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ABSTRACT

The widespread view that there are mechanisms which ensure that the individual will end up on his offer curve even though he is a wage rate and hours of work taker is shown to be wrong. If that behavior applies to some of the observations, the estimated slope (elasticity) of supply will be biased toward zero. If individuals were hours of work takers only, supply formulation should be changed, and current empirical results are likely to yield the correct sign but not the magnitude of the true supply slope (elasticity).

I. Introduction

In an attempt to estimate the supply of weekly hours of work economists regress (average) weekly hours of work on the (average) wage rate as well as on other relevant variables (e.g., Finegan (1962), Feldstein (1968), and Owen (1971)). It is well known that for the estimated relationship to be identified as the supply of weekly hours of work certain conditions must be met. One of these conditions, on which we focus our attention in this paper, is that the observed wage-hours combinations should lie on, or distribute randomly around, the individual's offer curve of weekly hours of work (i.e., be on his supply function).[1]

Casual observations suggest, contrary to the traditional view, that employers usually quote both the wage rate (either explicitly or implicitly by quoting total wages) and the weekly hours of work (i.e., the standard workweek). To the extent that the standard workweek is the result of employers' preferences, technological (= production) constraints, managerial considerations, government legislation or even union's demands, it represents the number of weekly hours of work the individual is required to put in. Unless this is also the number of weekly hours the individual wants to work at the given (implicit) wage rate, he will not be on his offer curve. Rayner (1969, pp. 297-8) has argued, that the observed wage-hours combinations need not be on the individual's offer curve under a standard workweek phenomenon. But, Friedman (1962, pp. 204-5), Rees (1973, pp. 24-5) and Fleisher (1970, pp. 59-61) suggested that several mechanisms which exist in the labor market ensure that the individual will end up on his offer curve, at least in the long run, even though he must take the wage rate and hours of work at any job as given.

The standard workweek seems to be a widespread phenomenon. As some doubts have been expressed concerning the individual's ability to stay on (or return to) his offer curve under such a phenomenon, and because that failure might make any attempt to estimate the supply of weekly hours of work a futile exercise, there seems to be a need for a systematic reeamination of that issue. This is the purpose of the present paper.

In the next section we discuss the mechanisms which are claimed to bring the individual to his offer curve even though he is both a price (= wage rate) and quantity (= hours) taker on any job. We show that this is an unlikely possibility. In section III we consider the implications of that result for the estimation of the supply of weekly hours of work and we show that it is likely to bias its slope (elasticity) by underestimating the negative effect of the wage rate on weekly hours of work. In section IV we turn to a conceptual problem caused by the standard workweek phenomenon. We conclude that the conventional formulation of a supply function, with hours of work as the dependent variable and the wage rate as an explanatory variable, is unlikely to be justified. If at all, these variables should probably change roles. In that case the current empirical results are likely to yield the correct sign but not the correct magnitude of the true slope (elasticity) of supply.

II. Labor Market Mechanisms and the Offer Curve

In a well known textbook Friedman (1962, pp. 204-5) states:

> "An objection sometimes raised to ... [the conventional supply of hours] analysis ... is that individuals cannot determine for themselves the number of hours they work: this is an institutional datum which the individual must take or leave.

> This objection is almost entirely specious. In the first place, ... much of the adjustment may take the form of the fraction of the people in the labor force. In the second place, even at any given time, a particular individual has some leeway. He can work overtime or not, take off more or less time during the year, choose the kind of occupation or employer that offers the number of hours of work he wants, etc. But neither of these is the basic fallacy. The important point is that the individual is like the competitor: to each individual separately, the number of hours of work per week may be fixed, yet the level at which it is fixed is the result of the choices of the individuals as a group. If at any moment this level of hours is, say, larger than on the average people prefer at a given wage rate, this means that any employer who makes them shorter, who adjusts them to the workers' preferences, will make employment with him more attractive than employment with others. Hence he can attract the better people or attract people at a lower wage rate. Employers thus have an incentive to adjust working conditions and hours of work to the preferences of the workers .... Competition in this way does permit individuals in effect to determine for themselves the number of hours they work."

