Theory and Evidence on the Political Economy of the Minimum Wage

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This paper examines how closely the minimum wage has been set to the most popularly stated goals of minimum-wage policy. I first estimate these goals: the minimum-wage rate at which the relevant labor demand is unitary elastic—maximizing the total earnings of minimum-wage workers (about $5.35)—and the level that would lift a typical minimum-wage worker's family out of poverty (about $5.17). I can reject that actual minimum-wage policy has been driven by a desire to achieve these goals and find that a simple interest group model best explains the historical path of the minimum-wage rate.

I. Introduction

The Fair Labor Standards Act of 1938 was designed to achieve specific public policy goals through the use of a federally mandated minimum wage. It is interesting that the House altered the original bill to give Congress, rather than a separate Wages and Hours Board, control over the minimum-wage rate (Seltzer 1995). Thus, since its beginning, the pursuit of these policy goals has been subjected to the political pressures facing Congress. Previous research (Silberman and Durden 1976; Kau and Rubin 1978; Bloch 1980, 1993; Seltzer 1995) has found that interest group pressure significantly influenced congressional voting on both the passage of the original act

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and subsequent minimum-wage increases. There are, however, many other endogenous features of minimum-wage legislation, such as the level of the minimum wage, the effective date of the change, and the number and timing of the series of steps, at the control of Congress besides simply voting on the bill's passage.

This paper tests whether Congress has set the minimum-wage rate according to the stated goals of minimum-wage policy or rather has allowed interest group pressures to determine the level of the minimum wage. The first step in this analysis is measuring the level of the minimum wage that would be consistent with stated policy goals. I consider the two alternative policy goals most frequently cited: the level that would allow a typical minimum-wage worker to attain the poverty threshold for his or her family and the level that would maximize the total income transfer to minimum-wage workers. The poverty threshold level is rather straightforward to calculate; however, the level that would maximize worker earnings is not. It requires estimating the minimum wage at which the relevant labor demand elasticity is unitary. To obtain this value, I develop and estimate a model of the relationship between the minimum wage and the total earnings of minimum-wage workers. My estimate of approximately $5.35 is then contrasted with the level that would allow a typical minimum-wage worker to lift his or her family out of poverty. Under reasonable assumptions about work hours and family size, this value is approximately $5.17.

Using estimated confidence intervals, I am able to reject the hypothesis that Congress has been setting the minimum wage at the level that would accomplish these policy goals. Instead, my evidence indicates that a simple interest group model can better explain the historical path of the minimum wage. In addition, I find that differing short-run and long-run labor demand elasticities create incentives for Congress to time minimum-wage changes very close to elections and also to increase the minimum wage in a series of smaller steps rather than one large change. Data support the conjecture that these other endogenous features of minimum-wage legislation are also influenced by political pressures, particularly the reelection constraints faced by Congress.

II. Quantifying the Stated Goals of Minimum-Wage Policy

To determine whether the actual minimum wage has been set at levels consistent with the stated goals of minimum-wage policy first requires that specific, quantifiable goals can be identified. A review of political speeches and academic research on minimum wages reveals that two such goals are more frequently cited than any others. One example is found in the speech of President Bill Clinton at the signing of the most recent minimum-wage increase:

> This bill ensures that a parent working full-time at the minimum wage can lift himself or herself and their children out of poverty. Nobody who works full-time with kids in the home should be in poverty. If we want to revolutionize America's welfare system and move people from welfare to work and reward work, that is the first, ultimate test we all have to meet. If you get up every day and you go to work, and you put in your time and you have kids in the home, you and your children will not be in poverty.[1]

This idea that the minimum wage should be set such that household heads can lift their families out of poverty can also be found in the work of academic scholars, such as David Ellwood, Professor of Public Policy at Harvard University, who states that

> I favor raising it back to the level of the 1970s. . . . Without such a change, it is virtually impossible to guarantee that work will pay enough to keep families out of poverty. . . . If the minimum is raised to $4.30 or $4.40, families of four with one full-time minimum-wage worker will still be poor. [Ellwood 1988, pp. 112–13]

These quotations offer one policy goal I shall consider: a ‘‘poverty threshold target.’’ It will be possible to obtain a value for this goal using data on family size and earners per family along with the poverty threshold level of income.

Another frequently cited goal for minimum-wage policy is echoed in Johnson and Browning (1983), which estimates the impact of the minimum wage on the income distribution. The opening sentence of their paper states that ‘‘the generally accepted goal of minimum wage laws is to alter the distribution of income in favor of low-income households’’ (p. 204). Along the same lines, almost every textbook treatment of the minimum wage states that, despite the possible adverse employment effects, the minimum wage may increase the total income of minimum-wage workers if labor demand is inelastic. One such example from an intermediate labor economics textbook (Fleisher and Kniesner 1984, pp. 78, 90) states that

> as a first approximation to deciding whether workers will be hurt or helped by the imposing of a minimum wage . . .

[1] From ‘‘Remarks by the President at Signing of the Small Business Job Protection Act of 1996’’ (http://www.dol.gov/dol/esa/public/minwage/presdent.htm).

> we will decide that workers are helped if their earnings rise and harmed if they decline. The direction in which earnings move . . . depends upon [whether] the elasticity of demand for labor . . . exceeds or falls short of unity (1) in absolute value. One important reason for measuring the elasticity of labor demand is to know whether imposing a minimum wage is likely to raise the average earnings of workers covered by the law. . . . This is a very rough guide to whether minimum wage legislation constitutes good or bad economic policy.

These quotations offer another policy goal I shall consider: a ‘‘nominal income target.’’ This target of setting the minimum wage where labor demand elasticity is unitary results in the maximization of the dollar value of income earned by the group of minimum-wage workers as a whole. In contrast to the poverty threshold target, which is much more individualistic, this target seems to care only about maximizing the total income held by these workers. From an aggregate sense, this does, however, achieve the maximum possible change in the income distribution.

The remainder of this paper will be devoted to putting specific values on these target levels and then testing whether actual minimum-wage policy has been consistent with achieving these goals. Because the poverty threshold target will be rather straightforward, I begin with the nominal income target, which requires the development and estimation of a more formal model.

III. A Model of the Nominal Income Target

Conceptually, the relationship between the minimum wage and the total earnings of minimum-wage workers is straightforward. When the equilibrium wage is on the inelastic portion of the labor demand curve, a minimum wage will increase total income up to the point at which labor demand has unitary elasticity. Above this level, the minimum wage begins to reduce total income.

This relationship is shown in figure 1 by the thicker curve (LR). This curve is labeled LR because it shows the relationship between total income (Y) and the minimum wage (w) based on the *long-run* elasticity of labor demand. The curve is vertical below the equilibrium wage (w_e) because here it is not binding, and total income remains at the equilibrium level, Y_e. The nominal income target goal would be achieved in the long run at point A with a minimum-wage rate of w_{lr}.

