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An Appraisal of the Wage-Price Control Program

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The introduction of the New Economic Plan in August 1971 marked a dramatic change in the United States approach to the problem of inflation. Relative to most countries, the United States had traditionally relied more heavily on policies that depressed resource utilization as the means for curbing inflation. Acceptance of this approach was widespread; and after 1968, fiscal and monetary restraint was viewed as appropriate. Reflecting these convictions, administration officials stuck with their game plan of applying restrictive stabilization policies, giving those policies two and a half years to produce some evidence of success. The inflation rate, however, did not decelerate, and most economic forecasts made during 1969–1971 consistently underpredicted the magnitude of actual wage and price increases.

The initial imposition of a ninety-day wage-price freeze was designed to provide time for developing a control program without introducing the types of inequities that preceded the imposition of the Korean War controls. It was accompanied by a shift toward sig-

nificantly greater fiscal and monetary stimulus in order to reduce unemployment, and by a major devaluation and a freeing of exchange rates.

Three "phases" of price and wage controls, spanning the years 1972–1973, followed the freeze period. This paper is directed toward an evaluation of the impact of the control program during those two years. A review of price and wage behavior prior to the imposition of controls is presented in the first section. This is followed by a brief outline of the regulations of the control program and an initial summary of price and wage changes during the control period. The major results of the study are given in the third section, which contains a detailed examination of the impact of the controls. Finally, in section four we summarize our major conclusions and discuss some of the lessons learned from this attempt to use an "incomes policy" to moderate the pace of inflation in the U.S. economy.

WAGE AND PRICE BEHAVIOR FROM 1960 TO MID-1971

In this section we review wage and price trends in the decade preceding the imposition of wage and price controls in August 1971. The discussion will be brief, as one of us has described the period in considerable detail elsewhere.[1] Selected wage-price-productivity data for those years appear in Table 1.

The data in panel A illustrate how much wage changes accelerated between 1960 and 1971. From 1960 to 1964, hourly earnings in the private nonfarm economy grew at an average rate of 3.2 percent per year. As output increased rapidly in 1965 and 1966, labor markets tightened; overall unemployment declined and remained below 4 percent of the civilian labor force through 1969. Average wage increases accelerated and reached a rate of 6.5 percent by 1969.

Wage changes by industry exhibit some definite patterns during 1960–1969. Between those dates, manufacturing was not a sector of especially rapid wage advances. Increases in manufacturing were consistently less than the all-industry average; nonmanufacturing had higher than average increases. Within nonmanufacturing, services and construction are also singled out in panel A because they exhibited especially high rates of increase. Rapid output growth (in services) and market power (in construction) probably

contributed to those sharp wage increases. Notice also that a rapid acceleration of construction wages took place in 1969.

Through 1969, the wage trends depicted in panel A can be interpreted as largely the result of an increase in the excess demand for labor. To reduce price inflation, which had been accelerating in 1968 and 1969, stabilization policy became restrictive in 1969. Growth in real output and in man-hour productivity dropped sharply during 1969 and 1970. Paralleling the lower real growth in gross national product (GNP) was an increase in the unemployment rate to 5.8 percent by the fourth quarter of 1970. However, the loosening of labor markets in 1970 was not accompanied by a deceleration of wage changes. The all-industry increase in average hourly earnings, in fact, rose from 6.5 percent in 1969 to 6.6 percent in 1970 as manufacturing wage gains accelerated, while nonmanufacturing held steady at its 1969 rate of 6.8 percent. Wage inflation decreased in trade and transportation, but this was offset by continued increases in services and, particularly, in construction.

The data in panel A also show that rapid wage gains continued into 1971. At annual rates, increases for all series except construction equaled or were above their 1970 rates during the first half of 1971. This remained true for manufacturing even after adjusting for the effects of the auto strike in the fourth quarter of 1970.[2] That adjustment, however, did lower the manufacturing increase from 7.5 percent to 6.4 percent for the first half of 1971.

The failure of wage changes to decline in 1970–1971 despite the increasing unemployment led to a widespread public discussion of an adverse shift in the U.S. Phillips curve. Gordon, Friedman, Perry, Phelps, and others have offered different explanations for the observed shift.[3] From this discussion the thesis of the changing nature of labor markets and the accelerationist thesis both gained adherents and have emerged as major competing explanations, though not necessarily mutually exclusive, for the unusually rapid wage advances observed since 1969.

Panel B of Table 1 follows union contract settlements, specifically first-year negotiated increases, in the decade prior to controls. Median percent increases are shown through 1967 (through 1968 in construction), and then means are displayed for 1968 and later periods. From 1960 to 1966, first-year negotiated increases rise at roughly the same rate as average hourly earnings. Negotiated increases consistently exceed gains in average hourly earnings in 1968, and by 1969 a sizable differential between the two is apparent.

TABLE 1 Selected Wages, Prices, and Productivity in the Private Nonfarm Economy, 1960–1971[a] (percent increases at annual rates)

	1960–1964	1965–1966	1967	1968	1969	1970	1971, 1st Half
				A. Average Hourly Earnings[b]			
All industries	3.2	3.9	4.9	6.3	6.5	6.6	7.6
Manufacturing	2.8	3.0	4.6	6.1	6.0	6.3	7.5
Nonmanufacturing	3.4	4.4	5.1	6.4	6.8	6.8	7.7
Services	NA	5.1	5.4	6.2	6.9	7.2	7.2
Construction	3.9	4.5	5.6	7.1	8.5	9.4	8.2
				B. First-Year Negotiated Wage Increases[c]			
All industries	3.0	4.3	5.6	7.4	9.2	11.9	10.2
Manufacturing	2.5	4.1	6.4	7.0	7.9	8.1	8.9
Nonmanufacturing[d]	3.6	4.4	5.0	7.8	10.8	15.2	11.7
Nonmanufacturing, except construction[e]	NA	NA	NA	NA	9.6	14.3	11.5
Construction[f]	3.7	4.3	7.5	10.1	13.1	17.6	13.9
				C. Labor Costs and Prices			
Compensation per man-hour[g]	3.9	4.7	5.6	7.5	6.8	7.1	7.6
Unit labor cost[g]	0.9	2.0	4.3	4.6	7.2	6.4	1.2
Output per man-hour[g]	3.0	2.6	1.2	2.8	−0.4	0.7	6.2
Private nonfarm deflator[h]	1.1	1.8	3.3	3.5	4.5	5.0	3.9
Consumer price index, all items	1.3	2.3	2.9	4.2	5.4	5.9	3.8

NA = not available.

[a] Through 1970 all percent changes are based on annual averages. The 1971 first-half data are based on changes from 1970IV to 1971II in seasonally adjusted quarterly data, except for the consumer price index. The CPI for the first half of 1971 is for the change from December 1970 to August 1971, expressed at an annual rate. Negotiated wage changes are for agreements settled during the period.

[b] Adjusted for interindustry shifts and for overtime in manufacturing. The 1960–1964 observation for construction is not adjusted for interindustry shifts.

[c] Mean first-year adjustments as published by the Bureau of Labor Statistics (BLS) in *Current Wage Developments*. From 1960 to 1967, medians are shown because BLS did not publish means. Data refer to settlements involving 1,000 or more workers.

[d] Before 1966 nonmanufacturing excludes construction, services, and finance.

[e] Derived as a residual by subtracting the effect of construction settlements from all nonmanufacturing settlements.

[f] BLS started publishing settlements data for the construction industry in 1969. Observations for 1960 to 1968 are based on Bureau of National Affairs (BNA) data on median

There is a continuing acceleration of negotiated wage changes into 1970; they are widespread and by no means confined to construction. For nonmanufacturing exclusive of construction, the first-year increase rose from 9.6 percent in 1969 to 14.3 percent in 1970. Thus, the gap between negotiated settlements and hourly earnings gains continued to widen in nonmanufacturing in 1970 to the point where the former was twice the latter, i.e., 15.2 versus 6.8 percent.[4]

Average settlements in the first half of 1971 continued to rise in manufacturing, but fell in nonmanufacturing. Yet settlements for all sectors remained above their 1969 levels, and considerably above levels compatible with low rates of inflation for the economy. Finally, the data in panel B dramatically illustrate the acceleration of construction wage settlements in the late 1960s, a trend that continued into 1970.

The implications of accelerating wage changes in the 1960–1971 period for unit labor costs and thus for price inflation are most pessimistic, as illustrated by the data in panel C. Note that increases in compensation per man-hour consistently exceed increases in average hourly earnings throughout the period. This reflects the rapid growth in nonwage compensation, a shift in the employment mix toward white-collar workers and, perhaps, more rapid increases in salaries than in wages during the period. Not only did compensation gains accelerate between 1960 and 1970, but a general slowing of productivity advances is also apparent in panel C. The effects on man-hour productivity of the slowdown in early 1967 and of the 1969–1970 growth stoppage are both dramatic. In 1969 and 1970, this meant that increases in compensation per man-hour were translated almost completely into higher unit labor costs. Consequently, unit labor costs in the private nonfarm economy rose by 7.2 percent in 1969, and by 6.4 percent in 1970. The increase in unit labor costs was reflected in higher prices; but particularly in 1969–1970, the rise in prices was less than that of labor costs.

The data in panel C appear to show some evidence of reduced price inflation during the first half of 1971. Although man-hour com-

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settlements. These settlements, in cents per hour, were converted to percentages and deflated by 0.84 to be at levels compatible with BLS median settlements. The deflation factor of 0.84 was the average ratio of BNA to BLS median first-year percent increases for 1969–1973.

[g] Based on data for all private nonfarm employees as published by BLS.

[h] Data are for private nonfarm GNP including the household and rest-of-world sectors.

pensation rose at a rate above that of 1970, this was largely offset by very rapid productivity gains.[5] Consequently, the rise in unit labor costs slowed to an annual rate of increase of just 1.2 percent, and increases in both price series fell to annual inflation rates of slightly below 4 percent, a substantial improvement over 1970. The improved price performance of early 1971 merits closer attention, and tables 2 and 3 provide more information about this period.

PRELUDE TO CONTROLS

The question of whether the inflation was coming to an end in early 1971 is crucial to any judgment about the effect of the controls. At first blush, the slower advance of the CPI in early 1971 would seem to offer support for the view that it was decelerating: the annual rate of increase during the first eight months fell to 3.8 percent, compared to an average of 5.9 percent in 1970. As shown in Table 2, however, half of this apparent 2 percent deceleration can be attributed to the reversal of mortgage interest rates as monetary policy shifted toward expansion. Furthermore, while the slower increases of the CPI are mirrored in the finished goods components of the wholesale index, the rate of increase of intermediate materials prices was accelerating.

Turning to a more comprehensive measure of price changes—the private nonfarm deflator—we find an interesting contrast displayed in tables 1 and 2. The use of fixed industry weights sharply reduces the apparent price deceleration of early 1971 from 1.1 percent (5.0 percent to 3.9 percent in Table 1) to 0.4 percent (4.9 percent to 4.5 percent in Table 2). Even this small amount of price deceleration can be traced to a sudden rise in the farm deflator which was not yet fully reflected in finished goods prices. The fixed weight deflators for consumer expenditures, fixed investment, and government purchases show no change from their 1970 rates of increase.

As noted, the aggregate wage indexes continue to increase at their 1970 rates. The fixed weight hourly earnings index rose at an annual rate of 7.6 percent during the first half of 1971 (7.4 percent after adjusting for the auto strike), compared to 6.6 percent in 1970. If the trend productivity gain of about 3 percent is subtracted from this rate of increase, the rise in unit labor costs would be about 4.5 percent. There is a slowing of negotiated wage increases in construction and in the rest of nonmanufacturing in this period. Nego-

tiated increases in manufacturing, however, actually rose above the 1970 rate; and for all sectors, negotiated settlements of early 1971 exceeded the level of 1969 settlements.

Thus, the evidence of a quick end to inflation is limited to consumer finished goods prices, with some indication from intermediate materials prices that even this slowdown was transitory. In sectors outside of contract construction, wage changes showed only minor deviations from 1970 patterns. On the other hand, the costs of aggregate demand restraint were considerable. The unemployment rate stabilized at 6 percent in comparison to the 3.3 percent rate of late 1968, and real GNP growth averaged only 1 percent between the second quarters of 1969 and 1971.

