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The Response of Wages and Prices to the First Two Years of Controls

IN A PREVIOUS PAPER I reached the conclusion that Phases I and II of the Nixon wage-price control program had achieved a slight reduction in the advance of wages and a marked decline in the rise in prices between 1971:3 and 1972:2 as compared with econometric simulations of the hypothetical paths in the absence of controls.[1] At first glance these relationships appear to have been reversed in the past year. Prices have exploded upward at rates exceeding all forecasts, whereas the apparent absence of any significant response of wages to observed price behavior has led to widespread puzzlement about the mystery of the "docile worker." If the response of profits to the business expansion in 1972 was sluggish, the price rebound of 1973 appears to have regained the lost ground.[2]

The purpose of this paper is to examine this view of recent wage and

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1. Robert J. Gordon, "Wage-Price Controls and the Shifting Phillips Curve," *Brookings Papers on Economic Activity* (2:1972), pp. 385–421. Hereafter, this document will be referred to as *BPEA*, followed by the date.

2. An example of this general evaluation is Andrew F. Brimmer's comment that the current inflation seems to have favored "profit recipients and wage earners in strong bargaining positions," while persons with fixed incomes and those receiving public assistance "appear to have carried much of the burden caused by the sharp rise in the general price level." *Wall Street Journal*, November 12, 1973.

price behavior. Specifically, how sluggish has been the response of wage increases relative to price inflation in 1973, as compared with econometric forecasts based on data for 1954–70? And to what extent has the price performance of 1973 permitted profits to rebound along the predicted, normal, cyclical recovery path, in contrast with my earlier conclusion that Phases I and II, by depressing prices, had held profits well below this path? Since the earlier paper has evoked considerable controversy, I begin by reviewing the methodology of this genus of policy evaluation, and try to anticipate the likely direction of its inherent biases.[3]

Methodological Preliminaries

A primary purpose of time series econometric models is the application of historical hindsight. A model yields a set of dynamic multipliers for each exogenous policy variable—say, government spending or the money supply —and these allow the calculation of the magnitude of hypothetical policy actions that would have been necessary to avert a given historical episode of excess or insufficient demand. The simulated value of an endogenous variable (s_t) is a function of present and past *actual* values of exogenous variables (x_t, x_{t-1}) and past values of itself (s_{t-1}):

$$s_t = f(x_t, x_{t-1}, s_{t-1}). \tag{1}$$

An asterisk denotes the simulated values (s_t^*) with an alternative hypothetical set of exogenous variables (x_t^*, x_{t-1}^*):

$$s_t^* = f(x_t^*, x_{t-1}^*, s_{t-1}^*). \tag{2}$$

The set of dynamic multipliers describing the effect in period $(t + i)$ of a change in policy at time t is then

$$m_{t+i} = \frac{s_{t+i}^* - s_{t+i}}{x_t^* - x_t}. \tag{3}$$

3. In addition to being attacked in the lead editorial of the *Wall Street Journal*, December 5, 1972, the main conclusions of the earlier paper differ from those reached by several other authors, including Edgar L. Feige and Douglas K. Pearce, "The Wage-Price Control Experiment—Did It Work?" *Challenge*, Vol. 16 (July/August 1973), and Timothy McGuire, "Controls and Expectations" (paper presented at the Rochester Conference on Wage-Price Controls, November 10, 1973; processed). All of these alternative conclusions are based on use of the consumer price index, which has disadvantages for this purpose (see below).

Unfortunately, the measurement of the effects of wage-price control policies differs from that for monetary or fiscal policies for two basic reasons. First, parameters that measure the effect of money on spending can be estimated from historical periods during which the money supply varied, but parameters for the effect of controls on prices cannot be measured if controls were not applied during the sample period of the econometric model. Second, and more important in principle, even if controls were applied during the sample period—for example, the Kennedy-Johnson guideposts of 1962–66—there is no quantitative measure of the "toughness" or pervasiveness of one control episode as compared to another, and thus no way to quantify the "policy input" in 1971–73 as compared with the earlier episode.

For this reason econometric estimates of the effects of controls cannot be based on dynamic multipliers, but rather require a comparison of actual price or wage change (y_t) with the hypothetical simulated values (s_t), based on actual values of exogenous variables. But this comparison introduces complications, because the actual outcome can differ from the simulated values for reasons other than the imposition of controls:

$$y_t = f(x_t, x_{t-1}, s_{t-1}) + z_t + e_t + u_t, \tag{4}$$

where the z_t are variables that were left out of the specified model either erroneously or unavoidably (that is, z_t did not vary during the sample period); e_t is the error in measuring the actual y_t; and u_t is the random error term in the estimated econometric equation.

