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This article examines the justifications for plant-closing laws, analyzing whether the objectives for plant-closing laws can be achieved. Authors Daniel A. Littman and Myung-Hoon Lee find that dislocated workers as a group do not suffer hardships any more severe than do the long-term unemployed. The article concludes that plant closings are a relatively small source of national unemployment and that plant-closing laws would not necessarily inhibit closings. The article further finds that such laws unintentionally create incentives to reduce the size of the work force in affected plants, especially among high-seniority workers.

Under the provisions of the Service Contract Act, Federal Reserve Banks must ensure that hired service contractors pay their employees according to wage scales set by the U.S. Department of Labor. Since Federal Reserve Banks also must charge for the services provided to depository institutions at prices reflecting the full costs of those services, the Service Contract Act affects the role of the Federal Reserve System in the payments mechanism. Author Mark S. Sniderman explains how the Service Contract Act increases Federal Reserve expenses and discusses the implications for priced transportation services.

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1. Although several closing-related proposals have been introduced to congressional committees in recent years, as yet the federal government has not implemented policies to address the plant-closing problem.

Plant Closings and Worker Dislocation

by Daniel A. Littman and Myung-Hoon Lee

In any dynamic economy, capital investments must be retired at the end of their useful lives and replaced by more productive investments. The industrial structure and its geographic distribution respond to a variety of powerful economic forces, including changes in prices, consumer preferences, production technologies, and international trade competition. The opening of new plants and closing of obsolete plants are part of this vital process. An economy is efficient when productive resources are allowed to move freely in response to this ever-changing environment. It follows that some magnitude of capital turnover, reflected in part by plant openings and closings, may signify economic health, as it assists growth and competitiveness (see Schumpeter 1950). Permitting a relatively uninhibited flow of capital among firms, industries, and geographic locations therefore may lead to net economic benefits for society.

Plant closings also can impose tremendous adjustment costs on particular economic actors—laid-off workers (hereafter, *dislocated workers*) and their families, local governments, and local businesses linked to the closing plants. Plant closings are attracting increased media and public attention because of the problems that such closings cause or symbolize—socioeconomic hardships for dislocated workers, increased unemployment, decay of the local employment base, and fiscal distress. Public officials have begun to consider policy options to strengthen the social safety net and to moderate the pace of plant closings. Proposals include incentives for employee ownership of marginal plants (employee stock ownership plans, or ESOPs), expanded use of industrial investment and employment/wage incentives, and increased occupational training and income maintenance assistance. One popular and comprehensive policy option considered by state and local governments is plant-closing laws, which are examined in this article.[1] Since 1975, five states (California, Maine, New Jersey, Rhode Island, and Wisconsin) and at least three municipalities (Philadelphia, Pittsburgh, and Vacaville, CA) have enacted plant-closing laws. During their 1981 and

1982 sessions, 21 state legislatures considered almost 60 proposals to alleviate the problems surrounding plant closings. State legislatures have found it difficult to weigh the merits of policy alternatives. Certainly one reason for this difficulty is that the existing literature does not embrace thorough economic analyses of the plant-closing problem.

In section I of this article, we review the characteristics of existing and proposed plant-closing laws. We also outline the major justifications for plant-closing laws, such as reducing unemployment, reducing hardships for dislocated workers, and alleviating fiscal distress of local governments. In section II we review the evidence on dislocated worker hardship and compare these hardships with the problems experienced by other unemployed workers. We conclude that dislocated workers as a group cannot be distinguished from other unemployed workers on the basis of the severity of their problems. In section III we examine whether, and to what extent, plant closings cause unemployment. Although plant closings are associated with the shrinking of local labor markets, such closings appear to be only a relatively small source of national unemployment. In section IV we analyze whether statutory provisions that inhibit plant closings would effectively reduce unemployment and the probability of fiscal distress. The analysis shows that plant-closing laws would not necessarily delay or otherwise inhibit closings. In section V we examine the effects of plant-closing laws on resource allocation, finding that the laws may unintentionally create incentives to reduce the size of the work force in affected plants, especially among high-seniority workers.

I. Plant Closing Laws

Existing and proposed plant-closing laws are rather diverse with respect to comprehensiveness, coverage tests, and statutory obligations placed on public authorities and affected firms (see table 1). The proposed laws are more comprehensive and more ambitious than existing statutes, in part because these laws have yet to run the gauntlet of legislative scrutiny. In Wisconsin, for example, firms that wish to close facilities employing more than a specified minimum number of workers must give employees and public officials at least a 60-day prior notice of such action. Maine's plant-closing law requires a 60-day prior notice of closing and severance

Table 1 Typical Provisions of Plant-Closing Laws

Provisions of existing and proposed plant-closing laws are listed in order of descending frequency. The number of states having proposed or existing laws with such provisions is listed in the right column.

Provision	Number of plant-closing laws with provision
Prior notice of closing	20
Firm-paid severance benefits	14
"Good-faith" sale efforts, incentives for employee ownership and firm reimbursements for employee retraining	11
Continuation of health-insurance coverage for specified period after termination	10
Effects bargaining, or requirement for employer to discuss effects of plant-closing with workers	10
Employer payments to state of specified proportion of annual wage bill	9
Firm reimbursement for employee relocation expenses	8
Paid leave time for workers prior to shutdown	7
Preferential transfer rights for affected workers	6
Decision bargaining, or requirement for employer to discuss decision to close with workers	2

pay to laid-off workers equivalent to their average weekly pay multiplied by their years of service. In marked contrast, the proposed plant-closing law in Hawaii would require employers to give a three-year prior notice of closing. Ohio's proposed law would require a one-year prior notice and severance pay, along with a variety of other obligations for public authorities and the firm that is planning to close a plant (see table 2).