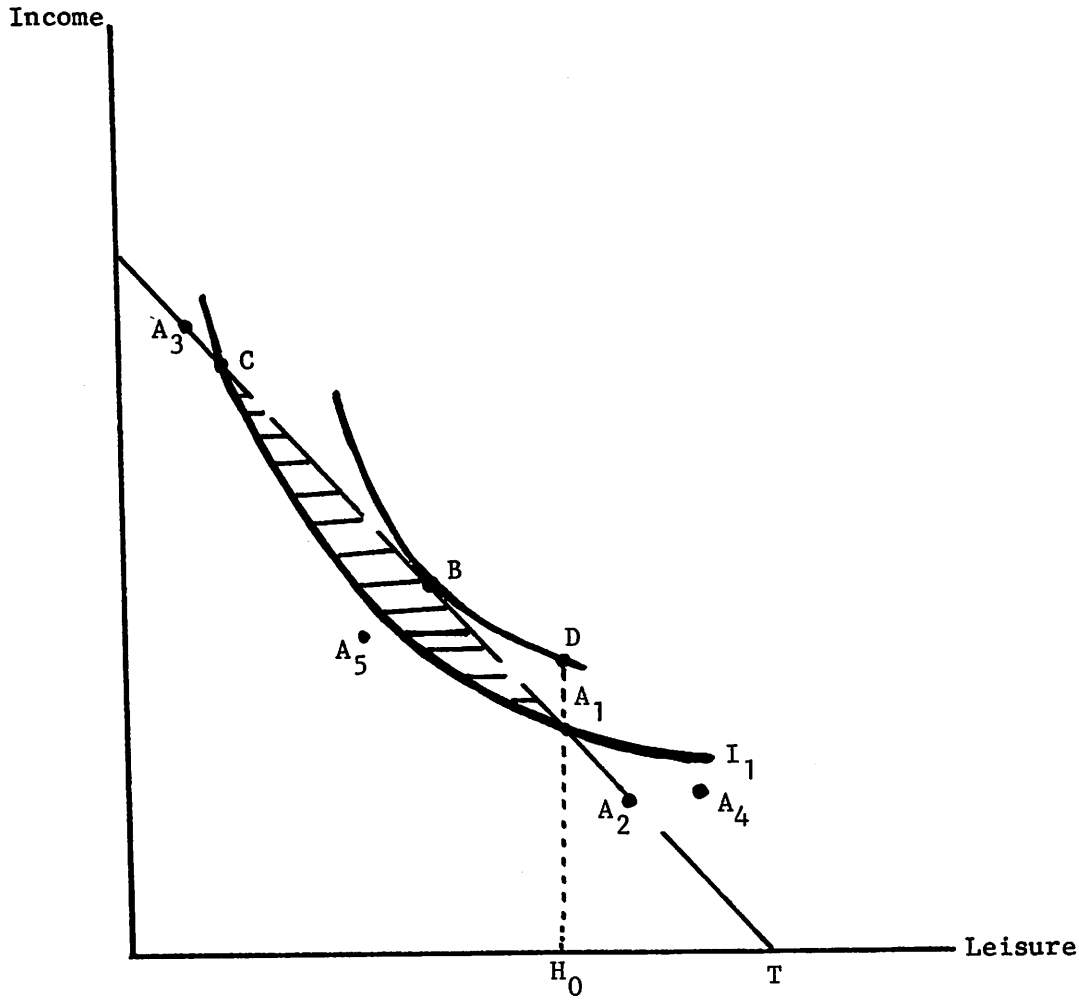
Consider first the role of competition, which Friedman (in the above quotation) as well as others (e.g., Rees (1973, pp. 24-5)) regard as the most powerful mechanism enabling the individual to reach his offer curve. Suppose that the individual has to choose one of five wage-hours offers

denoted in Figure 1 by A_1, A_2, A_3, A_4, and A_5. The individual of Figure 1 will choose offer A_1. If all other individuals also have the same preference map and face the same offers, no one would accept any other offer as long as A_1 is available. In that case the labor market will give the other employers a signal that their offers are not attractive enough. They will find that they have difficulties in hiring new workers, and that their old workers are quitting (or tend to quit more than before). Thus, although the wage-hours combinations are given to each individual, the decisions taken by all of them will force those other employers to adjust their offers in accordance with workers' preferences. If they have enough information to realize the revealed superiority of bundle A_1 over all those offered, they will improve their competitive position in the labor market by offering that very bundle themselves.

