottom right of Table 1A shows the distribution of part-time jobs among occupation groups for the same-job sample. The occupation distributions of full-time and part-time jobs are relatively similar, as both a full-time and part-time job must coexist in the establishment and occupation for the jobs to be included in the same-job sample. Table 1B lists the 20 most frequent occupations in the same-job sample.

A. ECI results

Tables 2A and 2B use the full sample to show gross differences in compensation between part-time and full-time jobs. Table 2A shows average hourly earnings and the average cost per hour for five benefit categories.[6] Table A1 of the appendix lists the benefits in each category. Average hourly earnings is much lower in part-time jobs than in full-time jobs: $9.09 to $13.97. Moreover, the average expenditure per hour for all five benefit categories is lower for part-time jobs than for full-time jobs. And, except for legally-required benefits, the average expenditure per hour for each benefit category is a smaller percentage of total compensation per hour for part-time jobs than for full-time jobs.

Table 2B shows results for the first set of regressions in the form of equation (2). Four dependent variables: log average hourly earnings, log benefits per hours, log total compensation per hour, and the log of average hourly earnings divided by total compensation per hour are regressed on a constant and a part-time dummy variable. Benefits per hour equals the sum of the costs per hour for the 22 benefits listed in Table A1. Total compensation per hour equals average hourly earnings plus benefits per hour.

The part-time coefficient estimate in Table 2B equals -0.531 when log average hourly earnings is the dependent variable, which is larger than most comparable estimates reported previously. However, the part-time coefficient estimate is twice the magnitude at -1.083 when log of benefits per hour is the dependent variable. Thus, the difference in average hourly earnings between part-time and full-time jobs substantially understates the difference in total compensation per hour between part-time and full-time jobs.

[6]The estimates in Table 2A differ from the Employer Cost for Employee Compensation estimates reported for March 1994 (see News Release, USDL: 94-290, June 16, 1994) because I delete jobs for which scheduled hours per week is not available and jobs for which average hourly earnings is imputed. Also, I define jobs as part time or full time based on scheduled hours per week, whereas the Employer Cost for Employee Compensation defines jobs as part time or full time based on how the establishment defines the job.

Table 3A shows coefficient estimates for equation (2) with other explanatory variables included in the regressions. In Table 3A, there are the four dependent variables and three sets of explanatory variables. Besides the explanatory variables listed, all 12 regressions include the job's log establishment size and dummy variables for the job's 3-digit Census occupation, major industry,[7] msa status, and census region. Therefore, the estimates for the part-time coefficient represent differences in expected compensation within occupations and adjusted for characteristics of the establishment. Union is a dummy variable for whether the job is unionized, and gov is a dummy variable for whether the job is in state or local government. Because 22 occupations have only one observation in the full sample, observations from these occupations are dropped.

In regression [1], the coefficient estimates for the part-time dummy variable are smaller in magnitude than the corresponding estimates in Table 2B, so differences in expected compensation between part-time and full-time jobs are smaller within occupations than the gross differences in Table 2B. However, the part-time coefficient estimates remain statistically significant and are still quite large in magnitude. The part-time coefficient estimate is -0.144 when log average hourly earnings is the dependent variable and -0.509 when log benefits per hour is the dependent variable.

Regressions [2] and [3] show results when the part-time dummy variable is interacted with the union dummy variable and both the union and government dummy variables. For example, Simpson (1986, Canadian data) finds that the union/nonunion wage differential is greater for part-time workers than for full-time workers: 42 percent for part-time workers, 19 percent for full-time

[7]The 13 major industries follow the CPS' Major Industry Recode.

workers, which implies that the part-time/full-time wage differential is smaller for union workers than for nonunion workers. Also note as background that, for the full sample, 12.9% of part-time jobs are unionized, while 21.4% of full-time jobs are unionized. Of the part-time jobs that are unionized, 58.8% are in state and local government. The three most frequent occupations among part-time and unionized jobs are elementary school teachers, secondary school teachers, and teacher's aids.