Advocates of plant-closing laws justify such labor-market intervention on the grounds of reducing hardships for dislocated workers, reducing flows into national and local unemployment, and insulating local governments from fiscal distress that a plant closing could cause. Advocates of plant-closing laws recognize that plant closings impose severe socioeconomic hardships on dislocated workers and attempt to alleviate

these hardships. It is argued that dislocated workers usually face more severe hardships than other unemployed workers, in terms of unemployment duration, income losses, and health and family difficulties. Advocates maintain that the existing policies to protect the unemployed in general do not address the particular difficulties experienced by dislocated workers. The features of plant-closing laws that specifically address dislocated worker hardships include cash-severance benefits, extra paid leave time, continuation of health insurance benefits after closing, occupational training, job counseling and placement, and income support.

Advocates of plant-closing laws maintain that plant shutdowns are a major source of local, regional, and national unemployment. It is argued that governments have a responsibility to inhibit or delay closings, thereby

Table 2   Features of Ohio's Proposed Plant-Closing Law

Coverage tests for firm

Employs 100 or more workers
Cannot be political subdivision or nonprofit firm
Must have operated in state for 5 years or more; if affected facility was acquired from another firm, purchaser succeeds to seller's obligations
Affected by permanent shutdown for reasons other than bankruptcy
Affected if transferring operations an "unreasonable distance" and reducing work force by 10 percent or more
Affected if one or more parts of an operation are being phased out, resulting in an overall work force reduction of 50 percent or more over 2 years

Obligations of state authorities

Establish Employee and Community Readjustment Administration (ERCA)
Establish rules for severance payments and firm payments to Community Readjustment Fund
Receive employer notification of closing, relocation, or reduction in operations
Investigate failures to provide prior notice
Receive and evaluate economic impact statements
Have subpoena powers
Notify and coordinate activities of county authorities

Obligations of county authorities

Establish local citizens' council within 45 days of closing notice
Establish Community Readjustment Fund
Administer Community Readjustment Fund to provide or maintain local employment opportunities, job finding and job creation assistance, planning services, emergency tax relief, community development projects
Have subpoena powers

Obligations of firm closing plant

Submit 1-year prior notice of closing, relocation, or reduction in operations to ERCA, workers, union, and community officials
Prepare economic impact statement within 90 days of notice
Give lump-sum severance payment to all affected workers with over 5 years seniority equal to average weekly earnings over past 2 years multiplied by years and partial years of service
Allocate lump-sum payment to Community Readjustment Fund equal to 5 percent of annual payroll
Continue health insurance coverage for affected workers for a period not to exceed 6 months
Allow affected workers to transfer to other facilities
Allow adequate relocation reimbursement

reducing the flow of workers into unemployment. The provisions of plant-closing laws aimed at this issue include discouraging closings through the threat of financial penalties for firms contemplating such action; providing incentives for employee ownership; and/or requiring firms that intend to close plants to offer preferential transfer rights and relocation assistance to affected workers.

Another reason for supporting plant-closing laws is that shutdown-related unemployment of dislocated workers can cause fiscal distress for local governments. Local tax revenues might be reduced through the loss of firm-paid property taxes, worker-paid local income and sales taxes, and reductions in property values. Simultaneously, a major closing could increase government outlays in such areas as General Assistance, Unemployment Insurance, and Aid for Families with Dependent Children.

II. Plant Closings and Hardships for Dislocated Workers

The existing literature on plant closings is filled with case studies that quantify the primary and secondary effects of permanent closings on workers and their families. Typical primary effects include extended unemployment, losses in income and occupational status, and failure to regain steady employment. Secondary effects include stress-related health and family difficulties.

Plants often experience a lengthy period of decline in output, productivity, capital investment, and employment prior to closing. As work forces decline in size, new hiring is curtailed and *pre-closing* layoffs tend to be concentrated among younger, lower-seniority workers. Case studies show that the typical dislocated worker is older (40 years to 55 years old), has higher seniority (15 years to 25 years) and occupational status, is less well-educated (7 years to 10 years of formal education), and has achieved relatively higher earnings than other workers in the labor pool. These five characteristics—age, senior-

ity, occupational status, education, and earnings—often prove to be labor-market handicaps once such workers become unemployed and begin to search for new jobs. Employers tend to screen older and less-educated workers in the hiring process. Conversely, many dislocated workers tend to be more selective about the jobs they will accept, because they have become accustomed to higher occupational status and higher earnings. The labor-market difficulties of dislocated workers are sometimes compounded by the fact that they often are dislocated from a declining industry or during a recession; in addition, the dislocated worker often is reluctant to relocate to areas where job prospects are better.[2]

The case studies indicate that, among dislocated workers, 10 percent to 15 percent find new jobs immediately or accept interplant transfers, 10 percent to 25 percent permanently drop out of the labor force, and 60 percent to 80 percent tend to experience very long unemployment spells. Estimates of the mean duration of the initial spell vary widely (ranging from 10 weeks to 13 months), depending on the industry involved, demographic and occupational composition of the work force, plant location, and stage of the business cycle at which the plant closing occurred. Our research adjusts for time period and business cycle by comparing the average duration of unemployment for dislocated workers in each case study with the average length of unemployment spells for all workers in the nation for the reference year. We found that dislocated workers experience average unemployment spells that are 50 percent to 80 percent longer on average than the average for all workers.