When the minimum wage is changed, labor markets require time

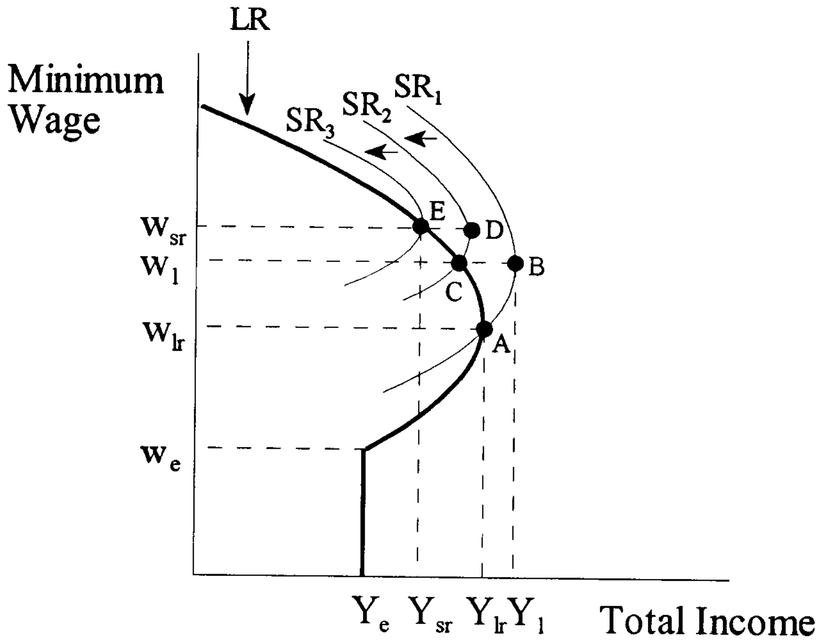

FIG. 1.—Minimum wage and worker earnings

to fully adjust to the new wage level.[2] The difference in the short-run and long-run impacts of a change can be quite substantial because the short-run elasticity of labor demand is significantly less than the long-run elasticity. Not only is it important to account for this to obtain unbiased empirical estimates, but this distinction also allows further insights into the politics of minimum-wage legislation. In figure 1, the SR curves show the short-run impact of a minimum-wage change beginning from a point of long-run equilibrium.[3] A change in the minimum wage from w_{lr} to w_1, for example, would cause an initial movement along SR_1 from point *A* to point *B*. The maximum point of the short-run curve (point *B*) occurs where the short-run elasticity of labor demand is unitary.

[2] Hamermesh (1993) finds that 3.6–4.2 months are sufficient for employment to fully adjust. Brown, Gilroy, and Kohen (1982) discuss leads and lags in the impact of minimum-wage policy with respect to the date of adoption of the legislation. Whether or not these short-run effects exist is ultimately an empirical question, and the results presented later in this paper answer this question in the affirmative, finding strong, significant effects precisely of the length suggested by Hamermesh.

[3] Many readers will note a similarity to the short- run/long-run Laffer curve framework of Buchanan and Lee (1982*a*, 1982*b*). While their analysis regards tax rates and revenue, Clark and Lee (1996, 1997) have shown this framework to be useful in a wide range of applications.

With the passage of time, labor demand adjusts, shifting the short-run curve from SR_1 to SR_2 to a point along the long-run curve as shown by point *C*. But from this point, another increase in the minimum wage would cause a movement along SR_2 to an even higher level of total income at point *D*. It is possible to show that a purely shortsighted political process would continue until an equilibrium is reached along the single short-run curve whose maximum lies on the long-run curve, shown in the figure as point *E* along SR_3.[4] Even if Congress were pursuing the nominal income target, a shortsightedness effect could lead it to adopt a minimum wage at the level w_{sr} rather than at the level best from the long-run perspective, w_{lr}.

This model shows an incentive for Congress to time changes in the minimum wage just before elections, to take advantage of the short-run curve on election day.[5] Certainly the most recent change, with its first step becoming effective October 1, 1996, just one month before the presidential election, is consistent with this. In fact, for each of the last four legislated changes, the first step occurred in a congressional election year, and timing averaged six months before the election. Similar correlations exist over the entire history of the minimum wage.[6] Of particular interest, the original Fair Labor Standards Act went into effect October 24, 1938, just *eight days* before the election.

The fact that minimum-wage changes are enacted in a series of steps rather than one large increase is also consistent with this model. In this way, workers are sent through a series of transitional gains that can be designed to correspond to elections. The change enacted in 1974, for example, had a first step effective in 1974 and two subsequent steps in 1975 and 1976. The first step increased the minimum wage by 40 cents, the second by 10 cents, and the third by 20 cents, making the final election year increase larger than the increase that became effective in the middle, non–election year. Again for the change enacted in 1977, the first step became effective in 1978, with subsequent changes occurring through the 1980 elections.

[4] See Buchanan and Lee (1982*a*, 1982*b*) for the proof. For simplicity in the graphical presentation, I have shown point *E* to be at the same wage rate as point *D* in the figure. It will, however, be above point *D*, just as point *D* is above point *B*. Each successive movement becomes smaller.

[5] A similarity is apparent to both the political business cycle literature and Tullock's (1975) idea of a transitional gains trap.

[6] Only four of the nine legislated changes were enacted in an election year. Of these, three became effective that year prior to the November election. Of the five non–election year changes, only one became effective that year. The effective dates of the remaining four were all delayed, in each case until during the next election year. Thus seven of the nine changes had first steps effective in congressional election years. Also, only two changes were enacted during the president's final term.

This section developed a model of the relationship between the minimum wage and the first policy goal, the nominal income target. This model shows that the impact of a minimum-wage change can be very different in the short and long run. The facts that minimum-wage changes tend to be effective just before elections and that they are enacted in a series of steps are consistent with this differing short-run response being an important feature of the economic impact of minimum-wage policy. This difference is important both in understanding the political forces behind minimum-wage changes and in obtaining unbiased empirical estimates of the effects of minimum-wage changes.