The possible errors in evaluating the effect of controls can be classified with the aid of equation (4).[4]

1. The model is erroneously specified and omits one or more variables (z_t). For instance, my 1971 wage equation constrains the influence of past inflation to operate with a fixed coefficient, whereas in 1972 I suggested several advantages of an otherwise identical equation in which the coefficient on past price change is allowed to vary.[5] A simulation of the alterna-

4. I omit sheer bad luck from this list of possible errors. Even if there are no specification, estimation, or measurement problems in the underlying econometric model, simulations could nevertheless exaggerate the effect of controls if the random error terms in the original equations happen to take on negative values in the control period. While one can always argue that price increases were avoided between 1971 and late 1972 not because of controls but because sunspots caused entrepreneurs to lose their minds, I reject this attitude as denying the possibility of any counterfactual historical investigation.

5. The 1971 wage equation was originally presented in "Inflation in Recession and Recovery," *BPEA* (1:1971), pp. 105–58.

tive variable-coefficient equation indicated a greater inflation in the absence of controls than did the fixed-coefficient version. Those who disagree with the specification of a given model can in general determine whether the proposed change increases or reduces the estimated effect of controls; in this particular case the alternative specification indicates that the basic equation understates the effect.

2. Sometimes misspecification cannot be avoided if a variable that is assumed a priori to influence prices or wages exhibits little variance in the sample period, thus preventing the estimation of a statistically significant coefficient. An example is the effect on nonfarm prices of changes in import prices, for which I was unable to obtain significant coefficients in my original paper because divergences between the two were relatively minor before 1971.[6] (As I argue below, prices in the other exogenous sector, agriculture, would not be assumed a priori to influence nonfarm prices.)

The importance of this omission is obvious in 1973, when import prices rose much faster than nonfarm prices. If the a priori coefficient on these prices is positive, then in the absence of controls nonfarm prices would have risen more rapidly than the simulated values (s_t), and the effect of the controls would be understated. This effect is mitigated to the extent that the spillover of demand from controlled goods *caused* the import inflation, but I am convinced that the successive devaluations that were primarily responsible would probably have come earlier without controls.

3. Econometric parameters are estimated with wide confidence intervals, so that simulations showing either large effects of controls or none at all can be calculated from alternative parameter estimates that cannot be statistically rejected. In my 1972 paper I illustrated alternative estimates of wage equations with the coefficient on past inflation constrained at alternative values. The 5 percent confidence interval ranged from 0.4 to 1.1, and in principle the paper should have exhibited simulation results during the control period based on both extreme values. My conjecture is that this factor again leads to an understatement of the effect of controls, since extensions of the sample period to dates successively closer to August 1971

6. I have recently replicated these experiments, which involve adding to the basic price equation a polynomial distributed lag on the quarterly rate of change of the price deflator for imports in the national accounts. The results are as follows: (1) In the "basic" sample period (1954:2–1970:4) the import deflator is insignificant, with a t-value of 1.33 on the sum of the coefficients. (2) When the sample period is extended to the last precontrol period (1971:3), the t-value declines to 0.58.

yield successively higher point estimates of this coefficient; thus the true value of the coefficient after 1971 without controls was more likely to have been at the high than the low end of the sample period confidence interval.[7]

4. Variables taken as exogenous, the x_t in equation (4) above, may in fact be influenced by controls. In my 1972 paper the effects of controls were estimated on the assumption that unemployment rates and the excess demand for commodities were unaffected by controls, involving the implicit assumption of "a monetary and fiscal policy sufficiently accommodating to have allowed nominal gross national product to grow faster in the absence of controls by the estimated effect of the controls."[8] Others may prefer to take monetary and fiscal policy and nominal income as exogenous, and compute the simulations for the unemployment rates and excess demand for commodities that would have accompanied that fixed nominal income. One would have expected the second set of assumptions to have produced a lower hypothetical rate of inflation, since the alternative simulation is based on higher unemployment rates; but in fact the model generates a Phillips curve that is sufficiently horizontal in the very short run to yield identical inflation predictions for very different unemployment rates.[9] In a longer simulation, for more than a single year, one would expect the alternative exogeneity assumptions to produce results that diverge by a greater amount.