Lengthy unemployment, combined with lower earnings in subsequent jobs, results in permanent earnings losses for dislocated workers. Jacobson and Thomason (1979) found earnings diverged from their pre-closing trend by 11 percent to 46 percent during the first two years after closing, and 10 percent to 30 percent after three years. Holen, Jehn, and Trost (1981) estimated that dislocated workers' earnings were 27 percent below their projected earnings two years
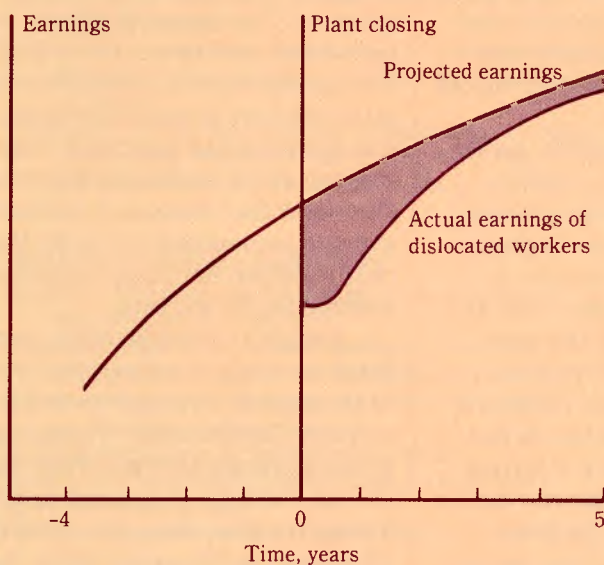
after layoff. These two studies, along with Holen (1976), also found that dislocated workers' earnings converged to the pre-closing trend within five years of closing, although such workers experienced a reduction in current income (see figure 1). In addition to lengthy unemployment and reduced earnings, dislocated workers suffer a number of secondary effects. Shostak (1980) found higher incidence of physiological health problems, mental disorder, divorce, alcoholism, suicide attempts, and anomie among dislocated workers than he found among employed workers.

The identification of hardships for dislocated workers does not necessarily imply a need for new policies to address such hardships. Special help for dislocated workers, in addition to existing policies for the unemployed, can be justified only if the difficulties of dislocated workers are found to be decidedly more severe than those of other unemployed workers. While the case studies demonstrate significant differences between dislocated workers and the "average" unemployed worker, dislocated workers generally cannot, as a group, be distinguished from the long-term unemployed. Older, less educated workers with relatively high pre-termination earnings and occupational status are disproportionately represented among the long-term unemployed, just as they are among the dislocated. Consequently, the labor-market and income problems of dislocated workers would appear to be the same as the difficulties faced by many other individuals suffering relatively long unemployment spells. The social, personal, and family problems experienced by dislocated workers also have been shown to be pervasive among the long-term unemployed.[3] It follows that dislocated workers are served just as well or just as poorly by existing unemployment protections as are other long-term unemployed workers, and there is no strong justification for policy targeting of the select group of dislocated workers. The structure of existing unemployment measures, both public and private, provides a substantial amount and range of protection to the unemployed in general and to dislocated workers who are part of that population (see table 3). Dislocated workers are likely to benefit from unemployment-insurance coverage, as well as from other federal and state programs, the National Labor Relations Board, corporate personnel policies, and union contracts.

III. Local and National Unemployment

Several researchers have examined the effects of plant closings on local labor markets. Bagshaw and Schnorbus (1980) and Aronson and McKersie (1980) found that plant closings increased local unemployment

Fig. 1
Earnings Losses of Dislocated Workers

Earnings

Plant closing

Projected earnings

Actual earnings of dislocated workers

-4   0   5

Time, years

rates but that the increase vanished after 12 months. The local unemployment rate returns to trend levels as a result of re-employment, voluntary and involuntary labor-force dropouts (e.g., retirement vs. "discouraged workers"), and worker reloca-tions. As a direct result of such adjustments, the local labor market tends to shrink as the unemployment rate once again approaches trend levels. The speed of adjustment and the decline in local employment levels may affect local government tax revenues and ex-penditures. Among three communities studied by Aronson and McKersie (1980), two exper-ienced slight increases in real-estate tax de-linquencies, and one suffered a slight decline

in sales-tax revenues. In all three cases, the divergence from trend was evident only in the year of the plant shutdown. Neither declines in real-estate values nor increases in local outlays for social services were found in any of the communities (although one reported a marked increase in food-stamp distribution).

Plant closings are considered to be a major source of U.S. unemployment and a significant constraint on the expansion of U.S. employment. Appraisals of the magni-tude of the plant-closing problem have been hampered by measurement difficulties and a lack of historical information. Since 1979, Conway Publications has tracked closings of U.S. manufacturing plants, and the Cali-fornia Employment Development Department (CEDD) has collected similar data for all industries in California. The Bureau of National Affairs (BNA) began to track the national private nonfarm business sector in 1982. Conway and BNA base their estimates on many bibliographic sources and an exten-sive network of contacts with trade associa-tions and federal, state, and local public agencies. CEDD's estimates are based pri-marily on the state's ES-202 data collection program, conducted under the auspices of the national payroll survey of the Bureau of Labor Statistics.

These data sources are the basis for 1982 estimates of the number of jobs lost through plant closings. The estimates can be com-pared with measures of labor-market activity to determine the extent to which plant clos-ings cause labor-market problems in the aggregate (see table 4). While the estimates differ in terms of geographic coverage, indus-try, and underlying definition, it is readily apparent that dislocated workers do not con-stitute a very large proportion of the national labor force, employment, and unemployment.

Number of Jobs Affected by Plant Closings

There is a body of research based on the pioneering work of Birch (1979) with the Dun and Bradstreet Market Identifier (DMI) files to arrive at estimates of the number of jobs affected each year by plant closings. This research is exemplified by Bluestone and Harri-son (1982), Weiss and Shapira (1982), and Leighton, Roderick, and Folbre (1981). Bluestone and Harrison, for example, found that between 1969 and 1976 on average 3,000,000 jobs per year were terminated through closings. This figure implies that plant clos-ings are the most important single source of unem-ployment in the United States.