But by offering a bundle from the shaded area A_1CB of Figure 1 these employers could do even better, since it is preferred to A_1. In that case, as suggested by Friedman and Rees, employers would be able to obtain more labor services at a lower (implicit) wage rate and/or of a better quality. (The number of applicants would increase and the hiring standards could be raised.) In either case their marginal costs would decline and their competitive position vis-à-vis the employer offering A_1 would improve.

There is, however, a difficulty with this solution: the workers' indifference maps are unobservable.[2] Thus, employers cannot rule out the possibility that A_1 is indeed on a worker's offer curve, i.e., the area A_1CB does not exist at all. They can, of course, search for a bundle in the area A_1CB, in the hope it exists, via trial and error, but this is a costly process. If they offer a wage-hours combination which is below the

Figure 1



indifference curve I_1 (of Figure 1), they will continue to lose workers. If they offer a wage-hours combination which is to the right of line TA_1BC but above the indifference curve I_1, they will begin to attract workers, but their marginal cost will increase. In either case their profits will be adversely affected.

Thus, employers are unlikely to take the risks of a trial and error approach. If they know that bundle A_1 proved to be superior to all those already offered, competition in the labor market is likely to bring all of them to one bundle, A_1.

Suppose that competition indeed brings all employers to A_1, with the standard workweek of TH_0. When all employers offer the bundle A_1, the workers' opportunity set includes two points, A_1 and T. In Figure 1, A_1 is the preferred bundle and the individual workers are <u>satisfied</u>. They reach the highest attainable level of utility. Clearly there are better bundles than A_1, and B is among them, but they are unattainable. The mere fact that the individual knows of a certain bundle which is beyond his reach and is preferred to his current bundle does not make him dissatisfied according to our traditional model.[3] Thus, as long as employers quote both the wage rate and hours of work they will <u>not</u> get any signal from their workers that something is "wrong" with the hours of work of bundle A_1. They will not know that their workers are not on their offer curve and, that there are some profits to be made from changing the standard workweek. Unless one employer "invents" bundle B (or any bundle in the area A_1CB), all employers could offer bundle A_1

indefinitely even under competitive situations. How and why such an innovation might occur is beyond the scope of our discussion, but it is abundantly clear that competition per se is unlikely to contribute to such an innovation.

It is not impossible that the employers will get a signal from the final good market that due to excess demand (supply), the price of the good and/or its quantity should be increased (decreased). If all employers want, for example, to increase production they have to attract more workers to the industry. As before, a movement into the shaded area A_1CB is desirable, but due to the uncertainties involved and lack of information this is unlikely to occur. A sure bet in that case will be to raise the wage rate and to offer a bundle like D, which requires the same standard workweek as A_1. (For a similar view see Rosen (1969, p. 261).) There is, however, no reason why bundle D will be on the individual's offer curve and in Figure 1 it is not. But bundle D will attract more workers to the industry, and if it is an "equilibrium" situation, neither workers nor employers will get any signal from the market that further adjustments are needed.

Let us now turn to other suggested mechanisms. Friedman (in the above quotation) and Fleisher (1970, p. 60) point out that workers tend to allocate themselves to jobs according to their preferences between leisure and income. In the long run, at least, this is clearly the case. But, in view of the previous discussion this is still not enough to ensure that the various individuals will end up on their offer curves. In Figure 1, for example, some individuals will choose A_1, others will choose A_2, etc. But A_1 is not on the offer curve of the individual whose preferences are shown in Figure 1. And there is nothing but pure chance to ensure that A_2 will be on the offer curve of the individuals who choose it. Thus, while freedom of

choice among various wage-hours offers allows workers to derive a higher level of satisfaction, it does not guarantee that they will end up on their offer curve. This depends entirely on whether the "best" offer happened to be on their offer curve or not.