AN OVERVIEW OF THE CONTROL PROGRAM

The thirty-three months of price and wage controls consisted of four distinct phases with significant changes over the period in the basic regulations and enforcement procedures. The first phase, a wage-price freeze, was essentially a transitory period and is not discussed in detail in this paper.[6] We are primarily concerned with the three phases that followed the freeze period.

In this section, the organizational structure of the control program and the basic regulations are outlined. We then summarize the price and wage changes in 1971–1973 as a prelude to the more detailed evaluation given in the subsequent econometric section.

Organizational Structure and Regulations

Only a brief outline of the significant features of the control program will be presented here since more detailed reviews are available elsewhere.[7]

The Cost of Living Council was responsible for administrative control of the Phase II program. It determined which economic units were subject to the controls and classified these units according to the prenotification and reporting requirements to which they were subject. During Phase II, most specific price and wage decisions were made by the Price Commission and the Pay Board. In addition, there were several ancillary committees, including a Committee on Interest and Dividends, and two special advisory committees—the Health Service Industry Committee and the

TABLE 2 Rates of Change in Selected Price Series, Various Periods, 1969–1973 (percent change in seasonally adjusted data at annual rates)

	1969–1970 (annual aver.)	Period of Controls					
		12/70–8/71	8/71–12/71	12/71 6/72	6/72–12/72	12/72–6/73	6/73–12/73
Consumer price index							
All items	5.9	3.8	2.4	2.9	3.9	8.0	9.6
All items[a]	5.5	4.5	2.9	2.8	3.9	8.0	9.4
Food	5.5	4.8	3.0	3.5	6.1	21.5	18.6
Nonfood[a]	5.9	4.7	3.0	3.0	3.2	4.2	6.5
Commodities[b]	4.2	2.8	0.9	2.1	2.5	4.2	6.5
Durables[b]	4.9	2.1	2.5	1.8	2.3	1.4	4.7
Nondurables excl. food	4.0	3.0	1.5	1.9	3.0	5.9	7.8
Services[c]	7.9	7.6	3.4	4.3	3.8	4.3	6.4
Rent[d]	4.1	4.3	2.9	3.6	3.4	5.0	4.7
Medical care services[c]	7.1	6.9	2.0	3.3	4.4	3.7	8.0

Wholesale price index							
All commodities	3.7	4.6	2.9	4.1	9.1	20.2	10.9
Farm products, processed foods and feeds	3.4	5.9	6.7	4.5	25.1	45.8	10.4
Industrial commodities	3.8	4.4	0.9	4.0	3.2	10.6	10.9
Consumer goods excl. food	3.0	2.2	1.1	2.3	2.1	6.7	8.1
Producers' finished goods	4.7	3.3	0.5	3.3	1.0	5.4	5.3
Intermediate goods excl. food	3.6	6.1	1.3	4.3	3.7	12.2	11.7
Crude materials excl. food	7.4	2.4	3.2	9.4	12.4	23.0	40.4
Private nonfarm fixed weight deflator[f]	4.9	4.5	2.7	2.8	2.8	5.7	7.5

SOURCE: U.S. Bureau of Labor Statistics and Department of Commerce. The consumer price index excludes the effect of the reduction in the automobile excise tax in 1971.

[a] Excludes used cars and mortgage interest.

[b] Excludes used cars.

[c] Not seasonally adjusted; excludes used cars and mortgage interest.

[d] Not seasonally adjusted; excludes used cars.

[e] Excludes mortgage interest.

[f] Based on quarterly data. Percent changes are for the quarter that includes the first month listed at the top of the column.

TABLE 3 Rates of Change in Selected Wage and Productivity Series, Various Periods, 1969–1973 (percent change in seasonally adjusted data at annual rates)

	1969–1970 (annual aver.)	1971 1st Half	Period of Controls				
			1971 2nd Half	1972		1973	
				1st Half	2nd Half	1st Half	2nd Half
Private nonfarm[a]							
Employee compensation per man-hour	7.1	7.6	5.6	7.4	6.6	8.7	7.6
Excl. payroll tax increases	–	–	–	–	–	6.5	–
Unit labor cost	6.4	1.2	2.3	3.4	1.8	7.4	8.1
Output per man-hour	0.7	6.2	3.4	3.7	4.7	1.2	−0.5
Average hourly earnings[b]	6.6	7.6	5.6	6.9	6.2	5.8	7.5
Manufacturing	6.3	7.5	5.0	7.2	5.5	5.5	7.6
Nonmanufacturing	6.8	7.7	5.6	7.0	6.3	6.2	7.2
Construction	9.4	8.2	7.8	5.7	4.9	6.4	4.7

Negotiated wages changes[c]							
Over life of contract							
Wages and benefits combined	9.1	8.4	9.0	7.7	6.9	6.1	5.8
Wages only	8.9	8.1	8.2	6.9	5.9	5.4	4.8
First-year adjustments							
All industries	11.9	10.2	12.9	7.7	7.0	5.9	5.6
Manufacturing	8.1	8.9	13.1	7.0	6.4	6.3	5.6
Nonmanufacturing	15.2	11.7	12.8	8.2	7.5	5.7	5.7
Excl. construction	14.3	11.5	13.0	8.0	8.5	5.8	6.7
Construction only	17.6	13.9	12.1	8.7	5.6	5.2	4.7

SOURCE: U.S. Bureau of Labor Statistics, *Current Wage Developments,* various issues; BLS news release, *Major Collective Bargaining Settlements,* various issues; and unpublished BLS data.

[a] Semiannual changes are based on data for the last quarter of each period.

[b] Data are for nonsupervisory employees and are adjusted for interindustry shifts and for overtime in manufacturing.

[c] Average during the period. Data on wages plus benefits refer to units with more than 5,000 employees. Wage adjustments are for units with more than 1,000 employees.

Committee on State and Local Government Cooperation. Beginning with Phase III, the Pay Board and Price Commission were abolished, and their functions were taken over by the Cost of Living Council.

Pay Controls

The Pay Board was initially a tripartite organization with equal representation of labor, business, and the public. After most of the labor members left, it operated as an essentially public board until its dissolution in Phase III. The general wage standard was an overall guide relating wage increases to the trend productivity growth of the economy plus prospective increases in the cost of living. The initial 5.5 percent limit on new wage contracts reflected a target inflation rate of 2.5 percent and a long-run productivity trend of 3 percent. Later action of Congress, exempting fringe benefits, raised the effective standard to 6.2 percent. Congress also excluded the "working poor" and required the board to permit exceptions for agreements which included elements of productivity bargaining to reduce work-rule restrictions.

Although this was a general wage ceiling, the regulations permitted significant departures. Exceptions were allowed in new agreements for historical tandem wage relationships and catch-up allowances for multiyear contracts signed prior to the 1969–1971 acceleration of the price inflation. In addition, deferred increases under existing contracts were not altered in any significant fashion. Thus, the program was focused on new wage contracts rather than existing wage rates. After the initiation of Phase III, the stabilization program moved away from emphasis on a specific wage standard.

Price Controls

The basic approach of the Price Commission was to approve a full percentage pass-through of all allowable cost increases. In general, the definition of allowable costs included all costs—everything except profits. The regulations were later modified to require use of a Price Commission estimate of labor productivity growth rather than that of the individual firms. Exceptions were made for the trade sector, rent, and medical care. In the trade sector, only invoice cost increases, marked up no more than during the freeze, could be passed forward into prices, and for rent and medical care,

ceilings were placed on the size of price increases. The commission also limited the allowable wage cost component of a price increase to 5.5 percent. During Phase IV, food manufacturers were placed under a margin control with a pass-through of materials costs on a dollar-for-dollar basis.

Experience with the cost pass-through provisions during Phase II indicated great technical problems because of the need to become involved with the internal accounting practices of individual firms. The allocation of overhead and joint operating costs is a highly arbitrary process. Thus, from a practical point of view, a second fallback regulation on profit margins became of greater importance. That regulation limited profits per dollar of sales to an amount equal to the average of earnings for the highest two out of three fiscal years prior to the establishment of the control program.

Finally, the commission entered into term-limit pricing agreements with some multiproduct firms as a means of reducing administrative burdens. Under those arrangements, firms agreed to hold their average price increases to 1.8 percent but were free to raise individual product prices by larger amounts. The major change during Phase III was a shift to voluntary compliance as opposed to prenotification and prior approval of price increases. Firms were also allowed to include 1972 in the calculation of the profit-margin ceiling. In the middle of 1973 there was a return to the requirement of prior approval for large firms.

Price and Wage Changes during the Control Period

Some progress in reducing the rate of inflation was made in the nonagricultural sector during 1972. As shown in Table 2, the annual rate of increase for nonfood items in the CPI declined from 4.7 percent prior to controls to about 3 percent. The deceleration was particularly large for services—a full three percentage points lower. The nonfarm deflator showed a decline of similar magnitude to that of the nonfood component of the CPI.

Because of a growing problem with food prices, overall price performance during the control period shows less evidence of a slowdown. Thus, the rate of increase of the total CPI was substantially above the target of 2.5 percent and only about one percentage point below the precontrol rate of 4.5 percent. A significant moderation of the inflation is also not evident in the wholesale price index (WPI), which excludes services, as the rate of increase for industrial prices slowed only slightly in 1972.

On the wage side, there was a gradual but steady reduction in the size of negotiated wage settlements—particularly in the construcure sector. As shown in Table 3, the slowdown ranged from 2 to 3 percent in the last half of 1972. There were less apparent signs of a slowdown, however, in the hourly earnings data. Employee compensation in the nonfarm sector rose by 6.6. percent in the last half of 1972, compared to 7.6 percent in the first half of 1971, and 7.1 percent in 1970. The fixed weight earnings index shows a slightly larger decline of about 1.5 percentage points from the early-1971 rate of increase.

In 1973, the rate of price inflation accelerated sharply. During the year the CPI rose 8.8 percent, and the WPI rose 15.5 percent. Initially, this inflation was heavily concentrated in the food sector, with a 45.8 percent rate of increase of farm prices in early 1973. At that time, the rate of increase of consumer nonfood items was still only 4.2 percent. However, a very large acceleration was also apparent in wholesale prices for crude and intermediate products other than food. Later in the year, petroleum prices became an additional major source of price inflation. The importance of food and fuel price increases in the last half of 1973 is indicated by data from the national income accounts. While prices of food and fuel were rising at annual rates of 18 and 16 percent, respectively, prices of other consumer items were rising at a 6 percent rate.[8]

Wages were slow to respond to the higher rate of price inflation. Negotiated wage changes continued to decline in size throughout the year. In part because of an increase in social security tax rates, the hourly compensation measure increased more rapidly than in 1972. The hourly earnings index continued to show some deceleration of wage increases in the first half of 1973, but returned to precontrol rates later in the year.

ECONOMETRIC RESULTS

A simple comparison of price and wage increases before and during the period of controls does not provide a very satisfactory basis for evaluating the effects of controls. Only in a few situations is the magnitude of change in the pattern of inflation sufficient for us to conclude that the change was a result of controls. Such a comparison also implies that other economic variables that influence wages and prices remained unchanged. But this was not the case. By late 1973, unemployment had fallen from its August 1971 level of 6.1

percent of the labor force to 4.7 percent; the United States experienced two substantial devaluations with implications for a changed composition of exports and imports and increased pressures on domestic prices; food prices rose sharply in response to crop failures in several major countries; and there was a dramatic shift toward shortages and price increases in world markets for basic commodities.

As an alternative, we made some use of statistical equations to estimate the probable course of prices and wages in the absence of controls. This, too, is not a very satisfactory method of estimating the effects of controls. The wage and price behavior that marked the precontrol period is not well explained by existing statistical equations. Yet similar equations have been used to infer the alternative path of wages and prices over a two-year period. In addition, some of the disturbances during the period of controls, such as devaluation and changes in international commodity markets, are difficult to incorporate into existing price equations, which emphasize domestic factors. Such equations, however, do provide some guidance in summarizing the influence of changes in the underlying economic conditions.