However, the DMI files seem to be inappropriate data for deriving plant-closing estimates. Because the files are not designed for social-science research, ana-lysts have faced significant methodological difficulties in using them to answer policy questions (see Birch 1979, Miller 1980, and Harris 1983). The DMI files contain no evidence of motive for inter-year "disap-pearances" of business establishments. It is likely that a large proportion of inter-year disappearances reflect acquisitions, mergers, changes of address, and Dun and Bradstreet data collection and input errors.

Even if the DMI files could provide a crude assess-ment of job losses attributed to plant closings, the figure cited by Bluestone and Harrison would be grossly overestimated from a public-policy standpoint. Most existing and proposed plant-closing laws use 100 as a minimum number of employees for a firm to be obligated under statute. Yet, the empirical results reported by Birch (1979) suggest that the vast majority of inter-year disappearances are firms that employ 50 or fewer workers.

In 1982, for example, the BNA recorded 619 plant closings involving 215,500 jobs. Unemployment spells of workers dislocated by these closings accounted for less than 1 percent of the total unemployment spells experienced in the United States in 1982. Sim-

Table 3   Existing Protection for Dislocated Workers

Protection	Coverage	Applicability
Federal and State		
Unemployment compensation	Income maintenance for unemployed	89% of U.S. workers in 1982
Comprehensive Employment and Training Act, Titles IIB, IIC, and VII	Employment, training, and counseling for structurally unemployed adults	In FY 1982, 835,234 individuals served by IIB and IIC; 125,994 served by VII
Trade Adjustment Assistance	Income maintenance and CETA-like services for workers adversely affected by imports	30,480 workers received first TAA payments in FY 1982
U.S. Employment Service	Job referral, counseling, and other supportive services	14.3 million workers served in FY 1982
Redwood National Park Act amendments of 1978	Income supplements for workers adversely affected by expansion of Redwood National Park	Primarily California-based lumber workers
Civil Aeronautics Board and Airline Deregulation Act of 1978	Income supplements and job guarantees for workers adversely affected by mergers and airline deregulation	Workers in air-transportation industry
Regional Rail Reorganization Act of 1973, Urban Mass Transportation Act, and High Speed Ground Transportation Act of 1965	Income supplements to workers adversely affected by these pieces of legislation	Mainly railroad workers, especially with Amtrak, Conrail, and their predecessors
Employee stock ownership plans (ESOPs)	Internal Revenue Code and Treasury regulations offer very favorable tax treatment to ESOPs	ESOPs nationally; potential ESOPs in 6 states in 1982
Prior notice of separation	National Labor Relations Board (NLRB) decisions require that unions have sufficient time to bargain over the rights of workers affected by closings, out-sourcing, and subcontracting	Union workers
Effects bargaining	NLRB decisions require that unions be allowed to discuss effects of closing; usually upheld by courts	Union workers
Decision bargaining	NLRB decisions require that unions be given the opportunity to bargain over decision to close, out-source, or subcontract; usually overturned in courts	Union workers
Health insurance	Conversion to individual policy without waiting period or physical examination upon layoff	40 states in 1982

ilarly, dislocated workers constituted less than 1 percent of the total number of workers who experienced unemployment spells in the year. Dislocated workers achieved a somewhat larger representation among the long-term unemployed and among unemployed

Protection	Coverage	Applicability
Federal and State (cont.)		
Health insurance (cont.)	Employer required to continue health insurance coverage for 3 months to 12 months after layoff	22 states in 1982
Corporate Personnel Policies		
Severance pay	Separation for economic cause, 2-week lump-sum payment to 2 weeks pay times years of service in lump sum	66% of companies and 56% of workers in 1977
Supplemental unemployment benefits	Supplements to income after layoff	15% to 27% of workers in 1981
Relocation assistance and/or retraining	Reimbursement of relocation expenses; company-paid retraining	45% of companies in 1977
Outplacement counseling	Counseling, job referral, supportive services	53% of companies in 1977
Continuation of life and/or medical insurance	Company continues to pay insurance premiums for period of 1 month to 3 years	70% of companies in 1977
Advance notice of separation	1–6 months advance notice; mode of 2–4 weeks (47% of companies)	95% of companies in 1977
Collective Bargaining Agreements		
Prior notice of closing	2 weeks to 1-year prior notice	19.8% of union workers in 1980
Decision bargaining	Negotiations with union over decision to close	1.5% of union workers in 1982
Effects bargaining	Negotiations with union over effects of closing	10.1% of union workers in 1982
Supplemental unemployment benefits	Income supplements to laid-off workers	27.7% of union workers in 1980
Severance pay	Lump-sum payment upon termination	37.8% of union workers in 1980
Relocation assistance	Reimbursement for relocation expenses	32.0% of union workers in 1980
Transfer rights	Preferential transfer and bumping rights, with retention of seniority	49.2% of union workers in 1980

SOURCES: U.S. Department of Labor, (1972, 1981a, 1981b, 1982); Scarry (1982); Miner (1978); Gorlin (1981); Industrial Union Department, AFL-CIO (1982); Gacek (1981); Millen (1979); Goldfarb (1980); and Freedman (1978).

4. The empirical
literature on plant
relocations also
suggests that the
number of workers
affected by intra-
state moves is small
relative to labor-
market activity.
Birch (1979) found
that emigration
of entire facilities
across state lines
affected between
0.03 percent and
0.10 percent of
the national labor
force each year from
1969 to 1976.
Miller (1982) con-
cludes that "reloca-
tions play a very
minor role in real-
locating manufac-
turing employment
among regions . . .
and that when relo-
cations do occur, the
majority involve
short-distance, intra-
state moves by non-
corporate affiliated
employers" (p. 34).

manufacturing workers.[4] Based on the CEDD count, plant closings and worker dislocation would appear to be more common in California than in the nation as a whole. However, the CEDD defines plant closings and worker dislocation more broadly than the other sources. While BNA and Conway count only complete plant closings and the number of workers immediately affected by such actions, CEDD measures job losses from the plant's employment peak during the 24 months prior to closing and includes partial closings and "massive" permanent layoffs from continuing plants that affect at least 50 percent of a facility's work force.