To make comparisons easier, Table 3B shows part-time/full-time compensation differences calculated using the coefficient estimates from regressions [1], [2], and [3] in Table 3A. For example, the union differential for regression [2] equals the coefficient estimate for the part-time dummy variable plus the coefficient estimate for the part-time/union interaction. The results from regression [2] suggest that compensation is significantly lower in part-time jobs than in comparable full-time jobs for nonunion jobs. However, the same is not true for union jobs. For all four dependent variables, the part-time/full-time difference is not significantly different from zero. Regression [3] allows part-time/full-time differences in expected compensation to vary by union and government status. For jobs that are both unionized and in state or local government, the part-time/full-time difference is actually positive and statistically significant when log average hourly earnings, log benefits per hour, and log total compensation per hour are the dependent variables.

The results in Tables 3A and 3B suggest that, at least in jobs that are not both unionized and in state and local government, compensation per hour is significantly lower in part-time jobs than in full-time jobs, even within occupations and adjusted for observable characteristics of the establishment.

However, unobserved differences between part-time and full-time jobs may still cause the lower compensation in part-time jobs. For example, even within 3-digit occupations, part-time jobs may still be disproportionately low-wage jobs from the secondary labor market. Therefore, to control for unobserved differences among jobs, Table 4A shows regressions results for the same-job sample. The regressions in Table 4A include an dummy variable for each establishment/occupation combination, so there is a separate intercept for cashiers who work in establishment X, etc. Therefore, the regressions compare compensation between part-time and full-time jobs from the same establishment and the same occupation.

Remarkably, however, the coefficient estimates for the part-time dummy variable in Table 4A are quite similar to the coefficient estimates for the part-time dummy variable in Table 3A. They remain statistically significant and quite large in magnitude.[8] Within the same establishment and occupation, the estimated part-time/full-time difference is -0.164 when log average hourly earnings is the dependent variable and -0.475 when log benefits per hour is the dependent variable.

The major change in the estimates between Tables 3B and 4B is for union jobs. The part-time/full-time difference in expected compensation becomes statistically significant and even larger in magnitude for union jobs than for nonunion jobs once the establishment/occupation intercepts are included. Analogous results hold for regression [3]. For all four categories of jobs,

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[8]Because I use the procedure suggested by White (1980), the standard error estimates are not adjusted for the number of parameters estimated, which is large relative to size of the same-job sample. However, I reestimated the standard errors assuming that the residuals in equation (2) are uncorrelated and homoskedastic. Adjusted for the number of parameters estimated, the standard error estimates are similar in magnitude to the ones reported.

compensation in part-time jobs is significantly lower than in full-time jobs when jobs from the same establishment and occupation are compared.

The following chart reinforces the results in column 2 of Table 4B. It shows just how different the provision of benefits is to part-time versus full-time jobs, even when the jobs are from the same establishment and occupation. Each of the 495 establishment/occupation combinations in the same-job sample is categorized as to whether it offers insurance, paid leave, and retirement and savings to its part-time job and/or its full-time job.[9] The chart shows the total number of establishment/occupation combinations in each category. (If the establishment/occupation has more than one part-time or full-time job, the job is coded as receiving the benefit if at least one of the jobs receives the benefit.)

	insurance	**paid leave**	**retirement and savings**
both jobs	194	412	209
full-time job only	247	78	115
part-time job only	1	1	1
neither job	53	4	170

It is virtually never true that the part-time job receives the benefit while the full-time job does not. However, it is often true that the full-time job receives the benefit while the part-time job does not.[10]

B. Extensions

[9]I count the establishment as offering the benefit to the job even if the job has a benefit plan but a zero cost per hour. For example, the job may have a plan for paid leave, but none of the workers in the job qualify, so the job as a zero cost per hour. I still count the job as being offered paid leave.