IV. The Empirical Model of the Nominal Income Target

This section parameterizes the model developed in the previous section for the purpose of estimation. First, the total wage income of all workers in the minimum-wage labor market, Y, can be defined as the wage rate times total labor demanded (defined in terms of labor hours):

$$Y = w \cdot L_d(w). \tag{1}$$

Let a first-order linear approximation of labor demand be given by $L_d(w) = \alpha + \beta w$, where $\alpha > 0$ and $\beta < 0$. Then, for a binding minimum wage, equation (1) may be rewritten as

$$Y = w(\alpha + \beta w) = \alpha w + \beta w^2. \tag{2}$$

To allow for the short-run effects of minimum-wage changes shown in figure 1, additional terms must be added to the equation. Equation (3) shows equation (2) appended with additional terms to capture the *marginal* short-run relationship (see the Appendix for the derivation). In addition, subscripts have now been added to the variables to denote the time period of the observation, t:

$$Y_t = \alpha w_t + \beta w_t^2 + \gamma(\Delta w_t \cdot w_t \cdot D_t) + \sum_{i=1}^{n} \delta_i \cdot \gamma(\Delta w_{t-i} \cdot w_{t-i} \cdot D_{t-i}). \tag{3}$$

In equation (3), Δw_t is the legislated change in the minimum wage from last period, D_t is an indicator variable equal to one in the period of a legislated change, δ_i is a decay parameter measuring how much of the short-run transitional gain remains present at time $t + i$, and n represents the number of periods taken for labor demand to fully adjust.[7] The coefficient γ should be positive if there is a short-run transitional gain in addition to the long-run impact of a change in the minimum wage. It is derived in the Appendix that the only constraint on the value of γ is $0 < \gamma < -\beta$.

In terms of this parameterized version, the minimum wage that maximizes total income in the long run (the nominal income target) is

$$w^*_{\mathrm{LR}} = -\frac{\alpha}{2\beta}, \tag{4}$$

and the "political equilibrium" minimum wage that would be produced by a purely shortsighted political process that pursued the nominal income target is (see the Appendix for the derivation)

$$w^*_{\mathrm{SR}} = -\frac{\alpha}{2\beta + \gamma}. \tag{5}$$

V. Data, Empirical Methodology, and Results for the Nominal Income Target

This section estimates the relationship between the minimum wage and worker earnings presented in the previous section. First, data must be acquired on total income of workers at the minimum wage. For current purposes it will be helpful to recognize that total income can be expressed as the average income per worker, $\bar{y}(w)$, times employment, $E(w)$:[8]

$$Y = \bar{y}(w) \cdot E(w). \tag{6}$$

The first component, average income per worker working at the minimum wage, is taken directly from Current Population Survey (CPS) Outgoing Rotation Group data files for January 1979 through December 1995.[9] The second component, minimum-wage employ-

[7] Actually, if the full adjustment occurs in period n, then δ_n would be zero. Thus, empirically, only $n - 1$ lags need to be included. Alternatively stated, if the last empirically significant lag of δ occurs in period m, then labor demand would be said to fully adjust in period $m + 1$.

[8] In the equation, average income per worker is expressed as a function of the wage rate. The reason is that it is equal to the wage times average hours worked, and average hours worked can be affected by minimum-wage changes. For evidence on this relationship, see Zucker (1973), Gramlich (1976), and Mattila (1981). Card and Krueger (1994) also address this relationship, but see Kennan (1995) for evidence surrounding their highly controversial findings.

[9] Average weekly earnings are the average of reported earnings last week across all private-sector workers with reported hourly wages equal to the minimum wage. I would like to thank Dave MacPherson of Florida State University for his help in acquiring these data.

ment, is proxied by the employment to population ratio of teenagers (16–19-year-olds) from the Bureau of Labor Statistics. In a later section of this paper, I shall explore the sensitivity of the results from this model to other measures of minimum-wage employment.[10]

The final version of the model to be estimated is then equation (3) supplemented with variables to control for other factors that might influence labor demand, such as the national business cycle and the prices of related factors of production. The civilian unemployment rate is used as the measure of the business cycle, the price of capital is measured by the annualized monthly real interest rate on six-month commercial paper from the Federal Reserve, and the price of high-skilled labor is measured by the real average hourly wage in manufacturing from the Bureau of Labor Statistics. All values are quarterly and are converted to constant October 1996 dollars using the consumer price index (CPI-U).[11]

Because of the highly seasonal nature of the employment data, a standard seasonal autoregressive moving average (ARMA) model is used in the estimation.[12] To check for robustness, the models are estimated both with and without the supplementary variables measuring the prices of substitute inputs.[13] The lag structure of the

[10] I follow other studies in using this employment to population ratio as a proxy of minimum-wage employment and shall test the robustness of the results to an alternative measure in a later section. Note, however, that the coefficient estimates will be scaled because the use of a population ratio will convert the dependent variable to a per capita value of total income. This specification has an interesting relation to the theoretical model of Holcombe and Metcalf (1977).

[11] I estimated the model using both monthly and quarterly data. Previous research using CPS data has mostly used quarterly data to reduce the impact of sampling variation present in monthly census data. The presence of these sampling errors is evidenced by a significantly lower R^2 when the model is estimated on monthly data. Like these other authors, I found the quarterly models to fit the data much better. The monthly data produced slightly lower estimates of labor demand elasticity and slightly higher (but not significantly different) estimates of the nominal income target.

[12] While seasonally adjusted employment data are available, Hyman B. Kaitz, chief of the Division of Statistics Standards at the Bureau of Labor Statistics, has repeatedly stressed (see Kaitz 1970) that the X-11 method used for seasonal adjustment probably removes many effects of the minimum wage since it is usually increased in a seasonal fashion (e.g., a change happened every January from 1975 to 1981). Despite this problem, studies have continued to use the seasonally adjusted variables or have used quarterly dummy variables in an ordinary least squares regression, which results in an identical problem. The appropriate procedure is the one taken in this paper since a standard ARMA time-series model correctly specifies the independent variables as being additive to an estimated underlying seasonal series (see Box and Jenkins 1976; Mills 1990, chap. 12). This maximum likelihood method allows the seasonal adjustment to be made independent of all other variables in the equation.

[13] A substantial part of the employment action among 16–19-year-olds occurs in the summer. To further explore this, models using three-month averages were estimated, as were specifications limiting the analysis to only summer months and only nonsummer months. In addition (see earlier note) the models were estimated using

ARMA models was determined by the usual method of using the Bayesian (or Schwarz) information criterion (BIC). The only other lag length left to specify is the number of periods taken for labor demand to fully adjust back to long-run equilibrium. The BIC criterion selected a one-quarter lag, and this is supported by the fact that when a second quarter was included, it was insignificant.[14] This is consistent with previous research (see Hamermesh 1993) that suggests that labor demand fully adjusts by the second quarter after a change.

With the substitute price variables included, the BIC favored an ARMA$(1, 1)(1, 1)_4$ model; when they were excluded, the criterion selected the ARMA$(1, 1)(2, 1)_4$ model.[15] Table 1 shows the results from these estimated models as well as the ARMA$(1, 1)(1, 1)_4$ model fit without the supplementary variables for comparison. Both the BIC criterion and the adjusted R^2 suggest that the ARMA$(1, 1)(2, 1)_4$ model without the substitute price variables (shown in col. 3) is the best-fitting model. In addition, the substitute price variables were insignificant in all specifications.