The foregoing analysis demonstrates that dislocated worker hardships are not unique; indeed, such hardships are "special" only insofar as the dislocated constitute roughly 5 percent of the long-term unemployed. Plant-closing laws are intended to make our economic system fairer and more equitable, yet their narrow applicability creates inequities. If the existing structure of unemployment protection is inadequate to the needs of the dislocated worker, it is likewise inadequate for the much larger mass of long-term unemployed. It follows that the most appropriate response for public policy would involve the modification and expansion of the existing structure of unemployment assistance that would more adequately address the needs of all long-term unemployed workers, including dislocated workers experiencing relatively lengthy unemployment spells.

IV. The Timing of Plant Closings

The existing and proposed plant-closing laws generally require firms to make a lump-sum severance payment to dislocated workers, equivalent to their most recent weekly earnings times the number of years of service for each worker. Firms with no severance-pay

protection or with an existing arrangement less generous than required by law would be affected by this provision. Advocates of plant-closing legislation argue that such laws should discourage and/or delay closings, thereby maintaining local employment stability and helping local governments to avoid fiscal distress. Unfortunately, existing plant-closing laws are too recent, have little history of enforcement, and are not sufficiently widespread to facilitate an empirical analysis of their economic effects. Thus, the analysis in this article relies on theoretical tools to indicate the direction but not the magnitude of the economic effects of severance-pay requirements. In this section, we examine whether severance-pay requirements and resulting adjustments by firms would influence the timing of plant closings and, if so, in what direction.

We assume that firms would continue to operate a plant as long as the net present value of future returns from operation remains greater than the net present value of returns from closing, or, alternatively, as long as the internal rate of return (IRR) from operation is larger than the IRR from closing. Let

$$\sum_{t=s}^{T} P_t/(1 + r)^{T-s}$$

represent the net present value of an operating plant's profit stream over a period of $T-s + 1$ years, where the plant becomes obsolete at year T. The symbols P_t and r denote profit in the year t and the discount rate, respectively. The P_t stream is assumed to be nonnegative for simplicity. The net present value of returns from continuous operation of the plant as of year s ($NPVO_s$) can be expressed as

$$(1) \quad NPVO_s = \sum_{t=s}^{T} \frac{P_t}{(1 + r)^{t-s}} + \frac{SV_T - TSP_T}{(1 + r)^{T-s}},$$

where SV_T and TSP_T are the plant's scrap value and total severance payments at

closing, respectively, in year T. The net present value of returns from immediate closing of the plant as of year s ($NPVC_s$) may be written as

(2) $NPVC_s = SV_s - TSP_s$.

Closing of the plant at year s rather than at year T makes the firm better off if, and only if, the following condition is satisfied:

(3) $NPVC_s > NPVO_s$,

or, equivalently,

(4) $SV_s - TSP_s > \sum_{t=s}^{T} \dfrac{P_t}{(1 + r)^{t-s}}$

$+ \dfrac{SV_T - TSP_T}{(1 + r)^{T-s}}$.

Table 4   Losses from U.S. Plant Closings: 1982

Alternative sources of dislocation data relative to measures of labor-market activity

Measures	BNA: U.S., all industries	BNA: U.S. manu-facturers	Conway: U.S. manu-facturers	CEDD: California, all industries
Number of plant closings	619	424	72	304
Number of jobs affected	215,500	146,900	63,723	57,406
Annual Work Experience Supplement to Current Population Survey[a]				
Unemployment spells, %	0.64	na	na	na
Workers who experienced unemployment, %	0.96	2.49	1.08	na
Unemployment spells exceeding 6 months, %	4.27	11.30	4.90	na
Current Population Survey[a]				
Labor force, %	0.20	0.64	0.28	0.47
Employment, %	0.22	0.72	0.31	0.52
Unemployment, adjusted %[b]	0.95	2.48	1.08	2.23
Unemployment exceeding 6 months, adjusted %[b]	5.07	11.96	5.19	15.76

a. The percentages reflect the estimated contribution of dislocated workers to 1982 unemployment spells, workers experiencing unemployment, and unemployment spells of more than six months duration (from the Annual Work Experience Supplement to Current Population Survey, Bureau of Labor Statistics) and annual averages for labor force, employment, unemployment, and unemployment of more than six months duration (from the BLS Current Population Survey).
b. To derive a more precise measure of the contribution of plant closings to the average monthly level of unemployment and the average monthly level of workers unemployed for at least six months, we have adjusted the number of dislocated workers to reflect case-study findings on the average duration of dislocated worker unemployment. Aronson and McKersie (1980) provided supplementary unpublished data that were particularly helpful in making these adjustments.