[10]Nollen and Martin (1978, p. 31) report similar discrepancies in the provision of benefits to part-time versus full-time jobs, although they report higher rates of benefit provisions to both part-time and full-time jobs. Their results are based on a survey of managers who employ both part-time and full-time workers.

In this section, I extend the regressions to test their robustness and implications. I report results for the same-job sample only. Corresponding results for the full sample are available from the author upon request. Except as noted otherwise, the regressions follow the specification from regression [1] in Table 4A. That is, the results show part-time/full-time differences within the same establishment and occupation.

1. Hours per day versus hours per week

The ECI micro data not only report average scheduled hours per week among employees for each job, but also average scheduled hours per day. To my knowledge, previous research defines part-time and full-time work based exclusively on hours per week.[11] The top of Table 5 shows results for the same-job sample when log hours per day, the square of log hours per day, log hours per week, and the square of log hours per week replace the part-time dummy variable. The bottom of Table 5 shows results for the same-job sample when dummy variables for different categories of hours per day and hours per week replace the part-time dummy variable. Below each set of coefficient estimates, I report estimated differences relative to an 8 hrs/day, 40 hrs/week job for three common combinations of hour per day and hours per week, based on the coefficient estimates.

I report the two sets of coefficient estimates because the results are somewhat sensitive to whether continuous functions of hours or hours category variables replace the part-time dummy variable. (Results using linear, squared, and cubed logs of hours and results using linear, squared, and cubed levels of hours are similar to the results using linear and squared logs of

[11]Hamermesh (1994) presents some statistics for the joint distribution of usual hours per week worked and days per week worked for the U.S. and Germany.

hours. Results using the category variables are robust to adding categories for very short hours per day and hours per week, but sensitive to how hours per day and hours per week are grouped into categories, particularly the estimates for 6 hrs/day, 30 hrs/week jobs.) Regardless of whether the log variables or the category variables are used, however, the hours per day coefficient estimates are jointly significant at 5% when log average hourly earnings and log total compensation per hours are the dependent variable. The hours per week coefficient estimates are jointly significant at 5% in all four regressions.

The estimates in Table 5 suggest that the length of the workday is important, even among jobs usually defined as part-time based on hours per week. Relative to an 8 hrs/day, 40 hrs/week job, the estimated difference in expected log average hourly earnings for a 4 hrs/day, 20 hrs/week job is two to three times the magnitude of the estimated difference for an 8 hrs/day, 24 hrs/week job. The length of the workday appears to be less important when log benefits per hour is the dependent variable, however. Relative to an 8 hrs/day, 40 hrs/week job, the estimated difference in expected log benefits per hours for a 4 hrs/day, 20 hrs/week job is only one and one-fourth to one and two-thirds the magnitude of the estimated difference for an 8 hrs/day, 24 hrs/week job.

2. Differences by occupation group

Table 6 shows results for the same-job sample when I allow part-time/full-time compensation differences to vary across major occupation groups. Log hours per day, the square of log hours per day, log hours per week, and the square of log hours per week replace the part-time dummy variable. The log hours variables are interacted with dummy variables for the major occupation groups in Table 1A. To increase the sample size of some groups, I combine professional, technical with executive, managerial, and I combine precision, craft, machine operators, transportation occupations, and handlers, laborers into blue-collar occupations. I list only estimated differences relative to an 8 hrs/day, 40 hrs/week job for brevity.

As mentioned in Section I, previous studies emphasize Blank's (1990) result that average wage rates for part-time female workers exceed average wage rates for similar full-time female workers in professional and managerial occupations. However, the results in Table 6 contradict Blank's findings.[12] Estimated part-time/full-time differences for service occupations stand out from the other occupation groups as smaller in magnitude, particularly for 6 hrs/day, 30 hrs/week and 4 hrs/day, 20 hrs/week jobs. Estimated differences for professional, executive occupations are very much in line with the other occupation groups outside of service occupations. For example, the estimated difference in expected log total compensation per hour between an 8 hrs/day, 40 hrs/week job and a 4 hrs/day, 20 hrs/week job equals -0.312 for professional, executive occupations, but only -0.106 for service occupations.