Impact on Wages

Econometric studies of U.S. money wage behavior have proliferated in recent years, and a thorough review of this literature is beyond the scope of our paper.[9] Some of the salient issues in this literature are: (1) the proper measurement of labor-market tightness; (2) the effects of price expectations on money-wage demands; (3) the effects of direct taxes (payroll taxes as well as income taxes) and (4) the effectiveness of income policies (in the 1962–1966 period as well as in the more recent initiatives from 1971–1974) in retarding wage advances. Each of the four issues has generated considerable controversy; and, depending on one's point of view, each has a large effect on how one would specify and estimate an econometric wage equation.

Basic Equations

After experimenting with several more elaborate specifications, we elected to use a relatively simple specification of the wage equation.[10] Except for particular issues discussed later, we found that the alternative specifications considered would not significantly

affect our analysis of the control period. The general equation is of the form

$$\%W = a + bUR + c\%\bar{P}_{-1} + dG$$

where

$\%W$ = quarterly percent change in money wage rates
UR = the unemployment rate for civilian men 25 and older
$\%\bar{P}_{-1}$ = a weighted average of recent changes in the CPI, weights being respectively 0.4, 0.3, 0.2, and 0.1 for the four quarters prior to the current quarter
G = a wage-price guidepost dummy variable with a value of unity from 1962II through 1966II and zero in all other quarters

Four wage series were examined: (a) a fixed weight index of straight-time hourly earnings in the private nonfarm economy; (b) a fixed weight index of straight-time hourly earnings in manufacturing; (c) the annual percent increase in wage rates negotiated in manufacturing (first-year increases for multiyear contracts); and (d) the percent increase in wage rates negotiated in the private sector, excluding manufacturing and construction. A description of the sources and derivation of all the variables is contained in Appendix A. Data for these series were used to estimate equations for 1956–1969, and the regressions were then used to predict wage developments for the ensuing four years.

The actual coefficients and summary statistics for the four equations appear in Table 4. The overall fit of these equations is quite good, with all adjusted coefficients of determination ($\bar{R}^2$) exceeding 0.6 and all standard errors 0.22 percent or smaller. On the basis of $\bar{R}^2$ and the standard error, the statistical fit is better in the two negotiated wage-change equations than in the other pair. Positive serial correlation, however, is present in both equations for negotiated wages, particularly equation 3, for manufacturing. Consequently, there probably is some upward bias in the t statistics shown for those two equations.

The coefficients for the three independent variables are reasonably similar in all four equations, and all are significant by the usual statistical criteria. More weight is attributed to price increases and less to unemployment in equation 4 than in the other three equations, but much of this difference is probably caused by the unavailability of negotiated wage data for 1956 and 1957. All four equations suggest a slowing of wage changes during the period of the Kennedy-Johnson guideposts but the point estimates of −0.22 to −0.35 percent per quarter seem a little large.

TABLE 4 Quarterly Money Wage Increases, 1956I–1969IV (figures in parentheses are t ratios)

Dependent Variable	Independent Variables[a]				$\bar{R}^2$ [SE] {DW}
	a	*UR*	$\%\bar{P}_{-1}$	*G*	
1. Average hrly earnings, private nonfarm	1.41 (10.49)	−0.14 (5.58)	0.33 (3.37)	−0.22 (3.61)	0.69 [0.19] {1.52}
2. Average hrly earnings, mfg.	1.37 (8.54)	−0.13 (4.53)	0.29 (2.49)	−0.35 (4.88)	0.65 [0.22] {1.81}
3. Negotiated increases, mfg.	1.29 (15.85)	−0.10 (6.68)	0.31 (5.21)	−0.32 (8.66)	0.85 [0.11] {0.60}
4. Negotiated increases, mfg. excl. construction[b]	1.25 (10.54)	−0.06 (2.83)	0.56 (6.49)	−0.23 (4.57)	0.82 [0.14] {1.28}

$\bar{R}^2$ = coefficient of multiple determination adjusted for degrees of freedom.
SE = estimated standard deviation of the disturbance term.
DW = Durbin-Watson statistic.
[a]For definitions, see accompanying text.
[b]Data for the dependent variable are not available prior to 1958.

Although the coefficients agree closely in size and are significant, they are quite sensitive to the period of fit. When earlier data are included, the relative importance of unemployment rises and that of prices declines. Adding later data points further enhances the importance of prices versus unemployment in explaining wage increases.[11] This sensitivity must be kept in mind in estimating the impact of the control program on wage changes during 1972 and 1973.

Results for Wage Controls

Equations 1 through 4 were used to predict quarterly wage changes for 1968–1973, with actual values of the variables appearing on the right-hand side of the equations. Semiannual averages of the residuals expressed at annual rates are shown in Table 5. For comparative purposes, the standard errors of the original regressions appear at the bottom of each column. The construction industry is excluded because of the lack of historical data for union settlements. This industry will be examined separately in the following section.

TABLE 5 Residuals of Wage Equations, 1968–1973 (seasonally adjusted semiannual percent changes at annual rates, actual minus predicted values)

	Estimation Period: 1956–1969				Estimation Period: 1958–First Half 1971			
	Hourly Earnings[a]		Union Negotiated[b]		Hourly Earnings[a]		Union Negotiated[b]	
	Nonfarm	Mfg.	Mfg.	Nonmfg.	Nonfarm	Mfg.	Mfg.	Nonmfg.
1968								
1st half	0.8	1.1	−0.2	−0.3	0.9	1.3	−0.2	−0.5
2nd half	0.5	0.3	0.2	0.8	0.4	0.3	−0.0	0.3
1969								
1st half	−0.2	−0.7	0.4	0.8	−0.4	−0.9	0.0	0.2
2nd half	0.4	0.5	0.4	0.3	−0.2	−0.2	−0.4	−0.6
1970								
1st half	−0.4	0.1	1.0	1.1	−1.2	−0.7	−0.1	−0.2
2nd half[c]	1.8	1.6	1.8	1.9	1.0	0.7	0.7	0.6
1971								
1st half[c]	1.5	1.2	2.4	4.2	0.8	0.5	1.4	3.1

				Period of Controls				
1971								
2nd half	0.4	0.1	3.0	5.9	0.0	−0.3	2.4	5.2
1972								
1st half	1.8	2.3	1.4	0.2	1.7	2.3	1.2	−0.2
2nd half	1.0	0.6	0.7	−0.2	1.0	0.8	0.7	−0.5
1973								
1st half	0.2	0.2	0.6	−0.3	0.1	0.3	0.3	−0.8
2nd half	0.7	1.1	0.1	−1.7	−0.4	−0.0	−1.4	−3.4
Standard error of regression	0.7	0.9	0.5	0.5	0.7	0.8	0.5	1.0

SOURCE: Equations in Table 4. Residuals are based on projections of observations beyond regression period.
[a] Index of straight-time hourly earnings including interindustry shifts and overtime (in manufacturing).
[b] Bureau of National Affairs data for first-year wage settlements (excluding fringes). Construction industry settlements are excluded.
[c] The data for earnings in late 1970 are adjusted to eliminate the disturbance caused by the automobile strike.

Average residuals based on the equations of Table 4 appear in the first four columns. In all four of these equations, average residuals are uniformly positive in the second half of 1970 and first half of 1971, as actual wage increases exceeded the predicted ones. Further, six of these eight averages are more than twice the standard error of the underlying equation. The residuals in the negotiated wage-change equations become increasingly positive for each period after the second half of 1969 and are especially large for the nonmanufacturing sector. During the period of controls, these positive residuals steadily decline in magnitude.

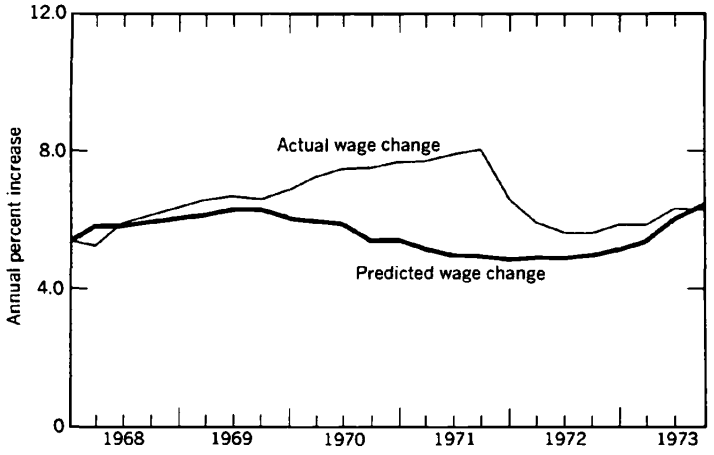
Residuals in the equations estimated from earnings data decline sharply in late 1971 and then increase in early 1972 in response to the wage freeze and retroactive wage payments. The same type of movement in the residuals is evident in late 1972, and has been related to a bulge of nonunion increases at the beginning of the second year of pay controls.[12] A smoothing of the underlying quarterly data, however, to reduce the impact of these two events, indicates a uniform reduction in the size of the residuals throughout 1972 and early 1973. The gradual movement of actual wage increases back toward the equation predictions is even more evident in the figures for negotiated wage settlements.

The pattern of wage residuals discussed above is illustrated in Figure 1, which shows actual and predicted negotiated wage changes for the manufacturing sector for 1968–1973. Beginning in 1969, actual wage increases begin to exceed those anticipated from historical relationships by increasingly large magnitudes. This pattern is broken with the introduction of the control program, and the two series gradually come back together—primarily because of a reduction in the actual increases.

Because of the sensitivity of the coefficients of prices and unemployment to the period of estimation, a second set of residuals is also shown in Table 5. These are based on an estimation period extending from 1958 through the first half of 1971, with a consequent increase in the weight assigned to the price variable. Qualitatively, these residuals are similar to the first set. The tendency of regressions to average residuals and reduce any extreme error is clearly evident in 1970 and early 1971, but the residuals remain large. The principal change is to raise the level of the predicted increases over the control period, with the result that the smaller positive residuals at the beginning are offset by larger negative residuals in 1973. The predicted increases also accelerate more during the rapid food and fuel inflation of late 1973.

Overall, these results suggest to us the following interpretation.

FIGURE 1 Negotiated Wage Increases in Manufacturing, 1968–1973 (actual and predicted percent rates of change at annual rates)



NOTE: Predictions are based on equation 3 of Table 4. The equation was fitted to data for 1956I–1969IV

During 1969–1971, there was a growing tendency for wage changes —particularly in the union sector—to exceed the rate of increase that would have been anticipated from historical relationships to unemployment and price inflation. The magnitude of negotiated wage changes increased despite an easing of labor market conditions during the recession. By late 1970, this was being reflected in large increases in average hourly earnings. The particularly large residuals of late 1970 and early 1971 have been noted by others. In a 1971 study, George Perry stated that the magnitude of wage increases from 1970IV to 1971II exceeded predicted levels from his equations by an average annual rate of about one full percentage point. The recent paper by Mitchell also shows a similar residual pattern for these quarters. However, because he did not adjust for the auto strike of 1970IV, he shows a small residual for 1970IV but a very large residual for 1971I.[13]

The wage freeze sharply reduced these increases, but they showed up again in the postfreeze period. In particular, negotiated increases in early 1972 were the result of bargaining that had been started in coal, steel, and the railroads before the freeze and which was allowed to go through without major change. But during Phase II, there was clearly a major decline in negotiated settle-

ments: prefreeze residuals were very large and growing, but they were eliminated by mid-1972 and throughout 1973.

Thus, one's view of the effectiveness of wage controls is dependent upon the interpretation of wage behavior prior to the freeze. If these large residuals indicated a permanent shift of wage behavior, the controls succeeded in restoring historical patterns of wage increases. Alternatively, if the wage behavior of early 1971 reflected only a temporary aberration, the controls had very little impact. The change in the magnitude of the residuals after 1971 would suggest a decline during the control period of approximately 0.4 to 0.8 percent in the annual rate of increase for hourly earnings.[14] The estimated reduction in union settlements ranges from 1.5 to 3.0 percent.