5. The measurement error (e_t) in equation (4) may be important if controls by themselves cause distortions in price measurement. To the extent that controls are binding and are accompanied by rationing, there is some vector of shadow prices (p_t') at which the rationed quantities would be the preferred, utility-maximizing amounts of those goods.[10] In this welfare sense, the "true" nonfarm price deflator that is relevant for individual utility functions is then a weighted average of actual prices for uncontrolled

7. This same comment applies to Oi's demonstration that this coefficient is very unstable and is much higher during the subsample period 1962–70 than during 1954–61. See Walter Y. Oi, "On Measuring the Impact of Controls: A Critical Appraisal" (paper presented to the Rochester Conference on Wage-Price Controls, November 9, 1973; processed).

8. "Wage-Price Controls," p. 412.

9. The assumption of exogenous nominal GNP growth reduced the estimated effect of controls on prices by only 0.06 percent per annum, as compared with the simulation based on exogenous unemployment. See ibid.

10. See James Tobin and H. S. Houthakker, "The Effects of Rationing on Demand Elasticities," *Review of Economic Studies*, Vol. 18 (1950–51), pp. 140–53. I am indebted to Walter Oi for bringing this point to my attention.

Table 1. Comparison of Actual and Predicted Performance of Selected Indicators during the Wage-Price Control Program, through Third Quarter 1973

Year and quarter	*Annual percentage rates of change*												*Level of index*		
	Fixed-weight wage index						*Fixed-weight nonfarm private deflator*						*Ratio of price to unit labor cost*		
			Residuals or alternative simulations[a]						*Residuals for alternative simulations*[a]						
	Actual	*Simulated*	*A*	*B*	*C*	*D*	*Actual*	*Simulated*	*A*	*B′*	*C*	*D*	*Actual*	*Simulated*	*Residual A*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1971:3	6.66	6.23	0.43	0.34	0.46	−0.07	3.12	3.90	−0.78	−0.85	−0.80	−0.88	98.9	99.4	−0.5
1971:4	5.09	6.91	−1.82	−1.80	−1.66	−2.16	0.64	3.81	−3.17	−2.82	−3.22	−3.33	98.9	100.0	−1.1
1972:1	8.34	7.66	0.68	0.88	0.92	0.38	3.83	4.56	−0.73	−0.57	−0.69	−0.95	98.5	100.0	−1.5
1972:2	4.10	6.16	−2.06	−1.46	−1.70	−2.41	1.86	4.52	−2.66	−2.06	−2.50	−2.93	99.3	100.9	−1.6
1972:3	6.83	7.15	−0.32	0.53	0.15	−0.70	1.11	4.53	−3.42	−2.82	−3.15	−3.73	99.5	101.9	−2.4
1972:4	6.83	6.53	0.30	1.41	0.84	−0.35	2.90	4.20	−1.30	−0.87	−0.89	−1.70	99.4	102.3	−2.9
1973:1	8.29	10.49	−2.20	−0.83	−1.73	−3.14	4.02	5.13	−1.11	−0.28	−0.62	−1.65	99.5	102.0	−2.5
1973:2	6.98	5.54	1.44	2.89	1.82	0.45	5.41	4.84	0.57	0.92	1.17	−0.10	98.9	101.6	−2.7
1973:3	6.29	8.77	−2.48	−1.12	−2.24	−3.69	4.21	5.39	−1.18	−0.40	−0.64	−2.00	98.8	101.3	−2.5
1971:4–1972:4	6.24	6.88	−0.64	−0.09	−0.29	−1.05	2.07	4.32	−2.25	−1.83	−2.09	−2.53	99.1	101.0	−1.9
1973:1–1973:3	7.19	8.27	−1.08	0.31	−0.72	−2.13	4.54	5.12	−0.58	0.08	−0.03	−1.25	99.0	101.6	−2.6
1971:4–1973:3	6.60	7.41	−0.81	0.06	−0.45	−1.46	3.00	4.62	−1.62	−1.11	−1.32	−2.05	99.1	101.3	−2.2

Sources: Wage and price equations are from Robert J. Gordon, "Wage-Price Controls and the Shifting Phillips Curve," in *BPEA* (2:1972), Table 3, column (6), and Table 4, column (3). The sources for the basic data are given in ibid., pp. 418–21.

a. The alternative simulations are as follows:

A. Basic equations, dynamic feedback of prices and wages, unemployment exogenous.

B. Basic wage equation, price feedback exogenous, unemployment exogenous.

B′. Basic price equation, wage feedback exogenous, unemployment exogenous.