When dummy variables for categories of hours per day and hours per week are interacted with dummy variables for the major occupation groups (not shown), estimated part-time/full-time differences for service occupations again stand out from the other occupation groups as smaller in magnitude for 6 hrs/day, 30 hrs/week and 4 hrs/day, 20 hrs/week jobs, although less so for 8 hrs/day, 24 hours/week jobs.

[12]For the full sample (results not shown), estimated part-time/full-time differences for professional, executive occupations do stand out from the other occupation groups as smaller in magnitude when log average hourly earnings is the dependent variable, although the estimated differences are quite large in magnitude for all occupation groups when log benefits per hour is the dependent variable, including professional, executive occupations.

3. Establishments with extended hours

Using data from surveys of firms, Nollen and Martin (1978) and Zeytinoglu (1992) find that the most common advantage to firms of hiring part-time workers is that part-time workers provide flexibility in scheduling workers to match peak workload hours and/or extended hours of operation. Table 7 shows results for same-job sample with the hours variables interacted with a dummy variable for whether the job is from a retail trade, personal service, or entertainment industry.[13] I assume that establishments from these industries are more likely to have extended hours of operation and therefore more likely to benefit from part-time workers.

However, estimated differences for jobs from retail trade, personal service, or entertainment industries are generally larger in magnitude than estimated differences for other industries. Thus, although establishments in these industries may be more likely to benefit from hiring part-time workers, the results in Table 7 provide no evidence that this translates into a smaller part-time/full-time difference in expected compensation per hour. (The same is true when dummy variables for categories of hours are used rather than logs of hours.)

C. CPS results

The ECI same-job sample results suggest quite strongly that a worker can expect much lower compensation per hour if he or she decides to work part-time

[13]The results in Table 7 relate to the results in Table 6 in that, for jobs from a retail trade, personal service, or entertainment industry, 55.8% are from sales occupations, 26.4% from service occupations, 14.1% are from handlers, laborers occupations, with the remaining jobs from other major occupation groups.

rather than full-time. However, this assumes that compensation per hour among full-time workers from the same establishment and occupation accurately reflects what the part-time worker would receive as a full-time worker. The obvious weakness of the ECI micro data is that no demographic information about individual workers is available. Human capital differences between part-time and full-time workers may still explain the large difference in compensation between part-time and full-time jobs. Therefore, I supplement the ECI results with results using household data from the CPS.[14] The CPS results suggest that human capital differences between part-time and full-time workers account at most for a minority of the large part-time/full-time differences in expected compensation suggested by the ECI results.

The CPS regressions use the following specification; i indexes for individuals.

(3) $w_i = x_{1i}'\beta_1 + x_{2i}'\beta_2 + \delta PT_i + \varepsilon_i;\ \omega_i$

where: w_i = log average hourly earnings for individual i

x_{1i} = characteristics of individual i's job

x_{2i} = demographic characteristics of individual i

PT_i = 1 if individual i works part-time, 0 if individual i works full-time

ω_i = CPS earnings weight for individual i

The vector x_{1i} contains characteristics of individual i's job that are available in both the ECI and the CPS: dummy variables for 3-digit occupations, major industries, census regions, union status, government status, and a union/government interaction. (Establishment size is not available in the CPS.) The vector x_{2i} contains demographic characteristics of

[14] Groshen (1991) performs a somewhat analogous exercise using both establishment and CPS data.

individual i that are known to affect expected compensation but are not available in the ECI data: age, age squared, dummy variables for whether the individual is male, married, and white, and dummy variables for the individual's level of education: less than high school degree, high school degree, some college, college degree, and post-college degree.