Because the control program focused on union settlements and in the short run on newly negotiated contracts, equations based on hourly earnings data may understate the long-run impact of the program. If the unusually large union wage adjustments of 1970–1971 had been permitted to continue into 1972 and 1973, their impact on average hourly earnings would have been larger than in earlier historic periods simply because these adjustments were becoming so large. It is probably safe to say that such large adjustments were tending to widen union-nonunion wage differentials. Had this been permitted to continue into 1972 and 1973, it would have been reflected in more rapid gains in overall average hourly earnings. This acceleration would have been further enhanced if nonunion workers tried to retaliate and to maintain their earlier relative wage position. Thus, the full impact of controls on hourly earnings would extend beyond the initial periods with a cumulative effect.

Construction Industry

Wage changes in construction have exceeded all-industry averages for the past decade. The data in Table 1 showed these wage changes accelerating in the late 1960s and in 1970 with little evidence of abating. Since unemployment rates in construction were already high, rising to 9.7 percent in 1970 from 6.0 percent in 1969, it became widely recognized that traditional market forces were not sufficiently strong to dampen wage increases in that industry. This situation led to the creation of the Construction Industry Stabilization Committee (CISC) in March 1971.

Since regression analysis of construction industry wage changes has not been very successful, we will focus on a tabular presentation of these wage data. In Table 6 we show quarterly percent wage

changes at annual rates for 1970–1973. Three wage series are shown: the Bureau of Labor Statistics fixed weight index of hourly earnings; median first-year negotiated wage settlements, as recorded by the BLS for settlements involving 1,000 or more workers; and median negotiated wage settlements effective for the life of the contract for the same series of BLS contracts. Additionally, the number of workers covered in the BLS settlements is shown. These numbers should be considered relative to average industry employment of about 3.5 million during these years.

In this industry, the hourly earnings data show substantial evidence of deceleration. The increases for 1972 and 1973 are more

TABLE 6 Construction Wages, 1970–1973 (percent increases at annual rates)

Year and Quarter	Aver. Hourly Earnings: Fixed Weight Index	BLS Negotiated Settlements		
		First-Year Median Wages	Life-of-Contract Median Wages	Number of Workers (thousands)
1970I	8.9%	15.7%	13.4%	130
II	8.0	14.7	13.9	417
III	11.5	19.0	14.9	112
IV	6.6	19.3	13.7	23
1971I	8.6	18.0	16.7	13
		Period of Controls		
1971II	8.9	13.4	11.0	74
III	8.2	10.9	8.8	171
IV	5.9	10.9	9.3	55
1972I	6.5	15.2	12.7	36
II	4.0	6.1	6.0	161
III	3.4	5.6	5.6	162
IV	9.0	4.6	3.1	97
1973I	6.9	4.2	5.0	154
II	3.2	4.7	5.3	312
III	6.0	4.4	4.6	270
IV	3.5	5.2	5.2	170

SOURCE: Average hourly earnings are from the Bureau of Labor Statistics; negotiated settlements are from BLS, *Current Wage Developments*, June 1974, appendix tables, and earlier issues. Data refer to settlements involving 1,000 or more workers.

than 3 percent below the 9.2 percent rate of increase which prevailed for the 1969–1971I period.

An even more dramatic pattern of deceleration is evident in the settlement data. With the introduction of the CISC in the second quarter of 1971, first-year settlements declined immediately, and then fell to even lower levels in the second quarter of 1972.[15] From the middle of 1972 through the end of 1973 these settlements were closely in line with the original Pay Board guidelines. The life-of-contract data strongly parallel the first-year median settlements. Again there are sharp declines in the second quarters of 1971 and 1972. Similar results are obvious in the data for mean settlements (as opposed to medians) and for compensation (rather than wages). Thus, all the data are consistent with the conclusion of a large and abrupt decline in wage settlements after March of 1971.

Controls and Negotiated Wage Settlements

In the previous sections we stressed the greater impact of wage controls on negotiated settlements relative to average hourly earnings. Because the program focused on union settlements—particularly new contracts—they are explored more fully in this section, using annual data from the Bureau of Labor Statistics on new contracts and effective wage changes.[16] Data for union settlements involving 1,000 or more workers are shown in Table 7 for the period 1966–1973. Consistent industry coverage including construction, services, and finance became available only in 1966.

The percent distribution of first-year wage adjustments and of total wage changes effective during the year are shown in panels A and B, respectively. Between 1966 and 1971, the data in both panels show similar shifts in the distribution of wage changes: a steady decrease in the proportion of workers in the category "under 5 percent" and a rapid rise in the proportion in the "over 9 percent" category. The upward shift was reversed after controls were introduced in 1972 and 1973. This reversal was particularly evident for first-year settlements in panel A. The increased percentage of settlements in the under-5-percent category is not consistent with the view that the general wage standard served as a floor for wage settlements. For first-year settlements, 17 percent were in the under-5-percent category in 1972, and 26 percent were in that category in 1973.[17]

A more systematic display of the shift in effective wage changes is contained in panel C. The second line shows the time pattern of median wage changes; the wage change for the first and third

quartiles are shown in the first and third lines. A measure of relative wage dispersion, the interquartile range divided by the median, is shown in the last line. Except for 1969, the median increased steadily throughout the 1966–1971 period. The first-quartile changes, however, rose most sharply in 1968 and 1969, while increases in the third quartile were concentrated in 1970 and 1971. Consequently, the measure of relative dispersion dropped in 1968 and 1969 but was very large in 1970 and 1971.

During the control period, the measure of relative dispersion declined sharply. In contrast to the 1968–1969 episode, however, this decline resulted from a lowering of the third quartile rather than an increase in the first. Thus, the compression of the distribution during the control period is primarily the result of a sharp reduction in the incidence of very large wage increases.

A decomposition of the effective wage changes is shown in panel D. Such increases can be traced to those resulting from newly negotiated contracts, deferred adjustments of contracts negotiated in prior years, and cost-of-living escalator clauses. The primary focus of the wage controls was on newly negotiated contracts. During the first year of controls, the mean effective adjustment fell from 9.2 to 6.6 percent. All of this decline resulted from the smaller role of the first-year adjustments, since deferred and cost-of-living adjustments were unchanged. However, since the number of negotiated contracts varies from year to year, not all of the reduced contribution from first-year adjustments can be attributed to controls or to any other behavioral factors: bargaining in 1972 was light. Of the total decline of 2.6 percent, 1.6 percent was due to the declining proportion of workers negotiating new contracts.[18]

In 1973 the contribution of first-year settlements increased even though their average size declined (5.8 percent in 1973 versus 6.6 percent in 1972). This was the result of a larger volume of contract negotiations in 1973, with a consequent increase in their contribution. The smaller contribution of deferred increases in 1973 reflects both the low level of bargaining activity in the previous year and the reduced size of the settlements.

The acceleration of effective wage adjustments can be traced to the greatly increased contribution of escalator clauses. Escalator clauses are becoming more prevalent, as expectations of large and continuing price increases are now widely held. However, this ascendancy is a consequence of recent inflationary experience and not a response to the control program per se. Mitchell and Weber report that escalator clauses actually declined in frequency during Phase II.[19]

TABLE 7 Aspects of Negotiated Wage Changes Effective in 1966–1973 (private nonfarm agreements covering 1,000 workers or more)

	1966	1967	1968	1969	1970	1971	1972	1973
A. Distribution of Percent Increases for First-Year Adjustments								
Under 5%	53	34	11	6	2	3	17	26
5–7%	35	29	31	30	20	12	41	52
7–9%	8	26	40	20	19	12	21	17
Over 9%	4	11	18	42	59	71	21	4
Not specified	0	2	1	4	0	1	0	0
Mean adjustment	NA	NA	7.4	9.2	11.9	11.6	7.3	5.8
B. Distribution of Percent Increases for Wage Changes Effective in the Year								
Under 5%	68	60	38	38	28	17	25	20
5–7%	25	19	29	35	20	25	37	24
7–9%	4	17	20	10	12	10	18	31
Over 9%	2	5	13	17	39	46	21	24
Not specified	0	1	1	2	1	1	0	0
Mean adjustment	3.7[a]	4.5[a]	6.0	6.5	8.8	9.2	6.6	7.0

C. Quartile Distribution Points[b] and Relative Dispersion of Percent Changes Effective in the Year

First quartile ($Q1$)	2.3	2.4	4.2	4.3	4.8	5.9	5.0	5.4
Median (*Md.*)	3.6	4.4	5.5	5.1	7.3	8.0	6.0	7.3
Third quartile ($Q3$)	5.5	6.5	7.5	7.3	12.4	13.7	8.0	8.9
[$(Q3 - Q1)/Md.$]	0.89	0.93	0.60	0.59	1.04	0.98	0.50	0.48

D. Mean Percent Adjustment, and Components, Effective in the Year

First-year adjustments[c]	NA	NA	3.2	2.4	5.1	4.3	1.7	3.0
Deferred adjustments[d]	NA	NA	2.4	3.8	3.1	4.2	4.2	2.7
Cost-of-living escalator adjustments[e]	NA	NA	0.3	0.3	0.6	0.7	0.7	1.3
Mean adjustment	3.7[a]	4.5[a]	6.0	6.5	8.8	9.2	6.6	7.0

NA = not available.

SOURCE: U.S. Bureau of Labor Statistics, *Current Wage Developments*, June 1974, and earlier issues.

[a] Estimated by BLS.

[b] Estimates of the first and third quartiles are based on linear interpolation of detailed interval data. The actual intervals published in *Current Wage Developments* are more numerous than those shown in panel B and vary according to the range of settlements effective in the particular year.

[c] Changes negotiated during the year and going into effect within twelve months from the effective date of the agreement.

[d] Changes decided upon in earlier years. Includes guaranteed minimum adjustments under cost-of-living escalator clauses.

[e] Excludes guaranteed minimum adjustments which are treated as deferred adjustments.

Average contract duration has tended to decrease in the 1972–1974 period. For example, the median duration of contracts negotiated during 1973 was 28 months. In the immediately prior round of settlements, these same contracts had a median duration of 32 months.[20] This shortening of contracts, however, should be attributed in part to inflation rather than to effects of the control program. Duration of contracts will probably show a continued decrease this year (1974), especially in settlements where escalator provisions are not part of the package.

Strike activity during 1972 and 1973 was rather low compared to other years. Only 0.15 and 0.14 percent of man-days was lost through strikes in 1972 and 1973, respectively. These percentages were lower than in any year since 1966.[21] Given the unusually heavy bargaining schedule of 1973, it would seem that the control program did not increase the difficulties for labor and management in arriving at mutually agreeable settlements. Perhaps the existence of pay controls even helped by reducing the upper range of feasible wage settlements.

In summary, both the average size of contract settlements and their relative dispersion were sharply reduced during the period of wage controls. The abruptness of this change creates a strong presumption that the controls were a significant causal factor. Finally, although cost-of-living escalators became more common and contract duration became somewhat shorter, these aspects of change seem to be related more to the inflation than to the existence of controls. Both trends have continued since the termination of Phase IV.

Impact on Prices

The price control regulations varied among major sectors of the economy, and for that reason, we have undertaken some disaggregation of the available data. Major distinctions can be made among the controls applied to retail and wholesale trade, services, manufacturing firms, and the food industry. A separate examination of each of these sectors offers an opportunity to evaluate the impact of different types of control regulations.

Retail and Wholesale Trade

Firms in the trade sector were required to maintain a percentage gross markup over invoice costs that was no higher than that of the freeze period. Thus, only increases in the costs of goods to the firm

could serve as a basis for an increase in selling price. By not allowing a pass-through of high operating costs, the regulation resulted in some additional restraint beyond a full-cost justification of price increases: productivity growth in the trade sector is less than that of the rest of the economy, while its wage increases match those of other industries. However, this exclusion of operating costs becomes quite unimportant for substantial increases in invoice costs.

Normally, the trade sector would not be viewed as a target for price controls, since it is considered to be quite competitive. The reduction of rates of return below long-run equilibrium levels can only result in a bulge of price increases after controls are removed. On the other hand, the regulation was clear and easy for firms to comply with, since it was designed to follow the pattern of their normal pricing procedures. By exempting firms with fewer than sixty employees, the Price Commission was able to reduce an otherwise overwhelming monitoring burden to manageable size. However, the loose definition of normal margin, shifts in product mix, and conflicts between categorical and item-by-item pricing all made enforcement of the regulations more difficult.