In all cases, the minimum-wage coefficient is positive and its square is negative, implying a Laffer curve–type relationship as depicted in figure 1. The estimates confirm the presence of a positive and significant marginal short-run effect of a minimum-wage change. To understand the magnitude implied by the short-run coefficient estimate, the final two rows of the table show the short-run and long-run impacts on total worker income of the first step of the most recent change in the minimum wage from \$4.25 to \$4.75. It is estimated that the short-run effect will be to increase total worker income by between 8.1 and 9.5 percent, but once labor demand has fully adjusted, the long-run impact will be to increase earnings by only 3.1–3.9 percent. The table also shows the elasticities of short-run and long-run labor demand implied by the model.[16] The short-run elasticities range from 0.243 to 0.396, and the long-run elasticities range from 0.835 to 0.923.

Of most interest are the estimates of the nominal income target. Both the minimum wage that maximizes income in the long run

monthly data. These alternative specifications produced estimates that were not statistically different from the ones presented but had lower R^2's because of the noise in the higher-frequency CPS data.

[14] All changes occurred in the first month of a quarter so that a one-quarter lag is four months in all cases.

[15] An ARMA$(P, Q)(p, q)_s$ model has P regular autoregressive lags, Q regular moving average lags, p seasonal autoregressive lags, and q seasonal moving average lags, and the number of periods that constitutes a season is given by s.

[16] The elasticity at wage w_0 is $\epsilon_0 = w_0/[(2 \cdot w^*) - w_0]$, where w^* is the estimated nominal income target wage.

TABLE 1

THE MINIMUM WAGE AND THE EARNINGS OF MINIMUM-WAGE WORKERS: ARMA$(P, Q)(p, q)_s$ MAXIMUM LIKELIHOOD ESTIMATES

Independent Variable	Coefficient	Coefficient Estimate (Absolute t-Ratio) (1)	(2)	(3)
Real minimum wage	α	42.22	37.21	34.21
		(3.39)	(9.95)	(10.87)
(Real minimum wage)^2	β	−3.73	−3.47	−3.19
		(2.87)	(9.05)	(7.39)
Short-run impact (marginal, first quarter)	γ	2.07	1.98	2.35
		(6.72)	(23.82)	(6.45)
Civilian unemployment rate		−2.23	−1.92	−1.62
		(5.76)	(7.56)	(4.89)
Price of high-skilled labor		1.07	. . .	. . .
		(.60)		
Price of capital		−.02	. . .	. . .
		(.21)		
ARMA$(P, Q)(p, q)_s$		$(1, 1)(1, 1)_4$	$(1, 1)(1, 1)_4$	$(1, 1)(2, 1)_4$
Adjusted R^2		.9719	.9757	.9759
BIC (Schwarz criterion)		1.639	1.364	1.242
Long-run nominal income target		$5.66	$5.37	$5.36
Short-run political equilibrium		$7.83	$7.51	$8.49
Long-run labor demand elasticity		.835	.922	.923
Short-run labor demand elasticity		.372	.396	.243
Percentage increase in total earnings from first step of most recent change ($4.25–$4.75):				
Short-run		8.2%	8.1%	9.5%
Long-run		3.9%	3.1%	3.1%

NOTE.—The BIC criterion, used to select the lags of the ARMA model, decreases with goodness of fit. Tests for autogressive and stationary autogressive root stationarity and Ljung-Box Q white-noise residual tests were satisfied for all models shown at a 5 percent level of significance or better. The short-run and long-run labor demand elasticities were calculated at the current minimum wage of $5.15 per hour; all models were estimated using quarterly data from January 1979 to December 1995.

TABLE 2

Monte Carlo Estimated Confidence Intervals for the Nominal Income Target

	Nominal Income Target Wage	Short-Run Political Equilibrium	Long-Run Labor Demand Elasticity	Short-Run Labor Demand Elasticity
Point estimate	\$5.36	\$8.49	.923	.243
Mean of empirical distribution	\$5.39	\$8.58	.933	.236
90% confidence interval	\$4.66–\$6.00	\$7.49–\$9.37	.702–1.142	.154–.330
95% confidence interval	\$4.42–\$6.10	\$7.19–\$9.47	.643–1.187	.142–.356

Note.—The point estimate is based on a calculation using the coefficient estimates from the model, a nonlinear combination of expected values; the mean of the empirical distribution is the expected value of the nonlinear combination, which differs because of the covariance between the coefficient estimates. The elasticities shown are at a real minimum wage of \$5.15 per hour. Estimates are derived from 3,000 Monte Carlo simulations. Because of the skewness of the distributions, the upper and lower confidence ranges were switched appropriately (see Hall 1992; Jeong and Maddala 1993).

(long-run nominal income target) and the wage that would be set by a shortsighted political process pursuing this goal (short-run political equilibrium) are shown in the table. The best-fitting quarterly model estimates a nominal income target of approximately \$5.36 per hour. The other lag specification of this model produces a value of \$5.37 per hour, and the model including the (insignificant) substitute price variables produces \$5.66. Because the estimated nominal income targets in table 1 are calculated using a nonlinear combination of the parameters, the identification of a confidence interval for the estimates requires Monte Carlo simulation. The parameter estimates along with the covariance matrix of the estimates were used to generate a sample of 3,000 observations of the nominal income target, the political equilibrium wage, and estimates of the long-run and short-run labor demand elasticities for the best-fitting model (version 3 in table 1). Statistics for these empirical distributions are given in table 2.

For the nominal income target, the point estimate was \$5.36, and the mean of the empirical distribution is \$5.39. They differ because covariance between the coefficient estimates makes the expected value of the ratio different from the ratio of expected values. The 90 percent confidence interval is \$4.66–\$6.00, and the 95 percent confidence interval is \$4.42–\$6.10. The confidence intervals show that before the most recent change, the \$4.25 minimum wage was significantly lower than the nominal income target wage. Most important, my estimate suggests that above a level of \$5.36, the minimum wage begins to reduce the long-run total earnings of minimum-wage workers.

VI. Supporting Evidence for the Estimated Nominal Income Target

This section provides supporting evidence for my estimates from previous literature and from a second data set. Johnson and Browning (1983), in their analysis of the income distribution effects of the minimum wage, base their simulations on the long-run and short-run elasticities of minimum-wage labor demand from Hamermesh. These estimates of 0.3 in the short run and 0.75–1.0 in the long run are both almost identical to my estimates in table 1. Thus the underlying parameters in my model produce elasticities entirely consistent with previous literature, despite their being produced from an entirely different type of model and different data set.