The strategy is the following. I first estimate equation (3) with x_{1i} as the only explanatory variables. I then estimate equation (3) with x_{1i} and x_{2i} as the explanatory variables. The change in the part-time coefficient estimate guides how much not including demographic characteristics potentially affects the ECI results. As mentioned in Section I, previous studies include a correction term in regressions like equation (3) to account for the selection of individuals into part-time work. However, because I include dummy variables for 3-digit Census occupations to make the results comparable to the ECI results, the number of explanatory variables in equation (3) is prohibitively large to allow for standard selection correction procedures. Instead, to account for the endogeneity of the part-time dummy variable, I also estimate the parameters in equation (3) by two-stage least-squares. The first-stage regression follows equation (4).

(4) $PT_i = x_{1i}'\gamma_1 + x_{2i}'\gamma_2 + z_i'\gamma_3 + \eta_i;\ \omega_i$

where: z_i = instruments for whether individual i works part time

The vector z_i contains instruments for an individual's decision to work part-time: number of children in the family less than five years of age, number of children in the family at least five and under 18 years of age, dummy variables for whether the individual is enrolled in high school, enrolled in college part-time, and enrolled in college full-time,[15] a dummy variable for whether the individual is at least 65 years of age, and a dummy variable for whether there are other family members 16 years of age or older who have positive usual weekly earnings. The dummy variable for other earners in the family is also interacted with the log of the sum of usual weekly earnings among other family members 16 years of age and older. Moreover, all variables in the vector z_i are interacted with the male dummy variable and with a dummy variable for whether the individual is less than 21 years old, so the parameters in γ_3 are allowed to differ between male and female workers and between very young workers and other workers.

The data are for CPS outgoing rotation groups from all months of 1993 and all months of 1994. The samples includes individuals from age 16 through age 70 with a positive usual hours per week worked. The samples exclude self-employed workers and workers in agricultural industries. Average hourly earnings equals usual weekly earnings divided by usual hour per week worked. Observations with average hourly earnings below one or above 250 are dropped. Part-time equals 1 if usual hours per week worked is less than 35, and zero if usual hours per week worked is greater than or equal to 35. I report results for all workers and separately for male and female workers.

Besides using the CPS earnings weights to account for the sample scheme of the CPS, I create an additional set of sample weights. They are calculated according to equation (5).

$$(5) \quad \omega_i^{same\text{-}job} = \omega_i * (f_o^{same\text{-}job} / f_o^{CPS})$$

[15]The CPS asks only individuals 24 years of age and younger the enrollment questions. I assume workers older than 24 years of age are not enrolled in high school or college.

where: $f_o^{same\text{-}job}$ = proportion of ECI same-job sample in occupation o

f_o^{CPS} = proportion of CPS sample in occupation o

The weights from equation (5) force the CPS sample to have the same distribution of 3-digit occupations as the same-job sample. When I use the adjusted weights in equation (5), I also exclude federal government workers and workers in agricultural or private household occupations from the sample, as these workers are outside the ECI's sample universe.

Table 8 shows coefficient estimates for the part-time dummy variable in equation (3) using data pooled from all months of 1993 and data pooled from all months of 1994.[16] The results are broken into three blocks: results for all workers, results for male workers, and results for female workers. The year and sample weights vary across the columns. The first and third columns use the CPS earnings weights. The second and fourth columns use the CPS earnings weights adjusted to the occupation distribution of the ECI same-job sample. Within each block, the set of independent variables varies down the rows. In the first row, job characteristics are included in equation (3). In the second row, job and demographic characteristics are included in equation (3). In the third row, job and demographic characteristics are included in equation (3) and the part-time dummy variable is estimated according to equation (4). Table A3 shows sample statistics for the variables used in the 1993 regressions for all workers. Sample statistics for 1994 (not shown) are similar.

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[16]All regressions also include dummy variables for the survey month. In addition, equation (3) includes a dummy variable for whether usual weekly earnings is topcoded, both by itself and interacted with the part-time dummy variable. Equation (4) also includes a dummy variable for whether usual weekly earnings for any other workers in the family is topcoded.