Changes in the severance-pay formula (TSP_s and TSP_T), as well as changes in scrap values (SV_s and SV_T), the profit stream (P_t), and the discount rate (r), can change a firm's decision on the optimal timing for closing by changing the direction of the inequality in equation 4. As an introduction to our main concern—the effects of changes in the severance-pay formula—let us first discuss the potential effects of changes in r, P_t, SV_s, and SV_T. First, *ceteris paribus*, an increase in the profit stream (P_t) or the scrap value at year T (SV_T) would delay the closing by increasing $NPVO_s$, while an increase in the scrap value at year s (SV_s) would accelerate the closing by increasing $NPVC_s$. Second, the effect of an increase in r on optimal timing of closing is uncertain, depending on the sign of $P_T + SV_T - TSP_T$. To describe this more clearly, we may rewrite equation 1 by moving $P_T/(1 + r)^{T-s}$ from its first term to its second term, as follows:

$$(5) \quad NPVO_s = \sum_{t=s}^{T-1} \frac{P_t}{(1 + r)^{t-s}}$$

$$+ \frac{P_T + SV_T - TSP_T}{(1 + r)^{T-s}}.$$

Assuming the profit stream to be nonnegative ($P_t \geq 0$, $t = s$, . . ., $T-1$) and to be positive for at least one period, an increase in the discount rate (r) always decreases the first term of equation 5. The discount rate sensitivity of the second term of equation 5 depends on the sign of $P_T + SV_T - TSP_T$: an increase in r decreases, does not affect, or increases the second term of equation 5 as $P_T + SV_T - TSP_T$ is positive, zero, or negative, respectively. When the two terms are combined, an increase in r unambiguously decreases $NPVO_s$ and accelerates the closing as long as $P_T + SV_T - TSP_T$ is nonnegative. If the expression $P_T + SV_T - TSP_T$ is negative, an increase in the discount rate

reduces the first term and increases the second term in equation 5, thereby making the effect of a discount rate increase on the sequence of closing-related events uncertain.

An increase in TSP_s alone, *ceteris paribus*, would delay closing by decreasing the value of $NPVC_s$; likewise, an increase in TSP_T alone would accelerate closing by decreasing $NPVO_s$. However, the effect of changes in the severance-pay requirement on the optimal timing of closing is uncertain when TSP_s and TSP_T change simultaneously, depending on the size of the discount rate (r) relative to the growth rate of TSP over time (expressed as m). Let us begin from a situation in which $NPVC_s$ equals $NPVO_s$, or, equivalently,

$$(6) \quad SV_s - TSP_s = \sum_{t=s}^{T} \frac{P_t}{(1 + r)^{t-s}}$$

$$+ \frac{SV_T}{(1 + r)^{T-s}} - \frac{TSP_T}{(1 + r)^{T-s}}.$$

Then the net present value of returns from closing is the same as that from remaining in operation until time T, and there is no incentive for a firm to advance its expected time of closing from T toward s. If concurrent changes in TSP_s and TSP_T are such that

$$(7) \quad \Delta TSP_s = \Delta TSP_T/(1 + r)^{T-s},$$

then the changes do not alter the equilibrium of equation 6, since both sides of equation 6 are simultaneously being changed by the same amount. However, closing would be accelerated if TSP_s and TSP_T change such that

$$(8) \quad \Delta TSP_s < \Delta TSP_T/(1 + r)^{T-s},$$

because $NPVC_s$ decreases less rapidly than $NPVO_s$. Equation 8 may be rewritten as

Federal Reserve Bank of Cleveland

5. *The foregoing analysis was restricted to the effects of severance-pay requirements on plants already located in a given state and effects on the local labor market. The analysis would not, however, be complete without brief comment on the effects of plant-closing laws on potential new investments in a given locality. The literature on this capital-flow question has been limited by the absence of empirical evidence. However, McKenzie (1982), among others, has argued that plant-closing laws reduce the attractiveness to new investment by increasing the cost of doing business in a place that enacts such a law. This assertion is supported by the literature on the effects of certain discretionary government policies, such as environmental protection. We have some reservations concerning the applicability of these examples to plant-closing laws, and we reserve judgment on the issue of plant-closing laws and capital inflows, leaving the question to further research.*

$$(9) \quad \frac{1}{\Delta TSP_s} > \frac{(1 + r)^{T-s}}{\Delta TSP_T} \, ,$$

or,

$$(10) \quad \frac{\Delta TSP_T}{\Delta TSP_s} > (1 + r)^{T-s} \, .$$

Assuming, for simplicity, that the total severance-pay obligation (TSP) changes over time at a constant annual rate of m, such that $TSP_T = TSP_s(1 + m)^{T-s}$, equation 10 may be rewritten as

$$(11) \quad \frac{\Delta TSP_s(1 + m)^{T-s}}{\Delta TSP_s} > (1 + r)^{T-s} \, ,$$

$$(12) \quad (1 + m)^{T-s} > (1 + r)^{T-s} \, ,$$

$$(13) \quad m > r \, .$$

Thus, the optimal time of closing can be accelerated by severance-pay requirements if employers observe that the growth rate of severance-pay liability (m) exceeds the discount rate (r). The size of m depends on the structure of the laws and on technical and institutional constraints that each plant faces: m is likely to be larger for plants whose production functions allow less substitution between capital and labor and less substitution between skilled and unskilled labor. Likewise, plants will have greater difficulty in reducing m if their production functions are relatively inflexible, and if the work place is governed by relatively restrictive work and seniority rules. We therefore conclude that the severance-pay provision would not unambiguously delay or otherwise inhibit plant closings. Indeed, depending on institutional and technological conditions, severance-pay requirements may result in earlier closings than otherwise would be the case. Thus, it is possible that plant-closing laws could accelerate both flows into unemployment and the pace of local employment decay.[5]

V. Distortions of Resource Allocations

Having shown that the timing of a plant closing can be accelerated by plant-closing laws, we now shall show that severance-pay requirements can change the optimal mix of production inputs by changing the perceived prices of the inputs. In the framework of comparative static analysis, we assume that a single-plant firm maximizes its profits (PRF) subject to its production function

$$Q = Q\,(K,L),$$

where K and L denote capital and labor, respectively, and

$$(14) \quad \max PRF = P \cdot Q\,(K,L) - WL - RK,$$

where P, W, and R represent prices of the product (Q), labor, and capital, respectively. In the short run, where capital is fixed and labor is assumed to be the only variable input, PRF is maximized when the wage rate equals the value of labor's marginal product.