C. Same as A, but with nominal income exogenous in place of unemployment.

D. Same as A, but with variable-coefficient version of wage equation.

goods and the shadow prices of controlled goods; such a price concept rises during a control period relative to the actual nonfarm deflator. Thus to the extent that rationing is important, the use of the actual deflator overstates real income in the welfare sense and hence overstates the "true" rate of price increase. Since reports of shortages and rationing were rare during the 1971–72 period of concern in my earlier paper, I doubt that this problem has a significant effect on its results. However, it clearly has become more important in recent months.

Another variety of measurement problem concerns the differing evaluations of controls implied by the nonfarm price index (used in my study) and the consumer price index (used by the *Wall Street Journal*, Feige and Pearce, and McGuire). Since the latter differs mainly in applying positive rather than zero weights to farm prices and mortgage interest rates, one must decide whether the behavior of these prices was exogenous or altered by the controls. Since I believe in their exogeneity during this interval, I feel that use of the CPI confuses the effect of controls with the exogenous disturbances which by coincidence happened partially or completely to offset the impact of controls.[11]

Alternative Counterfactual Simulations for 1971–73

The results of the simulations are displayed in Table 1. Actual and simulated values are compared for the annual rate of change, during each quarter between 1971:3 and 1973:3, of the nonfarm fixed-weight wage index, the nonfarm fixed-weight deflator, and the ratio of price to unit labor cost. In the case of wages the actual values are displayed in column (1), the results of a full dynamic simulation of my "basic" wage and price equations in column (2), and the difference between the two in column (3).[12] The same information for prices is contained in columns (7), (8), and (9), and for the ratio of price to unit labor cost in columns (13), (14), and (15).

11. To justify use of the CPI, one would have to argue that the successive devaluations, the corn blight, the Russian wheat deal, and the Peruvian anchovy die-off, which contributed to the farm and import price inflation, were not exogenous forces but instead were caused directly by the controls.

12. The wage and price equations are from my 1972 paper, "Wage-Price Controls," Table 3, pp. 398–99, column (6); and Table 4, p. 407, column (3). The simulation programs were run with absolutely no change in any coefficient.

Compared with the "standard" view that in 1973 wages have been surprisingly sluggish while prices have rebounded enough to cancel at least partially the effects of Phases I and II (which covered August 1971 through January 1973), the results of the simulations contain two basic surprises.

Surprise number one is that prices have not yet made up for any of the effect of the first two phases, and in fact in 1973 have continued to fall behind the simulated values at an average annual rate of 0.58 percent. Whereas at the end of the sample period covered in the earlier paper (1972:2) the actual ratio of price to unit labor cost had fallen 1.6 percent below its simulated value, the shortfall by 1973:3 was an even higher 2.5 percent. The standard view is correct only in that the rate at which actual price change has fallen short of the simulated change has been much less in 1973 than before.

Surprise number two is the behavior of wages. While column (3) superficially appears to indicate a greater residual in 1973 than in 1972, this is due entirely to the indirect effect of prices on wages. A separate simulation (B) calculates the wage change that would have occurred if price expectations had been based on actual rather than hypothetical price performance. The difference between actual wage change and simulation (B) is reported in column (4), with a very small negative residual in the first two phases but a *positive* residual in 1973. Given the actual price performance, therefore, wages have increased slightly *faster* in 1973 than the econometric equation predicts. Simulation (B′) in column (10) shows in parallel fashion the inflation that would have occurred with actual wage change exogenous.

The econometric simulations can be decomposed to reveal the contribution of each independent variable to the full dynamic predictions in columns (2) and (8). Wage and price change would have been considerably more rapid during 1973 than 1972 even with no allowance for the relaxation of controls in Phase III or for the explosion of farm and import prices. About half of the simulated increase in wages between early 1972 and 1973 can be accounted for by the tightening of labor markets (0.68 percent at an annual rate), and almost all of the remainder by the very large increase in the effective social security tax rate in 1973:1.[13] The lags in the formation of expectations in the wage equation are sufficiently long to have prevented an appreciable price-wage feedback as of 1973:3. In the price equation

13. In percentage terms the social security tax increase in 1973:1 was the largest in postwar history, exceeding the previous champion (1966:1).

most of the acceleration has been due to excess commodity demand; the increase in the ratio of unfilled orders to capacity between early 1972 and mid-1973 accounted for an annual rate of price increase of 0.6 percent. Another 0.4 percent was accounted for by the slowdown of productivity growth from the very rapid rates of mid-1972. Wage change had not yet begun appreciably to affect price change as of 1973:3.