Turning to intertemporal adjustments, we assume that when the standard workweek is not the desired one at the given (implicit) wage rate, the individual modifies his participation in labor market activities. For example, he might alter the number of weeks he will work during the year. Will such adjustments put him back on his offer curve of weekly hours of work? Our discussion below suggests that either this is not the case or that such an offer curve does not exist at all.

Simple economic reasoning based on the known results of lifetime planning models suggests that in a world of a zero interest rate, no time preferences concerning the consumption of leisure and an identical (real) wage rate over the life span, the individual's supply of effort (of a given quality) will have only one dimension: the number of hours of work during his lifetime. Their allocation over time is immaterial. The standard workweek sets a constraint on the allocation of those hours by determining the weekly hours while at work. But this will have no effect on the individual's welfare. The standard workweek will be the desired one, because the individual has no preferences concerning the number of weekly hours of work. The individual has an offer curve only for hours of work over his lifetime. No such offer curve, for weekly hours of week exists, so that there is no reason to attempt estimating it.

If any of the above three assumptions does not hold, the allocation of hours of work over the lifetime becomes important. The notion of the supply of weekly hours of work (when at work) becomes meaningful. And the standard

workweek might require the individual to work a different number of hours than he would have desired--at the given wage rate (or wage rate profile)--in the absence of such an imposed standard. The problem is not eliminated by the fact that the individual makes adjustments in other dimensions of his work effort (e.g., weeks worked per year or years worked during his lifetime), because these are not perfect substitutes for weekly hours. Of course, the individual is better off making those adjustments, but he cannot "return" to his offer curve of weekly hours of work.[4]

Finally we turn to adjustments in hours of work at a given point of time via multiple jobholding and overtime.[5] The previous analysis for intertemporal adjustments applies to multiple jobholding as well. Unless time spent in various jobs is an identical good (i.e., yields the same utility) and the wage rates are identical, the jobs are not perfect substitutes. If the standard workweek "forces" an individual to take another job, the total weekly hours of work on both jobs might be larger (or smaller) than the desired one (at the given wage rate) on the original job. Thus, we cannot say that the individual returns to his offer curve of weekly hours of work, or even that he is "closer" to it. Moreover, in that case there are actually different, though not independent, offer curves of weekly hours of work to the various potential jobs.[6]

Even the most "natural" adjustment--working overtime--has its limitations in ensuring that the standard workweek will be the desired one by workers. First, in many cases overtime is determined by employers' needs and not according to workers' desires,[7] a problem which initiated our study concerning the standard time. Second, as with the case of multiple jobholding one cannot aggregate standard time and overtime if their wages are different, and in many cases they are.[8] Total weekly hours of work on a given job which

includes both standard time and overtime cannot in those two cases be taken as the desired number of hours of work on that job at the given (implicit) wage rate for standard time.

III. Empirical Implications

The discussion of section II suggests that there are good reasons to believe that there will be a difference between the observed weekly hours of work, to be denoted by H^O, and hours desired by workers at a given wage rate, H^S. Thus,

$$(1) \qquad H^S = H^O + u$$

where u is the "error." Assuming that the supply of weekly hours of work depends on various variables, X_j's, we can write

$$(2) \qquad H^S = \sum_{j=1}^{J} \beta_j X_j$$

From equations (1) and (2) we get the relationship,

$$(3) \qquad H^O = \sum_{j=1}^{J} \beta_j X_j - u$$

Equation (3) is the one estimated in empirical studies, and if u has all the properties that econometricians require from the error term in a regression analysis, the least square technique will yield the best linear unbiased estimates of the β_j's. In that case, while the arguments of the previous section might still be of theoretical interest, they will have no empirical implications. There are, however, no reasons to believe that u will meet all the requirements of the least squares model.