Taking the partial derivative of PRF with respect to L yields the following first-order condition:

$$(15) \quad W = P \cdot \frac{\partial Q}{\partial L} \, ,$$

where the second-order conditions are assumed to be satisfied. In the long run, when the capital stock is allowed to change, profit maximization requires that the price of capital equal the value of its marginal product:

$$(16) \quad R = P \cdot \frac{\partial Q}{\partial K} \, .$$

In the long run, the profit-maximizing input combination $(K/L)^*$ before the imposition of the severance-pay requirement can be ob-

tained from equation 17, which is derived by dividing equation 16 into equation 15:

$$(17) \quad \frac{W}{R} = \frac{\partial Q/\partial L}{\partial Q/\partial K} \, .$$

That is, profits are maximized when the ratio of each factor's marginal product equals the ratio of each factor's price.

Suppose plant-closing laws would necessitate severance payments in the amount of *SP* per eligible employee. Although the amount of the severance pay does not increase the "actual" price of labor as long as the plant is in operation, it certainly would increase the "contingent" price of labor unless the firm's subjective probability of closing were zero. Consider a hypothetical situation where plant-closing laws allow voluntary transactions between employers and employees regarding the newly imposed severance-pay requirement and where the transactions costs are relatively low. The firm apparently is "worse off" than in the case of no severance payment, but the workers are "better off" because they can anticipate additional income should the plant be closed. Such an imbalance creates an environment conducive to trading between the employer and employees. Conceivably, the firm might prefer to increase the current level of workers' wages in exchange for the workers' voluntary releasing of the firm from the severance-pay obligation. Likewise, employees may prefer an increase in current wage levels in exchange for future contingent severance pay.

Such transactions would not occur if bargaining failed to achieve a wage increase satisfactory to both parties. Technically speaking, this would take place if the firm's maximum wage offer (*FXW*) remained below the minimum wage increase acceptable to workers (*ENW*). The optimal wage increase would, of course, lie between *FXW* and *ENW*, but the probability of satisfactory agreement

depends on the relative bargaining strength of the parties and the structure of negotiations.

It is not our purpose to elaborate on the likelihood that such voluntary transactions would arise, or the actual determination of the equilibrium level of wage increases. It suffices, rather, to indicate that the subjective wage rate has increased from *W* to *W* + *FXW*, and the subjective input price ratio between *L* and *K* has increased from *W/R* to (*W* + *FXW*)/*R* as a result of the severance-pay requirement.[6] The level of *FXW* would be higher if the firm were relatively risk averse and if the level of *SP* were relatively high. Excluding the extreme case of perfect factor substitution, the resulting increase in the subjective wage rate would raise the marginal cost of production, in turn reducing the profit-maximizing level of output. In the short run, the entire burden of the output reduction is borne by labor: as the wage rate rises from *W* to *W* + *FXW*, the use of labor input would be curtailed to satisfy equation 15.

In the long run, the increase in the marginal cost of production would be smaller than in the short run, because the capital stock would no longer be fixed. Therefore, excluding the extreme cases of zero or infinite factor substitution, the profit-maximizing level of output would fall with the imposition of severance pay, but by less than in the short run. In contrast to the short-run effects, the burden of reduced output in the long run is shared by capital and labor. Nevertheless, labor still would shoulder a disproportionate share of the burden arising from reduced output and from the substitution effect: since the severance-pay requirement increases the subjective input price ratio, the right-hand part of equation 17 must increase to satisfy the profit-maximizing condition. With the assumption of decreasing marginal product, this implies that the optimal input combination (*K/L*)* must increase through a greater reduction in labor input (*L*) than in capital input (*K*). These

would be perverse and unintended consequences of the severance-pay requirement—reduced production and reduced labor demand—considering that increased employment constitutes a key objective of plant-closing laws.

Just as severance pay can affect the quantity of labor used in production, it may also affect the quality of labor. For convenience, we define skilled labor as higher-wage and higher-seniority workers. Suppose the optimal input mix of capital and labor has been pre-determined with regard to the considerations discussed previously. Plant management may wish to manipulate labor quality and quantity to reduce the contingent liability associated with severance-pay requirements. Assuming a production function that allows substitution between the types of labor, plants could hire more skilled labor to keep overall labor productivity constant and reduce the number of workers. Let us suppose that the severance payment to employee h (SP^h) is a simple function of minimum-service years (MSY), years of seniority (SY^h), and current wage level (W^h), as follows:

$$(18) \quad SP^h = a + b \cdot [(SY^h - MSY) \cdot W^h].$$

Total severance payments (TSP) for the plant may then be defined as

$$(19) \quad TSP = \sum_{h=1}^{H} \{a + b \cdot [(SY^h - MSY) \cdot W^h]\}$$

$$= a \cdot H + b \cdot \sum_{h=1}^{H} (SY^h - MSY) \cdot W^h,$$

where H is the total number of employees.

Consider three combinations of signs of a and b, as follows:

(a) $a > 0, b = 0.$

In this case, SP^h is a flat payment of equal amounts to employees regardless of years of service or wage level. Plants can reduce TSP by hiring more skilled labor and reducing their overall number of employees (H), while keeping total labor productivity constant.

(b) $a > 0, b > 0.$

In this case, SP^h is a flat payment of equal amounts to each employee, plus a variable payment that increases in accordance with W^h and SY^h (as long as SY^h is greater than MSY). The direction of employment impact is uncertain, because an increase in skilled labor and a reduction in total employment use reduces TSP by lowering the first term of equation 19, $a \cdot H$, but increases TSP by raising the second term (by increasing SY^h and/or W^h). Thus, the direction of change depends on the relative sizes of $a \cdot H$ on the one hand, and

$$b \cdot \sum_{h=1}^{H} (SY^h - MSY) \cdot W^h$$

on the other.