Note three results from Table 8. First, adding the demographic variables from x_{2i} to equation (3) reduces the magnitude of the part-time coefficient estimate for all workers by about one-third for 1993, regardless of whether the CPS weights are adjusted to the ECI same-job sample. Results (not shown) are similar for 1992. However, the demographic variables reduce the magnitude of the part-time coefficient estimate for all workers by over 40% for 1994. Second, the demographic variable generally reduce the magnitude of the part-time coefficient estimates more for male workers than for female workers. For 1993, for example, the part-time coefficient estimates are 45% to 50% smaller for male workers when demographic variables are added to equation (3), but only about 20% to 30% smaller for female workers.

Finally, focus on the two-stage least-squares results for all workers in the second and fourth columns of Table 8, where the CPS sample weights are adjusted to the ECI same-job sample's distribution of occupations. For both 1993 and 1994, the two-stage least-squares estimate is statistically significant and slightly larger in magnitude than the corresponding least-squares estimates for all workers.[17]

I report the CPS results to give some sense of whether the results from the ECI regressions would be significantly different if demographic variables were included as explanatory variables. In general, they suggest that including the human capital and demographic variable in x_{2i} from equation (2) might explain some of the large difference in expected compensation between part-time and full-time jobs suggested by the ECI results, but the majority of the difference would remain. Moreover, the 35% to 40% reduction in the part-

[17] I experimented with subsamples of the CPS data from 1992, 1993, and 1994. The two-stage least-squares estimates proved much more erratic than the corresponding least-squares estimates.

time coefficient estimate when x_{2i} is added to equation (3) probably overstates the degree to which human capital and demographic differences between part-time and full-time workers explain the ECI results, particularly the same-job sample results. The CPS regressions compare part-time and full-time workers from the same occupation, adjusted for characteristics of the worker's establishment that are observable in the CPS. In contrast, the ECI same-job sample regressions compare part-time and full-time jobs from both the same occupation and the same establishment. Workers within the same establishment and occupation are probably much more homogeneous than workers in the occupation across all establishments with the same observable characteristics. For example, cashiers who work in the same store are probably much more alike in terms of their human capital (as measured by their age, education, etc.) than are all cashiers who work in retail trade and live in the same census region.[18]

V. Discussion

With the ECI and supplementary CPS results as background, I return to the three previous explanations for lower average wage rates among part-time workers than among full-time workers, and to the question of whether a worker can expect lower compensation per hour if he or she decides to work part-time rather than full-time.

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[18]There is also a more technical reason to believe that the CPS results overstate the degree to which including demographic information about workers would affect the ECI same-job sample results. Previous research suggests that error in coding 3-digit occupations in the CPS is not negligible (see Polivka and Rothgeb, 1993). Some of the explanatory power of the demographic variables in equation (3) may account for the miscoding of workers' occupations. By the design of the ECI, the same BLS field economist who initially collects earnings and benefit information from the establishment also codes the occupation for all of the establishment's sampled jobs. Therefore, the ECI same-job sample has no error caused by different coders coding 3-digit occupations differently.

Of the three previous explanations, the ECI results contradict dual labor markets most strongly, at least as applied in previous studies. Dual labor market models are often descriptive rather than theoretic, so they tend not to lead to clear hypotheses that can be tested empirically. Nonetheless, the striking result from the ECI samples is the remarkable robustness of the difference in compensation between part-time and full-time jobs, even between jobs that are otherwise similar; that is, from the same establishment and occupation. The common theme of dual labor market models is that jobs can be divided meaningfully between the high-wage primary labor market and low-wage secondary labor market. For example, in Rebitzer and Taylor's (1992) model, the primary and secondary labor markets coexist because the performance in a primary-sector job is difficult to monitor while the performance in a secondary-sector job is monitored costlessly. Yet it is hard to imagine that the difficulty in monitoring a part-time job differs significantly from the difficulty in monitoring a full-time job when the two jobs are from the same establishment and the same occupation.