Our efforts to measure the impact on retail trade margins are based upon a comparison of the CPI and WPI indexes for consumer finished goods. Differences in the types of products included in the two indexes and variations in the weights attached to individual items complicate any such comparison. The elimination of food and fuel products from the nondurables component and the removal of used cars and home purchases from the CPI index for durables do improve comparability, but the lists of products included still are not identical. An attempt was made to restructure the WPI index at the four-digit level, using CPI weights, but the results were not significantly different from those obtained using regularly published indexes. The primary effect of the lack of full comparability should be to increase the standard error of any regression equation. There would be no reason to expect a bias in any particular direction during the period of controls. Aggregation should average out some of the individual product differences.

The equations used to relate retail prices to wholesale costs closely parallel those of a pricing model by stage of processing developed by Joel Popkin.[22] The specific equations were estimated for the 1956–1970 period and are presented in Appendix B. These equations were projected through the control period, using other variables such as wholesale prices, wage rates, and capacity utilization at their actual levels. The residuals from these predictions are summarized in Table 8.

TABLE 8 Residuals of Price Equations for Period of Price Controls (seasonally adjusted semiannual percent changes at annual rates; actual minus predicted values)

	Retail Prices			Wholesale Prices		
				Consumer Goods		
	CPI Durables[a]	CPI Nondurables[b]	CPI Services[c]	Durables	Nondurables[b]	Producer Equipment
1971						
2nd half	−2.5	+0.1	−0.5	−0.8	−0.1	+0.3
1972						
1st half	−1.2	+0.5	−0.3	+2.1	−0.2	+2.2
2nd half	+1.0	−0.4	−1.2	−3.6	−0.7	−2.0
1973						
1st half	−0.7	−0.2	−1.3	+2.0	−1.9	+0.8
2nd half	+0.7	−0.7	0.0	−3.5	−2.8	−2.2
Average	−0.5	−0.1	−0.7	−0.8	−1.1	−0.2
Standard error of regression	1.0	0.7	0.9	1.3	1.0	1.1

SOURCE: Projections from the price equations of Appendix B.
[a] Excludes used cars and home purchases.
[b] Excludes food and fuel.
[c] Excludes rent.

There is some weak evidence that the margin controls did depress retail prices relative to wholesale costs. For both durables and nondurables, the average of the residuals is slightly negative over the control period. However, the large residual for durables during the last half of 1971 is almost wholly due to the automobile exise tax cut. Elimination of this observation results in a pattern of residuals within the range anticipated from the standard error of the regression, and showing only a slight negative tendency. Thus, the restrictive influence would seem to be of minimal importance. The regulations appear to have allowed firms to do about what they would have done in the absence of controls. From a strictly economic point of view, it is not clear that controls on this sector were worth the effort.

Service Sector

The services component of the consumer price index includes a highly heterogeneous group of industries that were subjected to several distinct types of controls. Medical care services are the most frequently cited example of a substantial impact of the price controls. During Phase II, a 2.5 percent cap on increases in physicians' and dentists' fees was applied. Price increases by medical care institutions had to be cost justified, and they could not be raised above 6 percent without special Price Commission approval.[23]

In the area of regulated utilities, the Price Commission delegated authority to the existing regulatory agencies but retained the right to review their decisions. Finally, a large number of small personal-service firms were exempt from the formal regulations.

As shown in Table 8, the category of services except rent is one that shows a substantial deceleration of inflation throughout the period of price controls. The underlying equation includes variables representing labor costs, mortgage interest rates, and cyclical output. Thus, the indicated slowdown of 0.7 percent is in addition to these cost factors. The residuals are consistently negative throughout the control period, although there is some evidence of a lessening of the restraint near the end of 1973. Among the major components (not shown), medical care and other services had substantial negative residuals. However, household services, which included most of the regulated industries, showed no apparent decline beyond that which could be anticipated from lower mortgage interest rates in 1972. Also, much of the slowdown in the category of transportation services resulted from the adoption of no-fault

insurance in several large states rather than representing the effect of controls.

The controls on rent included a 2.5 percent cap on the pass-through of general costs, the full pass-through of taxes, and a recovery of the costs of capital improvements. About half the market was exempt—including all new construction—and the controls were terminated with the introduction of Phase III. The regulations appear to have resulted in a temporary slowing of about 0.5 percent in the rent index. There was an immediate drop in the rate of increase coincident with the introduction of controls and a return to former rates of increase when controls were removed in 1973.

Manufacturing Prices

Our measure of the influence of price controls on prices of manufactured goods is based on equations which are more aggregated than those of Popkin. Three categories of finished goods prices—nondurables except food and fuel, consumer durables, and producer durable equipment—are related to raw materials prices, labor costs, capacity utilization, and cyclical fluctuations in labor productivity. Thus, we have aggregated over the intermediate stages of production.

In all three cases, the residuals of Table 8 show an average negative effect during the period of controls. For both categories of durables, however, the residuals are very erratic, with several large positive residuals. These sharp fluctuations were caused by changes in the timing of automobile price increases. In both years, fall price increases were delayed by the Price Commission into the early part of the following year. Thus, the inclusion of the price increases of early 1974 would substantially reduce the estimated effect of controls. Alternatively, exclusion of the last half of 1973 results in average values of the residuals very close to zero. The pattern of residuals for nondurables except food and fuel is more consistent in indicating a restraining influence of the controls.

Food Prices

Food prices must play a key role in the success of any price-wage controls program. Food costs represent a major portion of consumer spending. But, more important, food prices are likely to become the standard by which the general public will judge the performance of any anti-inflation effort. Price changes for products purchased on a

daily or weekly basis are far more visible than those for infrequent purchases, such as automobiles and household durables. Most economists, however, would support the view that food production is a highly competitive sector of the U.S. economy, where the effect of controls would most likely be to replace price increases with rationing. Given the difficulties of operating controls and the limited potential gains, the original decision to exempt raw agricultural products seemed reasonable.

The explosive rise of food prices, which began in late 1972, led to numerous demands that the controls be broadened to cover food products. On the other hand, opponents of price controls argued that the disruption of this market was itself caused by controls. Meanwhile, the Agriculture Department confused the issue further by alleging that the problem resulted from rising consumer demand for food. Claims that the farmer was not receiving the higher prices resulted in numerous investigations of profiteering by middlemen.

Today, it is clear that the rise in food prices had its primary origins in a huge expansion of U.S. agricultural exports. The magnitude of this export expansion and its impact on reserve stocks in the United States are shown in Table 9. World grain production fell sharply relative to expanding demand as adverse weather conditions were experienced in the USSR, South Asia, and Saharan Africa. Since the United States was a supplier of last resort in agricultural products, the dollar value of exports rose by 88 percent in 1973. In the 1972–1973 crop year the volume of feed grain exports rose 58 percent and wheat exports increased 87 percent. However, the United States had become increasingly ill-equipped to fulfill this stabilization function. Grain reserves had been sharply reduced as acreage set-aside programs with direct cash payments to farmers were substituted for the previous system of stockpiling large amounts of grain. This resulted in less flexibility to meet short-run increases in demand. In addition, the United States did not shift toward a policy of stimulating production until reserves had declined to extremely low levels. The grain situation was made worse by the termination of fish-meal exports from Peru, which led to a chaotic market for soybean products, a high-protein feed substitute.[24]

The initial rise of meat prices was related more to cyclical lows in cattle and hog marketings than to world market conditions. The production of meat actually declined in both 1972 and 1973. However, high feed costs did limit substitution of poultry for meat, and with the passage of time high feed costs became a more significant element of the meat supply situation. Price controls in the middle

of 1973 made the short-term situation worse in meat because price ceilings were not raised as feed costs increased. Also, the prior announcement of a termination date for the price ceilings caused much of the problem.

Despite the publicized claims, there is little evidence that the rise of retail food prices represented anything more than a simple pass-through of higher farm prices. The recent revision of the na-

TABLE 9 Selected Statistics on Production of Meat and Poultry, Wheat, and Feed Grains, Various Periods, 1960–1973

Status of Product	1960–1970	1970–1971	1971–1972[a]	1972–1973[a]	1973–1974[b]
Meat and Poultry (inspected slaughterings; average annual percent rate of change)[c]					
Meats, total	3.4	4.7	−1.6	−5.9	
Poultry	5.2	1.1	6.2	−2.2	
Wheat (millions of bushels; marketing year[d])					
Beginning carry-over		885	731	863	439
Production		1,351	1,618	1,545	1,711
Total supply[e]		2,237	2,350	2,409	2,154
Domestic disappearance		768	855	786	757
Exports		738	632	1,185	1,148
Ending stocks		731	863	439	249
Feed grains[f] (millions of tons; marketing year[d])					
Beginning carry-over		48.6	33.2	48.4	32.4
Production		160.1	207.7	199.9	205.0
Total supply[e]		209.1	241.4	248.7	237.7
Domestic disappearance		155.2	165.7	173.2	173.4
Exports		20.7	27.3	43.1	43.7
Ending stocks		33.2	48.4	32.4	20.6

SOURCE: *Survey of Current Business*, July 1974, pp. S27–S29, and earlier issues; U.S. Department of Agriculture, *Demand and Price Situation*, August 1974, Table 2.

[a] Figures for wheat and feed grains are preliminary.
[b] Figures for wheat and feed grains are estimates.
[c] Calculated from calendar-year production data, by weight.
[d] Twelve-month marketing year, spanning the pairs of years indicated in the column headings.
[e] Includes imports.
[f] Includes corn, oats, barley, and grain sorghum.

tional income accounts makes clear the rise of farm income, which doubled between the fourth quarters of 1971 and 1973. The Department of Agriculture maintains a price index of farm values using weights identical to those of the CPI series for domestically produced farm products. A comparison of the two indexes indicates that the farm-retail spread rose by 2.0 percent in 1972 and 6.5 percent in 1973. Compared to an average increase of 5.1 percent in the previous two years, and from what can be inferred about increases in labor, transportation, rent, and packaging costs, these increases do not seem large.

We conclude that price controls did not significantly alter food costs. Because of the competitive structure of the industry, controls that allowed for cost pass-throughs were of minor importance. Price controls cannot deal effectively with supply shortages. In the short run, restrictions on grain exports would have been the only effective means of limiting domestic price increases. However, this decision would have involved serious problems for American foreign trade policy.

Summary

In general, the results of this section imply a smaller direct impact of controls on prices than would be inferred from a simple examination of the price indexes of Table 2. Factors other than controls were changing during much of the control period, and, on balance, causing a decline in the predicted price increases. In addition, the disaggregation indicated the importance of special factors such as removal of the automobile excise tax, the adoption of no-fault insurance, and the delay of automobile price increases.

The pass-through of the impact on wholesale prices into the consumer price index implies that the annual rate of price increase was reduced by approximately 0.5 percent during the control period. However, this does not represent the full impact of the controls, because we have used actual wage changes in the price equations. As discussed in the section on wage controls, we find evidence of additional restraint in this area. Finally, the lower rate of price increases would have some indirect feedback effect: slower price inflation resulting in some moderation of wage increases and, thus, of the cost increases to be passed forward in future periods.

The largest direct effect of controls seems to have been in the service sector, where the regulations were tailored to specific industry characteristics. As might be anticipated, controls had little

impact on the trade sector, where competitive factors are believed to be quite strong. Within manufacturing, nondurables provided the most consistent evidence of restraining influences. The pattern of residuals for durable prices was more erratic, with some evidence that the greatest effect came from simple delays of automobile price increases.

One interesting result of these equation residuals is that they do not indicate any acceleration of inflation after the shift to Phase III. Although the actual rate of price increase does accelerate, this is more than accounted for by a sharp rise of raw materials costs, the impact on labor costs of the increase in social insurance taxes, and the delayed implementation of the automobile price increases.

On the other hand, this may be too simple a basis on which to conclude that the shift was not important. Certainly, the way in which Phase III was introduced did much to reduce public confidence in and support for the program. In addition, some more detailed components of the wholesale price index indicate a sharper rate of increase after January 1973. Most of these fall within the WPI category of intermediate goods except food, which rose at an annual rate of 16.1 percent between January and April 1973 compared to 3.4 percent in the previous three months. Finding a justification for an acceleration of this magnitude in the underlying cost data is difficult. However, given the size of later increases in food prices, raw materials shortages, and the second devaluation, the shift to Phase III was not a major factor in the 1973 price inflation.