Consider first the case of a standard workweek which reflects employers' preferences, managerial or technological considerations of production. As will become clear below, the error term, u, is likely to be correlated with the wage rate, w, so that at least one of the least square estimates of the

coefficients of the supply function (3) will be biased. Assuming for simplicity that both the wage rate and the error term are uncorrelated with the other explanatory variables of equation (3),[9] the least square estimate of its effect will be,

$$(4) \qquad b_{H^o,w} = \frac{\sum_{i=1}^{n} H_i^o w_i}{\sum_{i=1}^{n} w_i^2} = \frac{\sum_{i=1}^{n} H_i^s w_i}{\sum_{i=1}^{n} w_i^2} - \frac{\sum_{i=1}^{n} u_i w_i}{\sum_{i=1}^{n} w_i^2} = b_{H^s,w} - b_{u,w}$$

where $b_{H^s,w}$ is the "true" least square estimate of the constant slope (or elasticity)[10] of the supply of weekly hours of work, and $b_{u,w}$ is the least square coefficient of the simple regression in which the error term is regressed on the wage rate. If we assume that for m observations $H^s = H^o$ (i.e., $u = 0$), and for $n - m$ observations $H^s \neq H^o = H^d$ (i.e., $u \neq 0$), where H^d is the number of weekly hours of work demanded by employers, equation (4) becomes after some manipulations,

$$(4') \qquad b_{H^o,w} = \alpha b^*_{H^d,w} + (1 - \alpha)\, b^{**}_{H^s,w}$$

where $$b^*_{H^d,w} = \frac{\sum_{i=m+1}^{n} H_i^d w_i}{\sum_{i=m+1}^{n} w_i^2}, \quad b^{**}_{H^s,w} = \frac{\sum_{i=1}^{m} H_i^s w_i}{\sum_{i=1}^{m} w_i^2}$$

$$\alpha = \frac{\sum_{i=m+1}^{n} w_i^2}{\sum_{i=1}^{n} w_i^2}, \quad \text{and } 0 < \alpha < 1 \text{ when } 0 < m < n.$$

Equation (4') suggests that the least square estimate of the slope (elasticity) of the supply of weekly hours of work is a weighted average of the true least square estimate of that slope (elasticity) and the least square estimate of the demand for weekly hours of work.

Taking expectation, which is denoted by E, for both sides of equation (4') and subtracting the true slope (elasticity) of supply, $\beta_{H^s,w}$, yields the bias in the estimated supply which is,

$$(5) \qquad E(b_{H^o,w}) - \beta_{H^s,w} = \alpha[E(b^*_{H^d,w}) - \beta_{H^s,w}]$$

If, as suggested and assumed by Fleisher (1970, pp. 59-60) and Barzel (1973, p. 222), employers express their demand for labor in terms of total hours of work and not in terms of hours per week per worker, we expect $E(b^*_{H^d,w}) \equiv 0$. Equation (5) then implies that the sign of $E(b_{H^o,w})$ will be identical to that of $\beta_{H^s,w}$, and that the bias will have the opposite sign (i.e., bias toward zero). Most empirical studies find $b_{H^o,w} < 0$ and the result is usually significant. We may conclude, therefore, that $E(b_{H^o,w}) < 0$. Thus, to the extent that the standard workweek is due to employers preferences, managerial and technical considerations of production, equation (5) will suggest that empirical studies tend to <u>underestimate</u> the negative effect of the wage rate on the supply of weekly hours of work.

If the marginal productivity of a worker declines with his weekly hours of work and/or different costs are attributed to hours per worker and number of workers (e.g., Rosen (1969, p. 255), then hours per worker and the number of workers are not perfect substitutes. We expect, therefore, that $E(b_{H^d,w}) < 0$.[11] The previous conclusion will still hold if $|E(b_{H^d,w})| < |\beta_{H^s,w}|$, but we do not know whether that condition is met. Whatever the situation is, however, the (more) basic claim that the empirical estimate of the slope (elasticity) of supply of weekly hours of work is likely to be biased, still holds.