Table 1 also illustrates the results of two additional alternative sets of simulations. Columns (5) and (11) illustrate simulation (C) in which the path of nominal income is kept exogenous, as compared with the basic simulation (A) in which unemployment and real output are exogenous. As expected, an exogenous nominal income path results in higher unemployment, lower simulated wage change, and a lower estimated effect of controls than in the basic simulation. The difference grows steadily throughout 1972 and into 1973 as the higher unemployment rates along path C are gradually converted into lower simulated inflation rates. This simulation does not overturn the basic conclusion that Phases I and II had a significant effect, although it indicates that actual prices have kept even with the simulated values in 1973. By mid-1973 the difference between the two simulations had begun to decline, as the lower inflation along path C began to reduce the unemployment rate toward its level along path A.

The final simulation, (D), is based on the variable-coefficient version of the wage equation (in which the coefficient on past inflation is a variable function of the rate of inflation, with a maximum value of unity).[14] With this alternative version of the wage-price model, prices and wages are simulated to have advanced faster than in the basic simulation; in this alternative, a high coefficient on past inflation in the wage equation prevents unemployment from holding down wages as much as in the basic simulation.

Untangling the Effects of Import Prices

All of the simulations displayed in Table 1 implicitly assume that in the absence of controls nonfarm prices would not have responded to farm and import prices in 1973, because these prices are excluded from the basic price equation for the nonfarm sector. To the extent that a priori one would have

14. A discussion of the variable-coefficient version and the estimated coefficients is presented in "Wage-Price Controls," pp. 404–06.

expected some effect, an extrapolation of equations fitted to the sample period may be misleading for 1973. If the "true" coefficients on either farm or import prices in the nonfarm price equation are positive, then all of the results in Table 1 understate the simulated values and hence understate the impact of controls, given the crucial assumption that the behavior of farm and import prices can be treated as exogenous and unaffected by controls.

A priori it might appear that the true coefficients on farm and import prices in the nonfarm price equation should be positive. But by its very method of construction the nonfarm private deflator excludes any direct influence of external prices. For example, suppose the weight of the farm sector in total private output is 3 percent. If the price of farm products doubles, and the average price of all private goods increases by 3 percent, then the nonfarm price index is constant by construction.[15] Farm prices would raise nonfarm prices only if capital and labor income per unit of output were increased as a result of an increase in farm prices. On the contrary, wholesale and retail food margins appear to have been compressed during the 1973 upsurge in farm prices.[16]

The direct influence of import prices is also excluded from the nonfarm deflator by construction. But an acceleration of import price inflation may have an important positive indirect effect on the prices of import-competing goods in the nonfarm sector. For instance, the prices of small domestically produced automobiles that compete with imports increased at a much faster rate than those of large cars after the import "price umbrella" was lifted in the 1972–73 period. No precise a priori estimate of this effect is possible, because in the spectrum of substitution between foreign and domestic goods there is no unique cut-off point between goods that are perfect substitutes at one extreme and those with zero substitutability at the other. In addition, the indirect effect of higher import prices following a devaluation is not instantaneous but operates with a distributed lag.

15. This method is called "double deflation." The rate of change in the nonfarm private deflator is equal to the rate of change in the deflator for all private domestic production (including exports), minus the rates of change of farm and import prices, weighted by the respective current-dollar values of farm output and imports as a percentage of current-dollar private output.

16. William D. Nordhaus has performed some unpublished calculations, based on a fifty-eight-sector input-output table, which indicate that the inflation in wholesale food prices can be accounted for entirely by the direct effect of higher farm prices, with no additional impetus from higher profits or wages. On top of this, retail-wholesale margins may have been squeezed.

Table 2. Effects of Inflation of Import Prices on the Nonfarm Price Deflator, 1971:3–1975:4

Quarterly percentage rates of change at annual rates

Year and quarter	*Effect*
1971:3	0.76
4	0.76
1972:1	0.72
2	0.72
3	0.76
4	0.80
1973:1	0.84
2	1.00
3	1.28
4	1.52[a]
1974:1	1.64[a]
2	1.64[a]
3	1.56[a]
4	1.36[a]
1975:1	1.12[a]
2	0.84[a]
3	0.56[a]
4	0.32[a]

Sources: Estimated from basic price equation used in Table 1, refitted to permit import prices to influence nonfarm prices with a distributed lag.

a. Estimated on the assumption of zero change for import prices after 1973:3.