The estimated direct impact of controls on prices is somewhat smaller than that implied by previous studies. A recent study by Robert Gordon provides the best example of the results obtained from an aggregate application of the econometric approach.[25] In addition to estimating the effect of controls on wages and simulating the feedback effect, Gordon obtains an average direct effect on prices of 1.1 percent. In part, the lower estimated impact relative to Gordon reflects differences in the underlying equations and, thus, in the estimates of what the path of the inflation would have been in the absence of controls. In the case of the Gordon study, however, there are significant differences in the data used. His analysis focuses on a fixed weight deflator for the nonfarm sector, taken from the national income accounts, and which is similar to the index presented at the bottom of Table 2. Both indexes show a larger deceleration of the inflation during 1972 than either the CPI or WPI. Some of this difference is attributable to the inclusion of construction prices in the nonfarm-sector index. Except for single-family residential construction, these measures are heavily based on wage

rates; and, as shown in the section on wage controls, construction wages decelerated sharply after the introduction of controls. Second, these are value-added deflators, whereas the CPI and WPI measure prices of goods. The deflators include negative effects from import prices and farm products. Since both of these price indexes rose very sharply during the control period, they reduce the value-added deflators relative to finished goods prices.

The private nonfarm deflator is a broader measure of price change, and on a conceptual basis it is preferable to either the CPI or WPI. However, the quality of the price data is very low for both construction and imports. Gordon's index, also, indicates a slower rate of price increase over the controls period than the index of Table 2, which is derived from the Commerce Department fixed weight index for the private sector minus the impact of changes in the farm deflator. The Commerce index involves a more detailed set of weights than those available to Gordon. Some overstatement is also implied by his apparent inclusion of the automobile excise tax as part of the effect of controls.

Most studies do agree, however, that there was some suppression of prices beyond a simple pass-through of the wage restraint. We not only believe that this added price restraint was smaller than implied by other studies, but we are very doubtful that the results can be used to infer that a significant squeezing of profit margins occurred. Since most price equations are based on some measure of "normal" or trend productivity, knowledge of the path of the aggregate price-wage ratio does not provide information about the distribution of income between profits and wages until actual labor productivity has been specified. The extent to which cyclical fluctuations in productivity are incorporated into price changes is a matter of great uncertainty. William Nordhaus indicates that labor productivity change—and thus profits—is critically affected by the distribution of output among industries.[26] In addition, he attributes the decline of corporate profit margins to events that took place before the introduction of price controls. Finally, our own results indicate that much of the restraint on prices was in sectors such as medical care services, where restraint did not have direct implications for the return on capital.

We are reluctant to conclude that a profit squeeze was a major result of the controls. While the statistical results give some evidence for such a view, they are not unambiguous. In addition, the loose administration of the price controls makes it difficult for us to believe that they could have resulted in significant price restraint in the industrial sector.

SOME IMPLICATIONS AND CONCLUSIONS

In general, the interpretation of the control program presented in the previous sections is more favorable than that held by most economists or the general public. Much of the prevalent disillusionment is the result of the 1973 experience, when the rate of price increase exploded despite the existence of controls. However, we feel the events of 1973 illustrate the changing nature of the U.S. inflation problem and not the inevitable collapse of wage and price controls. Widespread crop failures led to a major world food shortage, and a coincident rapid economic expansion in the major industrial countries raised the demand for raw materials at a rate that suppliers could not satisfy in the short run. These two problems were made worse by a second U.S. devaluation and the conversion to flexible exchange rates—events that temporarily increased speculative pressures in the commodity markets. Finally, the oil embargo and the steep price increases that followed sharply intensified inflationary pressures. Not one of these developments was in any way caused by wage and price controls nor were they the types of inflation problems for which controls were a potential cure.[27] Thus, 1973 and 1974 would have been years of accelerating price inflation with or without controls. The rigid application of controls in these circumstances could only have resulted in rationing, black markets, and other distortions. American industrial workers lost substantial real income to farmers and the oil-producing countries, but controls could not be the means for restoring this loss.

The experience of recent years clearly indicates the need to distinguish different types of inflationary processes if we are to select appropriate anti-inflationary policy responses. The classical situation of excessive aggregate demand is but one type of inflation. The 1966–1969 period is one in which demand pressures seem to have been a primary cause of price and wage increases. In such situations, the traditional remedies of demand restraint may be appropriate.

However, the argument for demand restraint is more difficult to make in reference to the situation in 1970 and 1971. Even if this period reflects only a lagged response of prices and wages to prior episodes of excess demand, the long lags imply that restrictive stabilization policies can become very costly in terms of unemployment and lost output. Since most markets had substantial amounts of excess capacity, other factors must have played a role. In the labor market, the Phillips curve was too simple an explanation of wage behavior. In part, the continuation of high rates of wage in-

creases seems to have been related to attempts to catch up for past changes in relative wages or to expectations of continued price inflation.[28] Such a situation may provide justification for controls if they are directed toward stabilizing the relative wage and price structure with less overall inflation. But it is still only a temporary need.

Finally, the situation of 1973 is characteristic of an inflation that is related to supply disruptions in a few basic industries—particularly in food and fuel. Controls cannot effectively deal with real supply shortages; moreover, the application of general restraint can be very expensive unless the demand for such commodities has a very high income elasticity. In the long run, the aggregate impact of these disruptions can be reduced by the holding of adequate reserve stocks. If these stocks do not exist the options for policy are severely limited.

Any conclusion regarding the impact of controls on wages is dependent upon one's interpretation of wage behavior prior to the imposition of controls. If the unexpectedly high level of wage settlements in 1970–1971 represented a permanent shift of behavior, the controls had a substantial restrictive effect. On the other hand, if that was only a temporary development, the controls were not very important.[29] In the case of contract construction, however, the size of the deceleration makes it difficult to disregard the role of the Construction Industry Stabilization Committee.

Second, the focus of the pay controls on new negotiated wage settlements is important in any attempt to measure their impact. The implications for actual wage payments were not immediate and extended beyond the period of controls. Deferred increases, which were a large part of actual wage changes in 1972, were allowed to go through with only minor modifications. Substantial emphasis was placed on eliminating distortions in the relative wage structure even if it meant that some settlements exceeded the general guideline.

The general pay standard was frequently criticized on the basis that it failed to reflect the complexities of relative wages and other factors that are involved in actual wage settlements. In addition, it was alleged that such a standard would serve as a floor rather than a ceiling for wage increases.

Such criticisms of a rigid adherence to a single number may be valid, but this was not the nature of the general standard applied during Phase II. There was recognition of other factors in several exceptions to the 5.5 percent guideline. Examples of this were the catch-up provisions, exemptions for productivity bargaining, and

the exclusion of low-wage workers. Furthermore, there is little evidence in the data of the previous sections that the standard did become a floor for wage settlements. Since the United States does not have a labor market dominated by large national unions, some general guide to reasonable wage increases was useful for the smaller union settlements and those in the nonunion area. A pay board cannot be expected to play an active role in every wage negotiation.

On the price side there is some evidence that controls retarded increases by more than would have been expected from a simple pass-through of costs. The most significant slowdown of the inflation was in services—particularly medical care. In the food sector and in retail trade, the behavior of prices appears to have corresponded closely to what would have been anticipated in the absence of controls.

The experience with controls did make evident the major technical problems of administering price regulations. The allocation of resources is more sensitive to changes in relative prices than in relative wages, and problems of shortages can quickly develop. The total cost pass-through provisions were very difficult to enforce because their implementation involved the regulators in the internal cost accounting practices of individual firms. The regulations could also be criticized for using total costs instead of direct or marginal costs. The allocation of overhead costs among individual products involved the greatest technical problems, and fluctuations in sales volume had perverse effects on allowable price changes. It is of interest to note that the greatest impact of the controls appears to have been in the service sector, where direct limitations on market prices were used instead of allowable costs. In contrast, one study concluded that there was no correlation between industrial price increases as reported in the WPI during Phase II and approvals of the Price Commission.[30]

In conclusion, it should be kept in mind that the control program was not one of severe wage and price restraint intended to achieve an immediate end to the inflation. Instead, it was a modest effort with modest results. The focus was on a gradual reduction of the inflation rate. Some initial progress was made. In addition, a major benefit was the justification provided for the redirection of fiscal and monetary policy toward the goal of increasing the level of resource utilization. Subsequent developments—which, however, seem to have been largely independent of the existence of controls—eliminated most of the progress toward lower inflation and unemployment.

APPENDIX A. WAGE EQUATION VARIABLES

The econometric wage equations used four different dependent variables, each measured in quarterly percent changes. They were (a) a fixed weight index of straight-time hourly earnings for the private nonfarm economy; (b) a fixed weight index of straight-time hourly earnings in manufacturing; (c) median negotiated increases in manufacturing; and (d) median negotiated increases in nonmanufacturing exclusive of the construction industry. The two series on average hourly earnings are published by the Bureau of Labor Statistics and are adjusted for interindustry employment shifts and for overtime in manufacturing.

The two series on negotiated settlements are based on quarterly data published by the Bureau of National Affairs (BNA). Lester[31] has described these data in some detail. They are the only quarterly settlement data available for a reasonably long time period. Quarterly median increases, in cents per hour, go back to 1956I for manufacturing and to 1958I for nonmanufacturing exclusive of construction. For multiyear contracts BNA includes just the first-year increase in that quarter's median. These BNA series are closely akin to BLS data on "first-year changes in contracts negotiated during year," which appear in *Current Wage Developments*. BNA median increases were divided by average straight-time hourly earnings of the previous quarter to convert the former to percent changes. The average hourly earnings series for manufacturing is regularly published. An index for nonmanufacturing (1967 = 100) was derived by subtracting the manufacturing index times its weight (0.3384) in the overall index, from the overall private nonfarm index of straight-time earnings. The resulting series was divided by 0.6616 (to index it at 100 for 1967) and then multiplied by 0.0268 (average hourly earnings in the private nonfarm economy in 1967) to convert to a cents-per-hour basis. The median percent change in nonmanufacturing negotiated settlements was then estimated as the ratio of the median negotiated increase for nonmanufacturing to this average hourly earnings series lagged one quarter. Both series of negotiated wage increases are available upon request.

Except for the wage-price guidepost dummy (G), the independent variables used in the Table 4 regressions are based directly on data regularly published by BLS; the dummy equals 1 from 1962II to 1966II and zero in all other quarters. George Perry and Robert J. Gordon kindly supplied us with unemployment and tax-rate data, which were used in initial equation specifications.

APPENDIX B. PRICE EQUATIONS

The price equations used to investigate the impact of the controls are a modification of those published in Popkin, "Consumer and Wholesale Price Increases" (see note 22, below). All the data are seasonally adjusted quarterly percent changes for the period 1956–1970. All price indexes are from the Bureau of Labor Statistics, and all wage rates are fixed weight indexes adjusted to include fringe benefits. Several capacity utilization measures were tried, with the McGraw-Hill index showing the greatest significance. A time trend was used to approximate normal productivity growth, except where some cyclical correction was significant. Highly insignificant coefficients were deleted from the regressions, and the lag structures are the result of experimentation. In contrast to other published equations in which the Almon polynomial lag estimation technique was used, longer lags were not found to be significant.

Retail Prices (Consumer Price Index)

Durables Excluding Used Cars and Home Purchase

$$DCPID = \underset{(6.3)}{0.59}\, DWPICD + \underset{(1.5)}{0.16}\, DWPICD_{-1} + \underset{(2.7)}{0.20}\, DWRT_{-1}$$
$$+ \underset{(2.9)}{0.22}\, DWRT_{-2} - \underset{(4.6)}{1.17}\, DMY6503 - \underset{(3.8)}{0.43}$$

$R^2 = 0.78$; $SE = 0.25$; $DW = 1.9$

The percent change in consumer durable goods prices (*DCPID*) is related to current and lagged changes in wholesale prices of consumer durables (*DWPICD*); wage-rate changes in wholesale and retail trade (*DWRT*), lagged one and two periods; and dummy variables for the 1965 excise-tax reduction (*DMY*6503).