We turn now to the case of a standard workweek which is the result of government legislation. This may take the direct form of a maximum-hours

legislation, or the indirect form of a penalty wage rate for hours beyond the standard.[12] To the extent that the penalty is high enough it will succeed in putting a limitation on hours of work. The existence of such an "imposed" maximum standard workweek is likely to cause a bias in the estimated coefficients of the supply function (3). Assuming again that the wage rate and the error term are uncorrelated with the other explanatory variables, the least square estimate of its effect will be given by equation (4). If we further assume that there are m observations for which $H^s = H^o \leq H^g$ (i.e., $u = 0$), where H^g is the maximum standard workweek "imposed" by the legislation, and n - m observation for which $H^s > H^o = H^g$ (i.e., $u > 0$), equation (4) becomes

$$(4'') \quad b_{H^o,w} = b_{H^s,w} - \alpha b^*_{H^s,w}$$

where $b^*_{H^s,w} = \dfrac{\sum_{i=m+1}^{n} H_i^s w_i}{\sum_{i=m+1}^{n} w_i^2}$ and α is defined as before.

Taking an expectation for both sides of equation (4") yields after a manipulation

$$(5') \quad E(b_{H^o,w}) - \beta_{H^s,w} = -\alpha\beta_{H^s,w}$$

As before, we interpret the empirical findings to imply that $E(b_{H^o,w}) < 0$. And to the extent that the maximum standard workweek legislation affects our data, it causes an underestimation of the negative effect of the wage rate on the supply of weekly hours of work.

The effect of a standard workweek due to unions demands of a penalty wage rate or of a given standard workweek will be similar to the above.[13] We may, therefore, conclude that the various sources of a standard workweek cause biases in the estimated slope (elasticity) of the supply of weekly

hours of work, and there is no reason to believe that they exactly cancel one another. Moreover, it is quite likely that all of them affect in the same direction--to underestimate the negative slope of the supply of weekly hours of work.

IV. On the Correct Formulation of Supply

When estimating equation such as (3) the researcher (implicitly) assumes that the individual is a wage taker. The wage rate is given, and the individual chooses the number of hours of work. But under the regime of a standard workweek individuals are likely to be quoted both the wage rates and hours of work, so that the conceptual justification for estimating equation (3) becomes doubtful.

Whether individuals face several different wage-hours offers to choose from, or they face one such offer which they have to take or to leave, they are forced to choose both the wage rate and hours of work simultaneously. Thus, before an offer is accepted both the wage rate and hours of work are likely to be the subject of choice. This is not different from the situation which is assumed to exist in the "traditional" view of the labor market. But once an offer is accepted by the individual, both the wage rate and hours of work are given. This is in sharp contrast to the traditional view, where only the wage rate is assumed to be given. Under the standard workweek phenomenon as described above there is no reason to regard hours of work as the "dependent" variable and the wage rate as an "explanatory" one. Depending on the stage at which we observe the individual, either both are chosen simultaneously or both are given. And, if all individuals were both a wage rate and hours of work takers there would be no supply relationship between hours of work and the wage rate.

It is not impossible, however, that the individual has some bargaining power with the employer. If due to technological and managerial considerations the employer wants the same standard workweek to apply to all workers, the differential bargaining power among workers will reflect itself in a differential wage rates. Thus, the individuals are in that case quantity takers and their supply function becomes

$$(6) \qquad w^s = \beta_1 H^o + \sum_{j=2}^{J} \beta_j X_j + e$$

where e is assumed to be a random variable.[14] Assuming, for simplicity, that there is only one additional explanatory variable, X, the least square estimate of β_1 will be[15]

$$(7) \qquad \hat{\beta}_1 = \frac{(\sum_{i=1}^{n} w_i^s H_i^o)(\sum_{i=1}^{n} X_i^2) - (\sum_{i=1}^{n} w_i^s X_i)(\sum_{i=1}^{n} H_i^o X_i)}{(\sum_{i=1}^{n} H_i^{o2})(\sum_{i=1}^{n} X_i^2) - (\sum_{i=1}^{n} H_i^o X_i)^2}$$

which should be compared with an estimate of the coefficient of (3) which allows for collinearity,

$$(4') \qquad \hat{b}_{H^o,w} = \frac{(\sum_{i=1}^{n} H_i^o w_i)(\sum_{i=1}^{n} X_i^2) - (\sum_{i=1}^{n} w_i X_i)(\Sigma H_i^o X_i)}{(\sum_{i=1}^{n} w_i^2)(\sum_{i=1}^{n} X_i^2) - (\sum_{i=1}^{n} w_i X_i)^2}$$