Thus both the size of the ultimate effect and the lag pattern must be determined on empirical rather than theoretical grounds. My basic price equation has been refitted to allow import prices to influence nonfarm prices with a distributed lag, just as labor costs operate with a lag in the original basic equation.[17] Table 2 illustrates the effects of the inflation of import prices on nonfarm prices in the first three quarters of 1973, and shows an average effect only slightly higher than in mid-1971. This raises the basic estimate of the 1973 price shortfall by about 0.3 percent.

The most important implication of Table 2, however, is for the future.

17. The auxiliary equation was estimated for the same period as the original equation, 1954:2 through 1970:4. The extra variable is a polynomial distributed lag of past changes in the quarterly change in the national accounts import deflator, with a twelve-quarter lag distribution constrained as in the basic equation. The estimated sum of the coefficients is 0.133, the *t*-ratio on the sum of the coefficients is 1.33, and the mean lag is 5.1 quarters.

Even on the unrealistic assumption of zero change in import prices after 1973:3, the lagged effects of the import inflation that has already occurred imply an average of 0.8 percent *extra* inflation during the next four quarters, as compared with the outcome had import prices not accelerated in 1973.

The results of Table 2 should be regarded as suggestive rather than conclusive. The sum of the coefficients on import prices in the underlying price equation is quite unstable when the sample period is varied even by only a few quarters, although the shape of the lag distribution is quite stable. An alternative is available from Magee's calculations of import competitiveness at the four-digit industry level in manufacturing.[18] According to these estimates, the sum of the coefficients of the import effect should be reduced from 0.13 to 0.052, and each figure in Table 2 consequently should be reduced by about 60 percent of its stated value. Furthermore, to the extent that the inflation in farm prices has temporarily reduced margins in the nonfarm sector, the "true" impact of higher prices of inputs to the nonfarm sector in 1973 may have been zero or slightly negative.[19]

Conclusions

The standard view of inflation in 1973 appears to require reconsideration, according to the major conclusions of this paper:

1. In comparison with the "basic" simulation of an econometric model fitted to the precontrol period, nonfarm prices rose at an annual rate that was about 2.3 percent slower than the simulated values during Phases I and II.[20] *None* of this shortfall has been made up during Phases III and IV; on the contrary, nonfarm prices have fallen another 0.6 percent behind their simulated values.

18. See Stephen P. Magee, "The Welfare Effects of Restrictions on U.S. Trade," *BPEA* (3:1972), Table 3, p. 663, line 12.

19. The original price equation was also reestimated with a distributed lag on past changes in wholesale farm prices entered separately, in addition to the distributed lag on past changes in import prices. The coefficients are highly unstable when the ending date of the sample period is shifted from 1970:4 to 1971:3, and the sum of the coefficients is insignificantly different from zero.

20. This conclusion is supported by similar simulations of the price equation in the Federal Reserve-MIT-Penn econometric model. These yield an estimate of a 2.1 percent effect of price controls during Phases I and II, according to an unpublished memorandum dated June 12, 1973, furnished to me by Jared Enzler.

2. While wages have risen less rapidly than in the no-controls simulation—at a rate of about 0.6 percent during Phases I and II and of about 1.1 percent in 1973—this has been due entirely to the indirect impact of slow price growth on wage behavior. Controls have had no *direct* effect on wages, given the actual behavior of prices.

3. Econometric estimates of the effects of controls are subject to a number of possible biases due to errors of specification, estimation, and measurement. One of these biases appears to point to an underestimate of the effect of controls reported in this paper: an alternative version of the wage equation with variable coefficients on past inflation yields a considerably larger estimated impact of the controls.

4. The simulations assume that real output and unemployment would have been the same with or without the controls. To the extent that nominal income is exogenous, unemployment would have been higher without the controls, and inflation would have been lower in the basic simulation. However, an alternative simulation, treating nominal income as exogenous, indicates that this source of bias is not potent enough to reverse the major conclusions of the paper.