Nondurables Excluding Food and Fuel

Food prices are treated separately elsewhere, and fuel prices are excluded because of the difficulty of getting accurate historical price quotations.

$$DCPINDEFF = \underset{(4.6)}{0.48}\, DWPINDEFF + \underset{(2.1)}{0.22}\, DWPINDEFF_{-1}$$
$$+ \underset{(2.7)}{0.18}\, DWRT_{-2} - \underset{(3.1)}{10.77}\, RU_{-1} + \underset{(2.6)}{0.61}$$

$R^2 = 0.83$; $SE = 0.18$; $DW = 1.8$

The percent change in consumer nondurable prices (*DCPINDEFF*) is related to current and lagged changes in wholesale prices of consumer nondurables (*DWPINDEFF*), wage rate changes in the trade sector (*DWRT*), and the lagged unemployment rate (*RU*).

Services Excluding Rent

$$DCPISER = \underset{(2.9)}{0.41}\, DWRPNF + \underset{(2.3)}{0.33}\, DWRPNF_{-1} + \underset{(4.5)}{0.11}\, DCPIMIR$$
$$- \underset{(2.1)}{9.18}\, RU_{-1} - \underset{(4.2)}{0.34}\, DCS58 - \underset{(2.7)}{0.23}\, DCS58_{-1} + \underset{(3.1)}{1.20}$$

$R^2 = 0.85$; $SE = 0.23$; $DW = 1.6$

Changes in prices of consumer services (*DCPISER*) are related to current and lagged wage changes in the private sector wage index (*DWRPNF*), changes in mortgage interest rates (*DCPIMIR*), the lagged unemployment rate (*RU*), and current and lagged changes in the real output of the services sector (*DCS58*).

Wholesale Prices

Consumer Nondurables Excluding Food and Fuel

$$DWPINDEFF = \underset{(2.0)}{0.05}\, DWPICMEFF + \underset{(2.0)}{0.05}\, DWPICMEFF_{-1}$$
$$+ \underset{(3.5)}{0.16}\, DWRM + \underset{(4.3)}{0.19}\, DWRM_{-1} + \underset{(2.5)}{0.12}\, DWRM_{-2} + \underset{(3.2)}{0.03}\, KUM_{-2} - \underset{(3.5)}{2.41}$$

$R^2 = 0.53$; $SE = 0.25$; $DW = 1.3$

Changes in finished goods prices (*DWPINDEFF*) are related to current and lagged changes in prices of raw materials (*DWPICMEFF*), changes in wage rates (*DWRM*) over three quarters, and capacity utilization (*KUM*).

Consumer Durable Goods

$$DWPICD = \underset{(1.8)}{0.04}\, DWPICMEFF + \underset{(1.8)}{0.10}\, DWRM + \underset{(4.9)}{0.27}\, DWRM_{-1}$$
$$+ \underset{(4.2)}{0.25}\, DWRM_{-2} - \underset{(2.5)}{0.17}\, D4PROD_{-2} - \underset{(2.5)}{0.38}$$

$R^2 = 0.53$; $SE = 0.31$; $DW = 1.6$

Changes in prices of consumer finished goods (*DWPICD*) are related to changes in prices of raw materials, changes in wages rates over three quarters, and a four-quarter change in labor productivity (*D4PROD*).

Producer Finished Goods

$$DWPIPFG = \underset{(2.0)}{0.05}\, DWPICMEFF + \underset{(2.7)}{0.14}\, DWRM + \underset{(5.7)}{0.29}\, DWRM_{-1} + \underset{(4.0)}{0.20}\, DWRM_{-2} + \underset{(4.6)}{0.04}\, KUM - \underset{(2.9)}{0.18}\, D4PROD_{-2} - \underset{(4.8)}{3.67}$$

$R^2 = 0.66$; $SE = 0.29$; $DW = 1.4$

Changes in prices of capital goods (*DWPIPFG*) are related to changes in costs of raw materials, changes in wage rates over three quarters, capacity utilization, and a four-quarter percent change in labor productivity.

NOTES

1. See Barry Bosworth, "Phase II: The U.S. Experiment with an Incomes Policy," *Brookings Papers on Economic Activity* 2(1972): 343–383.
2. The observation for 1970IV was replaced by the simple average of 1970III and 1971I, all seasonally adjusted.
3. Four of the major articles are Milton Friedman, "The Role of Monetary Policy," *American Economic Review*, March 1968, pp. 1–17; Robert J. Gordon, "Wage-Price Controls and the Shifting Phillips Curve," *Brookings Papers on Economic Activity* 2(1972): 385–430; George L. Perry, "Changing Labor Markets and Inflation," *Brookings Papers on Economic Activity* 3(1970): 411–441; Edmond Phelps et al., *The Microeconomic Foundations of Employment and Inflation Theory* (New York: Norton, 1970).
4. During 1968–1970, first-year negotiated changes were consistently higher than either life-of-contract changes or effective wage adjustments.
5. A part of the explanation for the rapid compensation and productivity increases of this period is the auto strike of 1970IV. Using the averaging procedure described earlier, the compensation gain was reduced to 7.4 percent and the productivity gain to 4.6 percent. With these alternative measurements, unit labor costs increased by 2.7 percent in the first half of 1971. This rate of increase is still less than half the rate for 1969 and 1970.
6. A detailed review of the freeze period and the problems that were encountered is presented in Arnold Weber, *In Pursuit of Price Stability, Wage-Price Freeze of 1971* (Washington, D.C.: Brookings, 1973).
7. See, for example, the Quarterly Reports of the Economic Stabilization Program, published by the Cost of Living Council.

8. *Survey of Current Business*, July 1974, p. 6.
9. Robert J. Gordon summarized much of this literature in a series of recent papers. He has also made a detailed comparison of his specification with those of others: Robert J. Gordon, "Inflation in Recession and Recovery," *Brookings Papers on Economic Activity* 1(1971): 105–158; and "Wage-Price Controls," cited earlier.
10. Among the set of independent variables tested and rejected for making too marginal a contribution to explained variance were Perry's weighted unemployment rate, his measure of unemployment dispersion, the federal personal income tax rate as used by Gordon, and the tax rate for employer contributions for social insurance.
11. For example, three data periods examined were 1956I–1969IV, 1956I–1971II, and 1958I–1971II. The three pairs of unemployment and price coefficients in the nonfarm hourly earnings equation for these time periods were, respectively, −0.14 and 0.33, −0.11 and 0.48, and −0.08 and 0.64. Thus, an alteration of fourteen quarters from the original data period causes the unemployment coefficient to decline by about half, while the price coefficient roughly doubles.
12. Dan Mitchell, "Phase II Wage Controls," *Industrial and Labor Relations Review*, April 1974, pp. 351–375.
13. See George Perry, "The Success of Anti-Inflation Policies in the United States," in *Conference on Secular Inflation*, Universities–National Bureau Conference 25 (*Journal of Money, Banking, and Credit*, Supplement, February 1973), Table 5. Mitchell's residuals are in his "Phase II Wage Controls," Table 9.
14. These estimates are based on averages of the residuals for the second half of 1970 and first half of 1971 compared to 1972–1973 in Table 5. They are not sensitive to the inclusion of the guidepost dummy and would be increased by eliminating the postfreeze bulge of early 1972.
15. The timing of major reductions with the second quarter is consistent with the industry pattern of initiating annual contract discussions in the spring months.
16. Data from 1973, for example, are published in the June 1974 issue of *Current Wage Developments*.
17. A similar result is obtained if changes in total compensation are examined, rather than just wages, as in Table 7. For first-year settlements of firms employing 5,000 or more workers, the proportions of workers whose total compensation increased by less than 5 percent in the first year were 2 percent in 1970, zero in 1971, 7 percent in 1972, and 6 percent in 1973. These levels are all lower than those shown in Table 7, but the trends are the same, i.e., there were more settlements in this range in 1972 and 1973 than in 1970 and 1971.
18. Because comparatively little bargaining took place in 1972, some reduction in the overall mean between 1971 and 1972 was to be expected. In 1972, the mean of the first-year adjustments was 7.3 percent (panel A). If the mean had remained at its 1971 level of 11.6 percent, the 1972 first-year adjustment in panel D would have contributed 2.7 percent rather than 1.7 percent, and the 1972 mean adjustment would have been 7.6 percent rather than 6.6 percent.
19. Dan Mitchell and Arnold Weber, "Wages and the Pay Board," *American Economic Review*, May 1974, p. 89.
20. *Current Wage Developments*, June 1974, p. 43. Mitchell cites evidence of shorter contracts in his recent paper ("Phase II Wage Controls," p. 373). Dramatic increases in one-year contracts as a percent of all new contracts were

observed in construction in 1971. Outside of construction, however, the increased incidence of one-year contracts was much less pronounced, rising from 6 percent to 15 percent of all new contracts between 1971 and 1972.

21. *Current Wage Developments*, August 1974, p. 35.
22. Joel Popkin, "Consumer and Wholesale Prices in a Model of Price Behavior by Stage of Processing," Research Discussion Paper 13, mimeographed (Bureau of Labor Statistics, 1973).
23. These regulations were altered with the introduction of Phase IV to allow a higher ceiling on price increases, to distinguish inpatient from outpatient services, and to shift the emphasis toward cost per hospital stay rather than individual-service prices.
24. A detailed examination of the 1973 developments in world grain prices can be found in Dale Hathaway, "Food Prices and Inflation," *Brookings Papers on Economic Activity* 1(1974): 63–116.
25. Robert J. Gordon, "The Response of Wages and Prices to the First Two Years of Controls," *Brookings Papers on Economic Activity* 3(1973): 765–781.
26. William Nordhaus, "The Falling Share of Profits," *Brookings Papers on Economic Activity* 1(1974): 169–218.
27. The events of 1973 as they relate to an acceleration of inflation have been previously discussed by one of the authors and will not be extensively reviewed here. See B. Bosworth, "The Inflation Problem During Phase III," *American Economic Review*, May 1973, pp. 93–99. In addition, see William Nordhaus and John Shoven, "Inflation 1973: The Year of Infamy," *Challenge*, May-June 1974, pp. 14–22.
28. An attempt to relate inflation to distortions in the wage structure is illustrated in Arnold Parker and Seong Park, "Distortions in Relative Wages and Shifts in the Phillips Curve," *Review of Economics and Statistics*, February 1973, pp. 16–22.
29. These alternative interpretations are evident in Table 5. During controls the residuals are not generally negative. Instead, they decline toward zero from the large positive residual of the period prior to the controls.
30. H. Boissenian et al., "The Effectiveness of Phase II Price Controls," mimeographed (Santa Monica: Rand Corporation, 1973).
31. Richard Lester, "Negotiated Wage Increases, 1951–1967," *Review of Economics and Statistics*, May 1968, pp. 173–181.

COMMENTS

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The Bosworth-Vroman appraisal of the wage-price control program is disturbingly reminiscent of the play *Six Characters in Search of an Author.* The authors present a myriad of scintillating facts, figures, and questions, all in search of a coherent intellectual framework. As the curtain falls on Pirandello's play, the audience is left struggling to distinguish illusion from reality. Similarly, at the conclusion of the Bosworth-Vroman paper, the issues addressed remain as provocative and essentially unresolved as they were at the beginning. After reading the paper, I was left with a sense of frustration and uncertainty, reflecting not simply the complexity of the issues involved but also the flabbiness of the state of the art and the particular weaknesses inherent in the approach followed by the authors.

The paper begins with a factual description of wage and price behavior from 1960 through the middle of 1971. In the section entitled "Prelude to Controls," the authors raise the question of whether the precontrol inflation was coming to an end as a result of the restrictive stabilization policies embodied in the original "game plan." This issue is seen as "crucial to any judgment about the effect of the controls." The authors conclude that "the inflation rate . . . did not decelerate, and most economic forecasts made during the 1969–1971 period consistently underpredicted the magnitude of actual wage and price increases."

What evidence is brought to bear to sustain the claim that inflation was not decelerating during this period? The gross evidence is as follows:

The rate of increase in the CPI during the first eight months of 1971 fell to 3.8 percent, compared to an average of 5.9 percent in 1970.