The numerators in (7) and in (4') are identical, and from the Caushy-Schwarz inequality (see, for example, Apostol (1974, p. 14)) we know that their denominators must be positive. Thus, sign $(\hat{b}_{H^o,w})$ = sign $(\hat{\beta}_1)$. The bias from estimating β_1 (assumed to be the correct slope (elasticity) of supply) by $b_{H^o,w}$ depends on the magnitudes of the variances in the population of the wage rate and hours of work as well as on their covariances with the other explanatory variable(s), X. A-priori, we cannot predict the direction of that bias.

This writer is not aware of any study that investigate the question whether individuals behave as wage takers or quantity takers (or both). But, when studying unions actions, Rowan (1965, p. 33) concludes that in the last decades unions have exercised their bargaining power with employers almost entirely in terms of demands for higher wage rates. To the extent that the data are dominated by unions' actions as suppliers of labor services, researchers should prefer formulation (6) to (3) when estimating the supply of hours of work. Otherwise, their estimates, although probably having the correct sign, are not likely to yield the true magnitude of the slope (elasticity) of (unions') supply of labor services.

V. Concluding Remarks

The widespread belief that there are mechanisms in the labor market which ensure that the individual will return to his offer curve, even when he is both a wage rate and hours of work taker, has no foundation. Competition is unlikely to do that because employers operate in an imperfect world. They do not know whether a given wage-hours combination is or is not on the individual's offer curve, and the market will not give them any signal in that case. The individual who is required to work an undesired workweek at the given wage rate will make "adjustments" in other dimensions of his work effort. This raises his level of utility, but cannot bring him back to his offer of weekly hours of work.

If all individuals were quoted both the wage rate and weekly hours of work at any job, they actually choose both of them simultaneously when they accept job offers. In that case, they do not have an offer curve, and there would be no reason to even attempt and estimate such a curve. If, however, the above assumed operation of the labor market is relevant for only part of the sample being studies, the inability to return to the offer curve

in those cases is shown to bias the slope (elasticity) of supply that would have existed had all individuals in the sample been wage rate takers only. In all probability the bias is toward zero. In practice this means an underestimation of the negative supply relationship between weekly hours of work and the wage rate.

It is not impossible, however, that individuals (or unions) exercise their bargaining power in the labor market by demanding wage rate hikes, while taking weekly hours of work as given (or, more accurately, let employers determine them according to their needs). In that case the choice (or dependent) variable is the wage rate and weekly hours of work are the given (or explanatory) one. Such a switch in the roles of those variables implies that the current empirical studies use an incorrectly specified relationship between them. And we have shown that this will yield, in all probability, a biased estimate of the true slope (elasticity) of supply, though its sign is likely to be the correct one.

The theoretical considerations, which were suggested in the literature as making estimation of the supply of weekly hours of work a valid exercise in spite of the standard workweek phenomenon, were discredited. It is worthwhile noting in that connection that as long as time in various jobs (or overtime and standard time) are not perfect substitutes from the individual's point of view, the use of household data rather then industry data (e.g., Cohen et al. (1970)) does not solve the problem. Moreover, we suggested that the supply, assuming it exists, is likely to be wrongly specified in the empirical studies done so far. And we have shown that these factors are likely to bias the estimated slope (elasticity) of supply. But, in spite of all the above claims, our discussion is not such a devastating blow on the whole exercise of estimating the supply of labor services as measured

by weekly hours of work. Economists are more concerned with the sign rather than the magnitude of that supply relationship, and our discussion suggests that the standard workweek phenomenon is unlikely to cause a wrong sign in empirical studies. On the other hand, our discussion suggests that the standard workweek phenomenon is likely to affect the estimated supply relationship for other dimensions of labor services such as weeks worked during the year, labor force participation rate etc. The nature of that effect has not been investigated, but it is not unlikely that the inclusion of the standard workweek as an explanatory variable in those regression analyses will remedy the problem.