Zucker (1973) estimates the long-run elasticity of labor demand and finds values of 0.91 and 1.15 in his two models. He concludes that the minimum wage during his 1947–66 sample period (which averaged $5.07 real) was approximately at the level maximizing the earnings of these workers. Thus my estimates are also highly consistent with his findings. Because Zucker's study employs a sample period that is 30 years before my sample period, this is also evidence that my estimated nominal income target is accurate for earlier time periods.

In addition, it is worthwhile to test the robustness of my models to other measures of minimum-wage employment. Like the authors of other studies, I have used the employment to population ratio of teenagers to proxy minimum-wage employment. The use of an indirect proxy is necessitated by an unfortunate feature of actual employment data in which increases in the minimum wage expand coverage to workers earning between the old and new minimum wage. Thus, even if the change lowers employment or earnings among the *original* group of minimum-wage workers, data will show an increase as a result of the expanding coverage. The problem with using this proxy, however, is that it brings into question how well the results apply more generally to all minimum-wage workers.

To explore this issue, annual data on the actual number of workers employed at the minimum wage from 1974 to 1993 were taken from Even and MacPherson (1996). Multiplying their total number of minimum-wage workers by the average weekly earnings of a minimum-wage worker, $\bar{y}(w)$, results in the actual combined weekly earnings of all minimum-wage workers. To adjust for the problem of changing coverage as the minimum wage changes, the data were normalized by the percentage of the workforce at or below the minimum wage, relative to the average over the period. The data from these calculations are presented graphically in figure 2, and all data

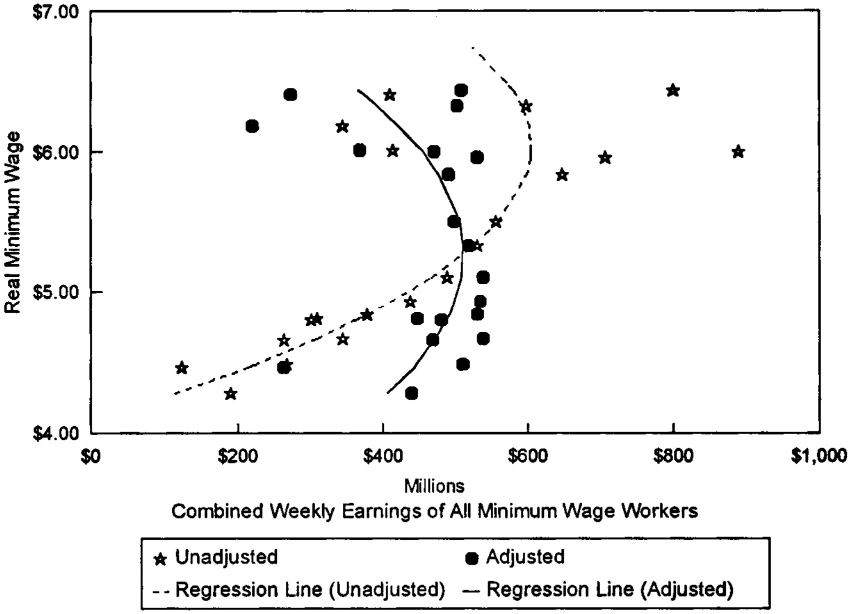

FIG. 2.—Actual earnings of minimum-wage workers, 1974–93

are adjusted to real October 1996 dollars using the CPI-U. The data shown by stars are the unadjusted data, showing the actual earnings of all minimum-wage workers; the data shown by circles are the same data adjusted for the changing coverage of the minimum wage. Even among the unadjusted data, a relationship consistent with the model presented in figure 1 can be seen, but it becomes more obvious when the data are corrected for coverage. For both series, the fitted values of a simple ordinary least squares regression are shown. In both regressions the coefficient on the minimum wage was positive and significant (t-ratios of 1.81 for the unadjusted data and 2.12 for the adjusted data), and for both regressions the coefficient on the minimum wage squared is negative and significant (t-ratios of -2.12 for the unadjusted data and -1.90 for the adjusted data). For the adjusted data the nominal income target is estimated to be $5.27 per hour. This completely different data set produces a value only nine cents less than the estimate from my best quarterly model shown earlier.

The fact that this relationship is so clear in the raw data for all minimum-wage workers strengthens the results of the previous section significantly, particularly regarding the degree to which the results can be used to infer about the entire group of minimum-wage workers. When the estimate from these data and the other labor demand elasticity research is taken into account, the evidence suggests that my earlier estimate of $5.36 is a robust and accurate measure of the true nominal income target.

VII. The Poverty Threshold Target

This section estimates the poverty threshold target, a second possible objective of minimum-wage policy. Data on the poverty threshold level of income were collected and converted to real terms using the CPI-U, with October 1996 as the base period. Because the poverty threshold is adjusted each year by the rate of inflation, the real poverty threshold has remained constant since it was defined in 1959. The poverty threshold levels of the minimum wage are shown in table 3, for differing sizes of families and numbers of earners, including an interpolated threshold for the average size of families in poverty, 3.57 (2.22 children and 1.35 adults).

In the table, two clear groupings are present: a ''high'' grouping of the $6.07 and $5.99 wages needed for a single parent with two children, and the average household with one primary earner and another part-time worker. The ''low'' grouping of the $5.12, $5.18, and $5.22 figures pertains to a single parent with one child, a family of four with one full-time earner and one part-time earner, and the average household with all earners working full-time. The lowest figure in the table ($3.89) pertains to a family of four with two full-time earners. For now, I shall concentrate on the two apparent groupings, which I shall denote the low and high poverty threshold targets. For convenience, I shall use the averages from these two groupings: $5.17 for the low poverty threshold target and $6.03 for the high poverty threshold target. It is worth noting that the lower grouping contains the estimates most apparently consistent with the quotations presented earlier in the paper.

VIII. How Has the Actual Minimum Wage Compared to the Targets?

Figure 3 shows graphically how the actual minimum wage has compared to the target values derived in this paper. In addition, table 4 shows the root mean square difference between the actual minimum wage and each target level.

In figure 3, it is apparent that the period before the January 25, 1950, increase is, in many respects, different from the period after. Thus table 4 also contains statistics restricting the analysis to the period after January 1950. Over the entire history of the minimum wage, it has remained slightly closer to the low poverty threshold

TABLE 3

Minimum Wage Rate Needed to Meet Poverty Threshold Level of Income for Different Family Sizes

	Requiring All Workers to Work Full-Time				Requiring Primary Earner to Work Full-Time and Secondary Earner to Work Part-Time	
	2 Persons	3 Persons	3.57 Persons	4 Persons	3.57 Persons	4 Persons
Number of workers	1 full-time	1 full-time	1.35 full-time	2 full-time	1 full-time, .35 part-time	1 full-time, 1 part-time
Poverty threshold	$10,650	$12,625	$14,650	$16,175	$14,650	$16,175
Poverty threshold target wage	$5.12	$6.07	$5.22	$3.89	$5.99	$5.18

Note.—Data on poverty thresholds and family size are taken from U.S. Bureau of the Census. Full-time earners are assumed to work 40 hours per week, part-time earners 20 hours per week. The average family size of a family in poverty is 3.57 persons, with 2.22 children and 1.35 adults.