Moreover, the ECI same-job sample results contradict the conclusion used to support dual labor markets that part-time wage rates are at least as large as full-time wage rates for workers who work in the primary labor market. Dual labor market models universally classify professional, executive jobs and union jobs as from the primary sector. However, and again quite strikingly, the ECI same-job sample results suggest that within job differences in compensation between part-time and full-time jobs are significant and at least as large in magnitude for professional, executive jobs and for union jobs as they are for other job categories.

The other two explanations for lower average wage rates among part-time workers are selection and technology. Distinguishing between the two is quite difficult, as it comes down to whether average compensation per hour differs between part-time and full-time workers because workers who are more productive (regardless of whether they work part-time or full-time) tend to work full time or because workers are more productive when they work a full-time rather than a part-time schedule. Nonetheless, the technology explanation is at least consistent with expected compensation being lower among part-time jobs than among full-time jobs from the same occupation and establishment, particularly because the supplementary CPS results suggest the including information on workers' age, education, gender, and race in the ECI same-job regressions would explain at most a minority of the difference. Moreover, Barzel (1973) and Rosen (1978) focus on hours worked per day as important in determining a worker's equilibrium wage rate. Consistent with their formulation, the ECI same-job sample suggests that the difference in the expected wage rate between a full-day, but short-week job and a similar full-day, full-week job is much smaller than the difference between a half-day, full-week job and a similar full-day, full-week job. (This appears to be less true for expected benefits per hour, however).

Thus, although the results may not distinguish between the selection and technology explanations definitively and certainly other explanations are also consistent with them,[19] the results do provide insight into the question of whether a worker can expect to receive the same compensation per hour if he or she decides to work part-time rather than full-time. Previous studies use the

[19]In Nollen and Martin (1978), for example, managers report that part-time workers lead to higher administrative and training costs. Full-time workers may be able to capture the savings on these costs in terms of higher compensation.

average wage rate among full-time workers with the same age, education, etc. to estimate the part-time worker's wage rate as a full-time worker. The results are somewhat mixed, however, at least when the average wage rates also incorporate information about the worker's reservation wage through selection-correlation procedures. This paper uses an alternative comparison group: full-time workers from the same establishment and occupation. Comparing workers who work "side-by-side", the results suggest clearly that an individual can expect a lower wage rate as a part-time worker than as a full-time worker, and much lower benefits per hour.

Appendix

AI. Number of employees per job

As mentioned in Section III, the ECI micro data do not report the number of employees in each job. However, the number of employees for some jobs in the ECI sample is available from the BLS' Employee Benefits Survey (EBS) program, which shares the same sample as the ECI.

Table A4 shows descriptive statistics for the number of employees in each job I could match to EBS data. I could not match the majority of jobs, so the descriptive statistics may not represent all jobs from the full sample particularly well. Nonetheless, they give some idea of the number of workers represented by each observation in the ECI.

AII. Imputation of benefit costs

Information on an establishment's cost per hour for one or more of a job's benefits is sometimes not available. When the cost is not available, the ECI imputes the cost per hour as equal to the average cost per hour among jobs from the same industry and major occupation. Industry refers to one of 72 industry groups, which correspond approximately to 2-digit SIC industries. Table 1 lists the nine major occupations.

Table A5 lists descriptive statistics for the proportion of benefit costs per hour imputed in the full and same-job samples. For each job, I sum benefit costs per hour that are imputed, and then divide the sum by the job's total benefit costs per hour. Table A2 lists descriptive statistics for this ratio. About half of the jobs have no benefit costs imputed, although both samples have some jobs for which the majority of benefit costs per hour are imputed.

Note that when the ECI imputes a cost for a job, it accounts only for the job's industry and major occupation. A part-time job and a full-time job from the same establishment and occupation will get the same imputed value for the benefit if the benefit cost is missing. Therefore, the ECI's imputation scheme probably leads to the same-job sample results understating the difference in benefit costs per hour between part-time and full-time jobs, rather than overstating them.

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