5. In a controlled economy "true" prices—those that would be appropriate to measure real income in an economic welfare sense—are understated when controls are accompanied by rationing. In this sense, the simulations overstate the benefits of lower prices associated with controls to an unknown degree for the 1973 period, during which shortages of goods have been widely reported.

6. The evidence that the effects of import price inflation operate with a distributed lag indicates that at the end of 1973 there was a modest amount of extra inflation in the pipeline which will tend to cause prices to increase faster during 1974 than they would have otherwise.

7. Most important, the data that suggest that price controls checked inflation in the 1971–73 period are not clear evidence that the controls "succeeded." Controls worked not by moderating the behavior of wages relative to prices, but rather by squeezing profit margins sufficiently to hold prices below their free market levels. This is not a situation that can be expected to last indefinitely, and hence the very fact of short-run "success" for the control program guarantees its long-run failure. Only if factors other than the control program kept profit margins from exhibiting their usual cyclical rebound during 1971–72 can one expect that the profit squeeze will be maintained after the price controls are eliminated. If instead profit

margins eventually return to their no-controls level, there will be a catch-up period after the controls are lifted during which the rate of inflation will be substantially faster than it would have been had the controls not been imposed. On the assumption that profit margins will eventually be reestablished, one can cite at least four reasons for concluding that the controls were a failure:

1. Controls will have had no long-run effect on inflation.
2. The removal of controls will cause an extra, "catch-up," inflation at some point; the timing of this catch-up may be awkward, if, for example, nonfarm prices are simultaneously escalating because of the energy shortage.
3. Controls have caused shortages and misallocations of resources in several sectors.
4. The administration of controls has consumed real resources.

Discussion

JOEL POPKIN OFFERED several comments on price behavior related to Gordon's paper. He noted that it is often difficult to analyze the effectiveness of price controls in a macroeconomic context, and found it helpful to study the price data on a sectoral basis or by stage of distribution. In such an analysis, two recent tendencies are outstanding. First is a turnabout in the inflationary tendencies of services relative to commodities. Over the past ten or fifteen years, prices for services have risen about 1 to 2 percent a year faster than prices for commodities; but, in late 1972 and in 1973, the two groups have risen at roughly comparable rates. Second, nonfood commodities in the consumer price index lately have risen much less rapidly than their counterparts in the wholesale price index, indicating a compression of distribution margins. While these two developments have occurred during the period of controls, Popkin regarded as open the question of whether controls caused them.

William Nordhaus expressed his doubts about attributing a narrowing of profit margins to controls, since a squeeze on profits had been under way for several years before controls were imposed. Nordhaus also cited some

research that he and John Shoven had done on recent price behavior. They found that, if prices of raw and basic commodities were taken as given, other prices were readily predicted, suggesting that there were no mysteries in the margins of manufacturers or distributors. Finally, Nordhaus suspected that Gordon's lags on import prices in Table 2 were too long, remarking that the British experience with the devaluation of the pound suggested that increases in import prices are passed through rapidly to other prices; food prices had responded fully within two months and all other prices within six months. William Branson offered the opinion that the appropriate weight for import prices in Gordon's overall price equation might be close to the weight of tradeable goods in total output, or roughly one-third, rather than the 13 percent used by Gordon.

Michael Wachter took issue with Gordon's standard for evaluating the effects of wage-price controls. Gordon had focused on the rate of increase of prices during recent quarters, whereas Wachter felt that the crucial consideration was the potential for future inflation. He remarked that government control policies should be judged successful only if they alleviated inflationary pressures in ways that would affect prices favorably even after controls were lifted. Gordon added his agreement and pointed to his concluding paragraphs, which emphasize the potential for future inflation in the recent suppression of profit margins.

Gardner Ackley inquired about the history of the equations used in Gordon's simulations. He wondered whether Gordon's equations might have an upward bias on prices insofar as they had been revamped to track the 1969–71 period. Price equations that explained the unique 1969–71 experience might overpredict the expected rate of price increase. Gordon felt that no important bias of that type was present since his sample period ended in 1970 and the price equation had displayed no instability in 1969–70. The instabilities of that period emerged in the behavior of wages.

George Perry suggested that a simple validation of Gordon's general results could be obtained by examining the difference between recent rates of increase in nonfarm prices and wages. He noted that nonfarm prices had risen at a rate of about 3 percent during the period of controls, while average hourly compensation had risen at 7 percent, a difference of roughly 4 percent, far greater than the long-run average difference of less than 3 percent.