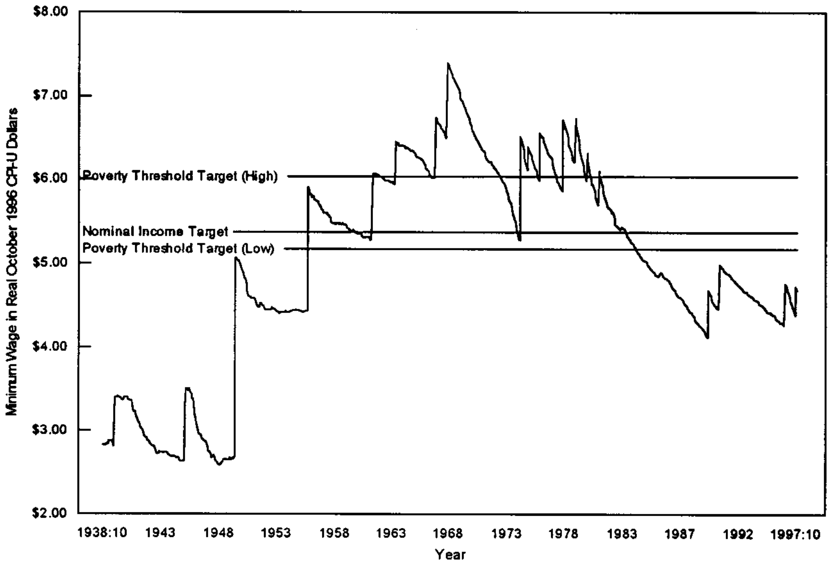

FIG. 3.—Minimum wage vs. goals of public policy

target, but since 1950 it has remained slightly closer to the estimated nominal income target. However, the actual minimum wage has differed substantially from these targets by an average of 75 cents to $1.00 in any given month.

Another productive comparison is made between the actual minimum wage and the Laffer-type curve presented in figure 1. This is shown in figure 4 using the estimates from the best-fitting quarterly model. Also included are the estimated short-run curves and a 95 percent confidence interval for the target level. The numbers in the figure correspond to the last two digits of the year of the change in the minimum wage.

TABLE 4

MINIMUM WAGE VS. THE STATED GOALS OF PUBLIC POLICY

		Root Mean Square Difference from Target	
Target	Target Level	All Months	Since January 1950
Nominal income target	$5.36	$1.05	$0.72
Low poverty threshold target	$5.17	$1.03	$0.75
High poverty threshold target	$6.03	$1.26	$0.82

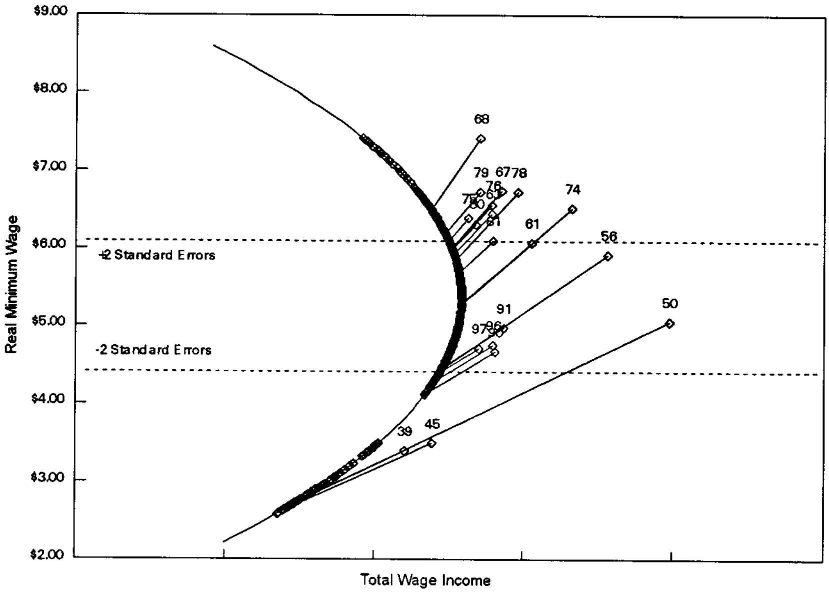

FIG. 4.—Minimum wage and the nominal income target

In a test whether actual minimum-wage policy has been consistent with the nominal income target goal, a full 47.5 percent of the observations fall outside the confidence interval shown. Of these, 26.1 percent lie below the lower bound, and 21.6 percent lie above the upper bound. Thus, for approximately half of its history, I can reject the hypothesis that Congress has set the minimum wage in accordance with the nominal income target goal. It is interesting that at its peak in 1968, the minimum wage was within the confidence interval for the shortsighted political equilibrium level of the nominal income target. For the most recent changes in the minimum wage, indicated in the figure by 96 and 97, while below the maximum point, the observations are within the confidence interval for achieving the nominal income target. Notice, however, that the slope of the income curve is becoming nearly vertical, implying that the marginal increase in worker income that could be achieved at the present by further increasing the minimum wage is very small.

The analysis above suggests a rejection of the hypothesis that minimum-wage policy has been consistent with the nominal income target goal for at least half of its history. Unfortunately, because the poverty threshold target is a single calculated number, there is no estimation error with which to produce a confidence interval. However, in terms of comparisons, the actual minimum wage has spent

52.6 percent of its history below the lower poverty threshold estimate and 24.7 percent above the higher poverty threshold estimate. It has been more than 10 percent above the higher or below the lower poverty threshold values for 45 percent of its history. A look at figure 3 also suggests that neither poverty threshold target has been a locus point for the actual level of the minimum wage.

IX. Can Interest Group Activity Explain Minimum-Wage Policy?

The previous section has rejected the hypothesis that the minimum wage has been entirely determined by the stated goals of policy. The purpose of this final section is to explore whether the minimum wage can be better explained by measures of interest group pressure. Here, I consider two extreme groups on the minimum-wage issue: organized labor unions and business interests.

To measure the political strength of unions, I use union membership as a share of nonagricultural employment. I have chosen the top marginal corporate income tax rate as a measure of the (lack of) political power of business interests. When business interests gain more power to influence legislation, one of the things they will spend this power on is changing the tax rate applied to themselves. Thus, during periods of increased business interest group strength, corporate tax rates should fall, and vice versa. Figure 5 shows the real minimum wage relative to these measures.