Footnotes

[1]The other conditions are that the observed wage-hours combinations will lie on, or distributed randomly around, the demand for weekly hours of work, that the demand shifts but the supply does not. The relevant literature is that of the identification problem. For a discussion specific to our problem see Feldstein (1968).

It is worthwhile noting that Fleisher (1970, p. 60) is bound to be wrong when he claims that the introduction into the regression analysis of employers preferences and other reasons for the standard workweek from the demand side would have yielded the correct supply relationship. In order to identify a supply relationship we should introduce into the regression analysis the shift variables of the supply, but not those which shift the demand.

[2]We assume that competition does not imply that employers have information on their workers' tastes. Whenever perfect competition is characterized it is usually suggested that it requires perfect information on prices (wages) but not on workers' tastes (e.g., Ferguson and Maurice (1974, p. 236)). Employers could, of course, obtain some information about those tastes by surveying their workers. But, as the value of hypothetical answers to hypothetical questions is doubtful, it is not surprising that employers do not spend resources on collecting such information.

It is worthwhile emphasizing that our discussion is based on the assumption that individuals face a limited number of job offers. If they were faced an infinite number of job offers at a certain (implicit) wage rate, differing only in their hours of work, their choices would have revealed bundles that are on their offer curves.

[3]It is not impossible that the traditional leisure-income model is wrong, but those suggesting the importance of competition to our problem are known to believe in it. Moreover, the discussion by Sharir (1975) suggests that the model is likely to be valid.

[4]Note that when such an adjustment takes place, the individual is no longer on his offer curves of the other dimensions of his work effort. This will have an adverse implication concerning the interpretation of the empirically estimated relationships with such work effort variables as the labor force participation rate or the number of weeks worked during the year, as supply functions. The problem might be corrected if the standard workweek were introduced as an explicit explanatory variable in such regressions.

[5]If the unit of decision-making were the family rather than the individual, we could have interpersonal adjustments as well. The discussion in the text concerning intertemporal adjustments or multiple jobholding will apply to that case as well.

[6]Even if the wage rates in all the jobs changed by the same amount, so that they could be aggregated into one composite good, we would have not been able to infer from changes in the supply of that composite good (measured in dollars) on the changes in the desired total number of hours of work on all the jobs.

[7]Many contracts require the individual to work overtime at the employer's request. There are some indications that this is sometimes done against the workers' desires. See, for example, Helfgott (1974, p. 373n).

[8]About a third of those who work overtime in the U.S. receive a premium pay. See, for example, Helfgott (1974, p. 373). The implication of the aggregate good theorem is as in footnote 6.

[9]The conclusions are not affected by making these assumptions. If the wage rate is correlated with the other explanatory variables, equation (4) still holds although the formula for $b_{H^o,w}$ is different. If, in addition, the error term is correlated with the other explanatory variables, this is likely to be another source of a bias in $b_{H^o,w}$.

[10]If the variables are measured by their units, $b_{H^o,w}$ is their slope and if they are measured by the natural logarithms of their units, it is their elasticity.

[11]An increase in the wage rate will induce, in an attempt to minimize costs, a decline in demand for hours per worker and an increase in the number of workers demanded.

[12]In the U.S., for example, a direct maximum-hours legislation applies only to women and minors. For others, the federal acts require a payment of one and one-half times the wage rate for all hours in excess of 40 hours per week. See Chamberlain and Cullen (1971, p. 479).

[13]Only if all the union's members had identical tastes, and union's officials were able to observe them and make their demands accordingly, the union's demands would have reflected each individual's desires. Otherwise, union's demands are not those desired by at least some individuals, and they may say to reflect only the union's supply of labor services.

[14]One might interpret Rosen's (1969, p. 261) discussion as suggesting such a supply function. But in estimating supply he uses the traditional formulation.

[15]See Johnston (1963, p. 56).

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