The private nonfarm deflator showed a decline from 5 percent to 3.9 percent.

The WPI showed an increase from 3.7 percent to 4.6 percent.

Aggregate wage indexes showed a continuation of wage increases at approximately 1970 rates, while negotiated settlements exhibited modest deceleration.

The authors discount the deceleration in the CPI by claiming that half of the decline is accounted for by the reversal in mortgage interest rates; they minimize the decline in the private nonfarm deflator by citing the smaller decline registered by the fixed weight deflator; and they place an unwholesome weight on the problematic WPI by concluding that "evidence of a quick end to inflation is limited to consumer finished good prices, with some indication from intermediate materials prices that even this slowdown was transitory." Unfortunately, we are not told what specific type of evidence would have persuaded them that inflation was indeed decelerating during this period. This section would have been considerably stronger had it included an analysis of the peculiarities of the construction and weighting patterns of the different inflation indexes along with some conceptual guidance for selecting an "appropriate" measure of inflation. The conceptual issue is particularly acute given the vexing divergences among various measures of inflation.

The next section contains a cursory overview of the controls program, outlining its organization and administration and ending with a recounting of actual price and wage changes during the period of controls. The authors describe the observed dampening in inflation rates during phases I and II and the abrupt acceleration in inflation during 1973 when the CPI rose at a rate of 8.8 percent and the WPI at 15.5 percent.

The main section of the paper, "Econometric Results," is begun with the observation that "a simple comparison of prices and wage increases before and during the period of controls does not provide a very satisfactory basis for evaluating the effects of controls." Nevertheless, in the very next sentence the authors assert that "only in a few situations is the magnitude of change in the pattern of inflation sufficient for us to conclude that the change was a result of controls." Nowhere do we find the basis for such an inference. How large would the observed deceleration in a price index have to be in order to warrant the inference that the controls caused the deceleration?

As an alternative to simply looking at the behavior of observed prices, the authors consider the use of econometric models to generate counterfactual forecasts of the predicted behavior of prices and wages in the absence of controls. This approach, too, is viewed as unsatisfactory because "the precontrol period is not well explained by existing statistical equations." Moreover, "some of the disturbances during the period of controls, such as devaluation and changes in international commodity markets, are difficult to in-

corporate into existing price equations, which emphasize domestic factors."

Despite their own realistic reservations, Bosworth and Vroman go on boldly to elect a very simple specification of a wage equation to use for generating counterfactual forecasts. They specifically reject a number of the refinements in the wage equation introduced by R. J. Gordon and assert that alternative specifications would not have affected their analysis of the controls. They do not detail the nature of any of the tests performed on alternative specifications and thus the paper offers no real insight into the sensitivity of wage predictions from alternatively specified equations.

The authors depict the percent change in money wages as depending on the unemployment rate, an arbitrarily weighted average of past-quarter changes in the CPI and a wage-price guidepost dummy to give uniform weighting to the 1962–1966 guidepost period. These regressions are estimated by ordinary least squares, and the results are highly suspect. Several of the equations indicate very substantial problems of serial correlation, thus calling into question the adequacy of the specification and the usefulness of conventional tests of significance. The authors mention this problem, but I suspect that they underestimate its importance. Recent simulation results by Granger and Newbold suggest that standard errors might be underestimated by a factor of five, thus raising considerable doubts about the adequacy of the equations presented. The authors also note that their estimated parameters are highly sensitive to the time period selected for fitting the model. The deletion of two earlier years of observations from the data set and the addition of one and a half later years causes a 50 percent reduction in the unemployment coefficient and a doubling of the price coefficient. On the basis of this evidence, I would strongly suspect that if the data set had been more appropriately divided into two subperiods reflecting the years before and after the more rapid inflation of the sixties, the equations would exhibit even greater instability. Furthermore, the confidence ellipsoids on the parameters would be so large that acceptability of the model would be doubtful as a useful counterfactual generator for an assessment of the control period.

The observed parametric instability indicates that the coefficient on past prices seems to rise as actual inflationary experience increases. This finding is probably an echo of the observation made by R. J. Gordon which prompted him to experiment with a variable response coefficient that itself depended upon the severity of the expected rate of inflation. Oi's Tests of the stability of the Gordon

wage equation also indicated radical changes in the coefficients between the subperiods 1954–1961 and 1962–1970. It is certainly likely that as expected inflation accelerates, more and more wage contracts will include escalator clauses. Bosworth and Vroman do not, however, pursue this line of inquiry and retain, instead, a simple fixed coefficient model.

The model specifications presented are disconcerting in other regards as well. Nowhere in their paper can I find even a passing suggestion that monetary and fiscal policies might also have some effects on the course of the inflationary process. Neither monetary nor fiscal variables appear in any of the econometric specifications. Given these various problems, it is perhaps not so surprising that the equations grossly underpredict the actual rates of wage inflation in the period immediately preceding the controls.

The authors seem to take some comfort in the finding of a similar pattern of underestimation in models estimated by Perry and Mitchell. Such underestimation raises the question of whether these large residuals reflect a fundamental change in an otherwise stable structure of wage formation or simply an inadequate representation of the historical process generating wages. Since the reported wage equations show little stability over time, I am hard pressed to accept an ad hoc rationalization of this apparent empirical anomaly. While it is true that underprediction of this kind has been reported for the same period in several studies, the latter should not be regarded as each contributing independent evidence of the phenomenon, since they are all based on models that are essentially similar and are estimated from essentially the same body of data.

The predictions used to assess the impact of controls are based on simulations of the simple wage equations, using actual values of the right-hand-side variables, which include lagged prices. To the extent that controls had any effect on holding down prices—for example, during the Phase I freeze—such an effect will be included erroneously in the predicted rate of change in wages for subsequent periods and thereby contaminate the counterfactual forecast with the effects of controls. In general, Bosworth and Vroman find that actual wage increases are substantially above predicted wage increases both before and after the control period. To illustrate, the equations for union-negotiated increases in manufacturing underpredict the actual increase by 3 percent for the second half of 1971 (annual rate) and underpredict the nonmanufacturing increase by a whopping 5.9 percent. The manufacturing equation cited has a reported Durbin–Watson statistic of 0.60 and should probably have

been discarded on that basis alone. The large positive residuals only turn negative and greater than 1 percent in the second half of 1973, and this reversal appears due to the burst in prices in the first part of 1973.

Bosworth and Vroman note that the control program focused on settlements and thus "equations based on hourly earnings data may understate the long-run impact of the [control] program." This effect suggests to them that "the full impact of controls on hourly earnings would extend beyond the initial periods with a cumulative effect." This suggestion provides an interesting justification for using data including the 1973 price explosions for assessing the control program. However, upon examining the settlement data, the authors find that the deceleration there is not reflected in average hourly earnings, which in fact rise sharply during the third and fourth quarters of 1973.

In examining the construction industry, the authors simply focus on a tabular presentation of the wage data because "regression analysis of construction industry wages changes has not been very successful." However, if an equation capable of forecasting the behavior of construction wages in the absence of controls cannot be found, it is hard to see what basis of inference can be used to assess the control period.

The next section, "Controls and Negotiated Wage Settlements," again stresses the greater impact of wage controls on negotiated settlements rather than hourly earnings and relies on tabular rather than econometric evidence. Data are presented on the average size of contract settlements and their relative dispersion with the conclusion that "both . . . were sharply reduced during the period of wage controls." The authors assert that "the abruptness of this change creates a strong presumption that the controls were a significant causal factor."

The section dealing with the "Impact of Prices" is motivated by a fascinating issue. The authors note that since control regulations varied among major sectors of the economy, it is possible to evaluate the impacts of different types of control by a study of the separate sectors.

In order to estimate the effects of controls in the separate sectors, the authors utilize a variant of Popkin's stage-of-process framework. Prices in particular sectors are specified to depend upon current and lagged values of wholesale prices, current and lagged wages, an assortment of dummy variables, capacity utilization rates, unemployment rates, and labor productivity measures. No attempt is made to give a theoretical justification for any of the specific equa-

tions estimated, and we are simply informed that "highly insignificant coefficients were deleted from the regressions, and the lag structures are the result of experimentation." While such candor about empirical experimentation is refreshing and commendable, the experimentation itself does not inspire much confidence in the inferences derived from equations so selected. The equations are estimated from data covering the period 1956–1970, yet no attempt is made to test the structural stability assumption in spite of the aforementioned instability reported for the aggregate price equations. Once again, counterfactual predictions are generated by using actual values of variables the authorities were trying to regulate, leading to a potential underestimation of the control effect. The authors acknowledge this problem of understatement, but make no attempt to use predicted rather than actual values of those variables, nor do they make any effort to assess the magnitude of the effect.

A recurring feature of these sections is the resort to ad hoc interpretation. While one cannot help but admire the wealth of institutional materials which the authors interweave with their econometric residuals, the collage of assorted findings is unnervingly capricious. A −2.5 percent residual for durables is dismissed as being "almost wholly due to the automobile excise tax cut." Erratic residuals in the manufacturing price series, ranging from −2.1 percent to +3.6 percent, are explained as being "caused by changes in the timing of automobile price increases. . . . Thus, the inclusion of the price increases of early 1974 would substantially reduce the estimated effect of controls. Alternatively, exclusion of the last half of 1973 results in average values of the residuals very close to zero." On the other hand, residuals of −1.9 percent and −2.8 percent for nondurables are regarded as "more consistent in indicating a restraining influence of the controls."

This type of "now you see it, now you don't" empiricism ultimately leads the authors to conclude that "in general, the results . . . imply a smaller direct impact of controls on prices than would be inferred from a simple examination of the price indexes," and that "disaggregation indicated the importance of special factors such as removal of the automobile excise tax, the adoption of no-fault insurance, and the delay of automobile price increases." I find little basis for such inferences in the detailed empirical work presented in the paper. Too many of the authors' rich institutional insights are squandered in attempting to explain residuals from econometric equations in which the authors justifiably have little confidence. Moreover, it is disappointing to discover how little can be inferred

about the efficacy of different types of control regulations from their analysis.

On the question of whether the shift to Phase III was responsible for an acceleration of inflation, the authors first argue that the acceleration was "more than accounted for by a sharp rise of raw materials costs, the impact on labor costs of the increase in social insurance taxes, and the delayed implementation of the automobile price increases." We then learn that "this may be too simple a basis on which to conclude that the shift was not important." Finally, we are assured that "given the size of later increases in food prices, raw materials shortages, and the second devaluation, the shift to Phase III was not a major factor in the 1973 price inflation."

In summarizing their findings, the authors claim that their estimated impact of controls on prices is "somewhat smaller than that implied by previous studies." These differences are attributed to differences in both the underlying equations and the data base. A careful study by Kraft and Roberts makes possible an examination of the consequences of different model specifications on the estimates of the effect of controls for a given body of data. However, to date, no one has carefully examined the implications of using different definitions of inflation.

Bosworth and Vroman conclude that their estimate of price restraint "was smaller than implied by other studies," and they are doubtful that a "significant squeezing of profit margins occurred." Given their broad results indicating that controls had virtually no effect, it seems odd that they should begin their final section with the summary statement, "the interpretation of the control program presented in the previous sections is more favorable than that held by most economists or the general public." They then proceed to enumerate the various "causes" of the 1973 inflation including, of course, the oil embargo, devaluation, food shortages, expansion in the industrialized countries, and speculative pressures in the commodity markets. Their favorable impression of the control program is apparently justified by the remark that "not one of these developments was in any way caused by wage and price controls nor were they the types of inflation problems for which controls were a potential cure." If the most favorable observations that can be made about controls are that (a) they did not work to reduce inflation and (b) that they did not cause the oil embargo, the devaluation, the food shortages, etc., then perhaps the time has come to bury controls once and for all. Instead, Bosworth and Vroman gently conclude that the control program was "a modest effort with modest results" and that "a major benefit was the justification provided for

the redirection of fiscal and monetary policy toward the goal of increasing the level of resource utilization." Is it not at least conceivable that some of that redirected monetary and fiscal policy has contributed to the exacerbation of our inflationary problems?