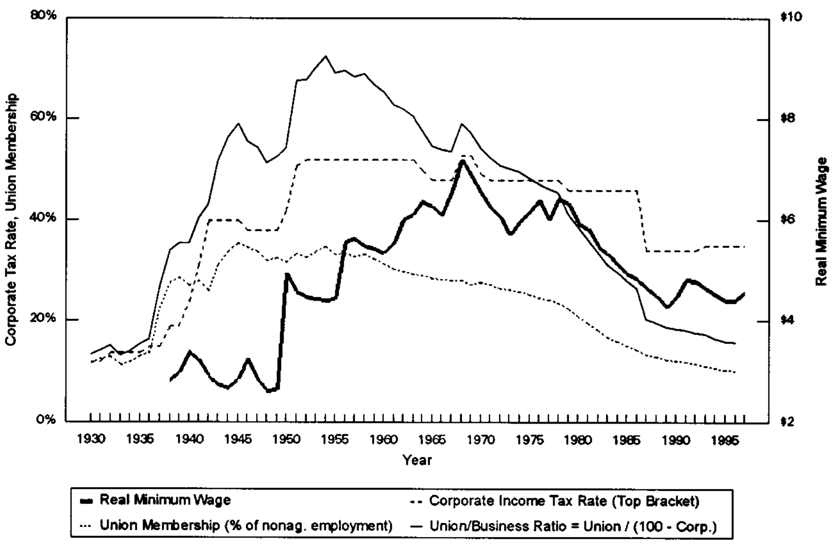

FIG. 5.—Interest group activity and the level of the minimum wage

A relationship between these rough interest group measures and the minimum wage can clearly be seen. When the minimum wage was first introduced, corporate income taxes were rising rapidly. The large increase in 1950 is correlated with an increase in corporate income tax rates. The peak of the minimum wage also has a peak in the corporate income tax associated with it, and finally, during the late 1980s the drop in the corporation income tax rate is associated with a declining minimum wage. A similar comparison may be made with union membership. Around the time of the introduction of the minimum wage, union membership began rising rapidly as a share of employment. A peak of union membership in the early 1940s is associated with another change in the minimum wage. Also, the largest single change in the level of the minimum wage in 1950 occurred during the peak of labor union activity. Since the 1960s, labor union strength has been falling, especially since the late 1970s, and this decline has been associated with a falling real minimum wage.

The model of the political process developed by Becker (1983) suggests that policy is the result of a compromise between competing interest groups. It is not the absolute power of an interest group that matters, but strength relative to other competing interest groups. To compute a relative measure, union membership as a share of employment is divided by 100 percent minus the top corporate income tax rate. This relative union/business ratio is also shown in figure 5. There are again obvious correlations between changes in the minimum wage (and, more important, the overall trend growth of the minimum wage) and this index. In addition, the average size of the changes in the minimum wage appears to be correlated with this index. During periods of high relative union strength, not only did the minimum wage change more frequently, but also the magnitude of the changes is higher than it was later when interest group strength shifted more in favor of business.

There are two channels through which interest group activity influences minimum-wage policy, whether or not it is changed, and how much it is increased when it does change. Because the minimum wage is never legislatively lowered, interest group pressure against the minimum wage results in erosion of its real value by inflation. When it is changed, interest group pressure against the minimum wage will result in smaller increases. On the other hand, interest group pressure for the minimum wage results in both more frequent increases and larger increases when they do occur. This type of relationship is nonlinear because the declines caused by anti-minimum-wage interests are bounded by inflation, whereas increases caused by pro-minimum-wage interests are not bounded.

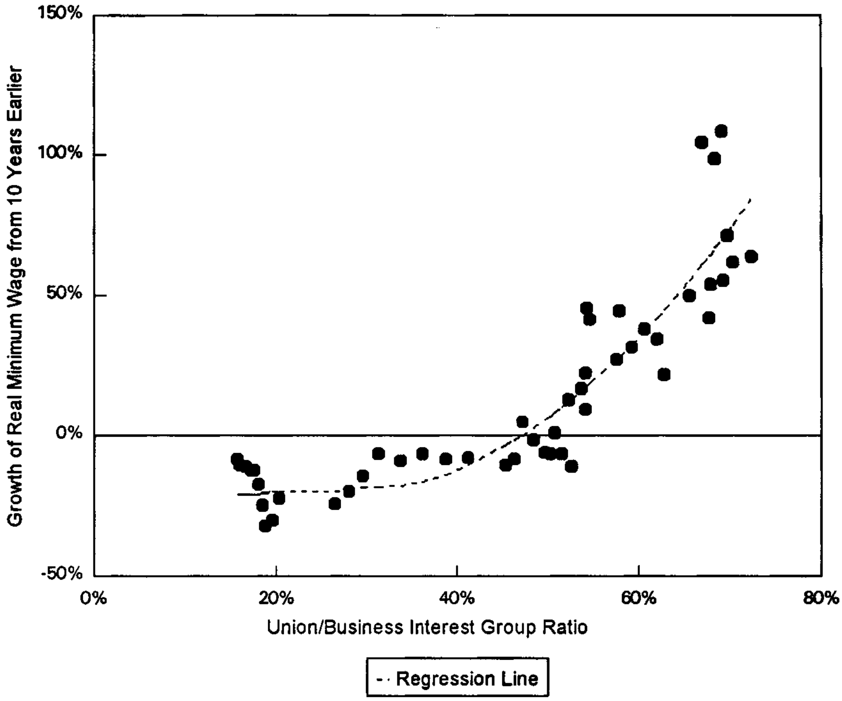

FIG. 6.—Interest group activity and the growth of the minimum wage

To explore this relationship, figure 6 shows the union/business interest group ratio in each year against the percentage by which that year's real minimum wage exceeded the minimum wage one decade earlier, a measure of the long-run rate of growth in the minimum wage. Also in the figure is a quadratic regression line fitted to the data. The R^2 of this regression was .832, and both coefficients were significant at a 1 percent level (absolute t-ratios of 3.99 and 6.44, respectively). The data in the figure show the relationship exactly as expected. When the relative strength of unions is high, the minimum wage grows, and it grows more rapidly the higher the ratio. On the other hand, when the relative strength of business is high, the real minimum wage is likely to be declining, but the rate of decline is bounded by the real decay produced by inflation.[17]

The conclusion from this section is that a relative measure of the

[17] The regression line crosses the axis at a relative union/business ratio of 47.1 percent. Here, the minimum wage would be increased every few years, but only by the rate of inflation. The results shown in the figure are insensitive to the use of other reasonable time frames (5–15 years).

political power of interest groups on the minimum wage issue appears to be highly correlated with the overall trends in the minimum wage, whereas the stated goal levels are not. With this in mind, it is interesting to return to figure 5 and look at this interest group ratio in the years surrounding the original establishment of the minimum wage by the Fair Labor Standards Act of 1938. Recall from the Introduction that Seltzer (1995) found congressional voting on this act to be significantly influenced by interest group activity. In the figure, there was a rapid, significant, increase in the relative strength of labor unions relative to business between 1936 and 1938, with the index almost doubling between these two years. It appears that not only can the minimum-wage level be explained by the relative strength of interest groups, but also the creation of the original act is likely explained by a significant shift in interest group power in the American political system.

X. Conclusion

While the original Fair Labor Standards Act might have had a specific goal for the minimum wage in mind, it left its determination up to the political process. This paper has estimated the minimum wage that would be consistent with two frequently stated goals of public policy: the maximization of the total income of minimum-wage workers and the level that would bring a typical minimum-wage family out of poverty. I estimate that a minimum wage of approximately \$5.25 is consistent with both of these stated goals. During most of its history, I can reject the hypothesis that the minimum-wage level has been set at the levels consistent with these stated goals.

Previous literature has shown that congressional voting on minimum-wage legislation is significantly influenced by interest groups such as organized labor and business. This paper has shown that other endogenous features of minimum-wage legislation, such as the level, the timing of changes, and the step process, are also shaped by pressures in the political process. In addition, my evidence suggests that a simple interest group model can better explain the history of the minimum wage than can the levels that would achieve the stated goals of minimum-wage policy.

Appendix

Derivation of the Short-Run Curves and Results

Figure A1 shows the impact of a change in the minimum wage from w_0 to a new level w_1. The new level of long-run total income is the area $0L_{1lr}Cw_1$.

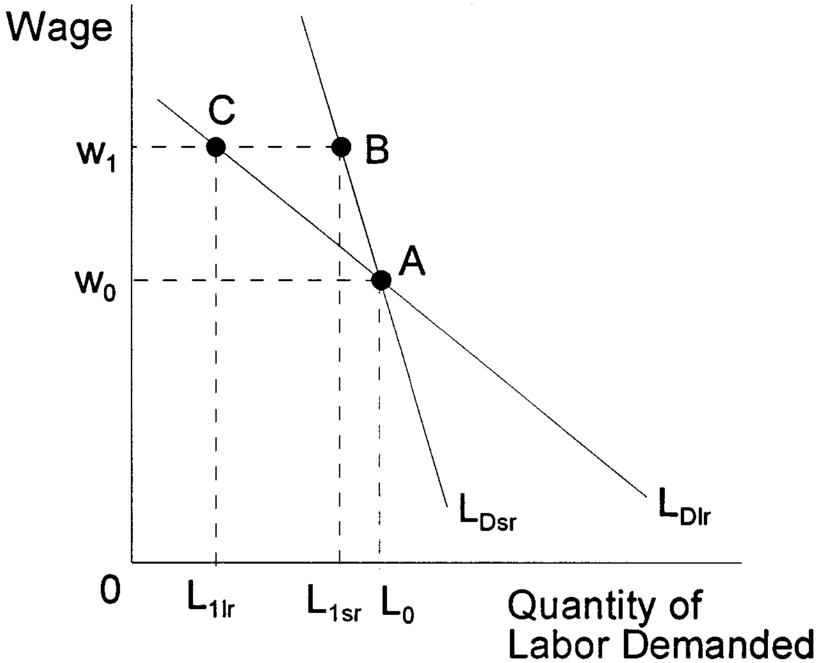

FIG. A1.—Short-run and long-run labor demand

From equation (2) this value is

$$Y^{\mathrm{lr}}(w_1) = \alpha w_1 + \beta w_1^2. \tag{A1}$$

The short-run effect is the area $0L_{1\mathrm{sr}}Bw_1$. The difference between the long-run and short-run areas is $L_{1\mathrm{lr}}L_{1\mathrm{sr}}BC$. The horizontal distance BC may be specified as $\gamma \cdot \Delta w$, where $\Delta w = w_1 - w_0$ and $\gamma > 0$. Thus the marginal short-run area is $\gamma \cdot \Delta w \cdot w_1$. Filling in for Δw, this may be rewritten as $\gamma \cdot (w_1 - w_0) \cdot w_1$. This may be simplified to $\gamma \cdot w_1^2 - \gamma \cdot w_0 \cdot w_1$. Thus the short-run relationship between the wage rate and income can be represented as the long-run relationship of equation (A1) plus this marginal term:

$$Y^{\mathrm{sr}}(w_1) = Y^{\mathrm{lr}}(w_1) + \gamma \cdot w_1 \cdot \Delta w = \alpha w_1 + \beta w_1^2 + \gamma \cdot w_1 \cdot \Delta w. \tag{A2}$$

The short-run curve's shifting back to the long-run curve is allowed by the lags shown in equation (3) in the text. To proceed, it is necessary to simplify equation (A2) to

$$\begin{aligned} Y^{\mathrm{sr}}(w_1) &= \alpha w_1 + \beta w_1^2 + \gamma w_1^2 - \gamma w_1 w_0 \\ &= (\alpha - \gamma w_0) \cdot w_1 + (\beta + \gamma) \cdot w_1^2. \end{aligned} \tag{A3}$$

This equation specifies the short-run curve beginning from a wage of w_0. For the short-run curves to have proper curvature, it is required that $\alpha -$

$\gamma w_0 > 0$ and $\beta + \gamma < 0$. The second is met for $\gamma < -\beta$ and the first for $\gamma < \alpha w_0$. This must hold for all acceptable values of the wage w_0. The minimum value is zero, which implies a restriction $\gamma < \infty$. The maximum value is the wage axis intercept of the long-run labor demand curve, $-\alpha/\beta$. Substitution produces $\gamma < -\beta$, which was already required to meet the earlier restriction. Thus all the restrictions are met as long as $0 < \gamma < -\beta$.

The wage that maximizes short-run income beginning from an initial level of w_0 can be found by maximization of equation (A3) with respect to w_1. The first-order condition is given by

$$w_{SR}^{\max} = -\frac{\alpha - \gamma w_0}{2(\beta + \gamma)}. \tag{A4}$$

The wage set in purely shortsighted political equilibrium must satisfy equation (A4), but it must also have two additional characteristics. First, it must be a point along the long-run curve, and second, there must be no incentive to move. This can be imposed by requiring that the beginning wage of w_0 must be the wage that maximizes income in the short run. Thus setting the two wages in equation (A4) equal and solving yields equation (5) in the text.

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