(c) $a = 0, b > 0.$

There is no flat payment in this case, and SP^h is a function solely of SY^h, MSY, and W^h. This severance-pay formula is more relevant than the previous two, since it closely resembles the formulas incorporated in existing and proposed plant-closing legislation. If there were a requirement for minimum years of service to be eligible for severance pay (five years in most laws), plants may wish to add new workers relative to high-seniority skilled workers, attempting to reduce TSP by decreasing $SY^h - MSY$ and W^h. Firms can unambiguously reduce TSP by deliberately hiring new, unskilled workers and letting them go before they have worked MSY years.

Therefore, in the absence of effective worker opposition, plants have incentives to increase work-force size, decrease average seniority and average wages, and increase employee turnover. Early retirement of high-seniority workers is one of many methods to reduce average seniority. As a result, high-skilled, high-seniority workers would tend to be worse off with this severance-pay formula.

VI. Policy Implications

Plant closings can result in serious hardship for dislocated workers and their families, including periods of extended unemployment, losses in income and occupational status, deterioration of health, and family difficulties. Yet, the foregoing analysis shows that such hardships (alone or in combination) are not unique to dislocated workers. The same kinds of hardships are prevalent among the long-term unemployed, of which dislocated workers constitute a relatively small part. Plant-closing laws are intended to make our economic system more fair and more equitable, by transferring scarce economic resources to the unemployed. It follows that plant-closing laws might help equalize the disparity *between* the employed and the unemployed members of our society. The laws have the opposite effect, however, *within* the pool of unemployed workers. Plant-closing laws are designed to benefit an arbitrarily defined subgroup of the unemployed: to qualify, a worker must have lost his/her job in a permanent facility shutdown. Dislocated workers receive additional benefits not available to other unemployed workers who share the hardships of unemployment.[7]

Plant-closing laws do not appear to be effective policy instruments. The laws are intended to inhibit closings, yet the standard severance-pay requirement, in many cases, would create incentives for plants to close earlier than they would otherwise. While the laws are intended to reduce the number of unemployed workers (especially high-seniority workers), they may create incen-

tives to reduce overall labor use, increase employee turnover, and shed high-seniority workers more rapidly.[8]

The design of plant-closing laws could be modified to make them less ineffective policy instruments, although the adverse effects on within-group distributional equity would remain. The inherent bias against high-seniority workers might be eliminated by exchanging the severance benefit based on years of service and pay for a fixed severance payment per worker. This approach would not, however, eliminate the incentives to use less labor per unit of output. A second possibility would involve shifting the penalty for closing from a labor-based to an asset-based formula: if firms engaged in closings were required to pay a proportional tax on the plant's scrap value at closing, the laws might delay closings in the short run without causing distortions in the optimal mix of productive resources. This approach would not, however, provide much direct financial assistance to dislocated workers, and it might create incentives for firms to keep plants operating with only skeletal work crews.

A more comprehensive unemployment assistance policy, aimed at the structurally unemployed and financed by tax revenues and experience-rated employer payments, would avoid many of the equity, efficiency, and design problems associated with plant-closing laws. Such a policy would deliver general- and specific-skills training, income support, career and job-search planning services, and relocation assistance to the unemployed. It could also include additional incentives for the establishment of ESOPs. This proposal closely resembles the existing structure of unemployment protections, and it could be built on a well-developed administrative delivery system and substantial past program experience. While the existing framework of unemployment protection is by no means perfect (and could certainly benefit from increased coordination), both dislocated workers and the pool of unemployed workers probably would obtain greater benefit from a broad-based approach than from the selective intervention of plant-closing laws.

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Prevailing Wage Laws, the Federal Reserve, and the Service Contract Act

by Mark S. Sniderman

Private firms entering into certain kinds of contracts with the federal government must agree to compensate their employees working on the contracts according to standards set forth by the U.S. Department of Labor. The various laws from which the Department of Labor derives this authority are informally called *prevailing wage laws*, since their intent is to guarantee that compensation of employees performing work for the federal government is no lower than compensation for comparable jobs in that geographical location. Economists are typically critical of prevailing wage laws, because there is virtually no evidence to suggest that the equity considerations that motivate such laws outweigh the economic inefficiencies they promote.

The Federal Reserve System complies with the requirements of one of these prevailing wage laws, the Service Contract Act (SCA), in engaging contractors to furnish various services to the Federal Reserve Banks. Employees of these engaged contractors are compensated according to criteria established by the Department of Labor (DOL) in Washington, DC. One effect of compliance with the SCA is costs of contract services to Federal Reserve Banks that are greater than would be expected if the SCA did not exist. These greater Reserve Bank expenses might be construed as evidence that the SCA is having its intended effect, i.e., raising the compensation of covered employees. However, this article presents evidence that the SCA actually boosts compensation rates *above* the average levels of the marketplace. And, since the Federal Reserve is mandated by law to sell its services to depository institutions at fees that reflect the full direct and indirect costs of providing those services, the SCA therefore causes the Federal Reserve to set higher fees than would occur in the act's absence. The pricing obligation stems from the Depository Institutions Deregulation and Monetary Control Act of 1980, wherein Congress sought to encourage competition between the Federal Reserve and the private

1. *Robert S. Gold-farb and John F. Morrall III, "The Davis-Bacon Act: An Appraisal of Recent Studies,"* Industrial and Labor Relations Review, *vol. 34, no. 4 (January 1981), pp. 191-206.*

sector so that the nation's payments system would become more efficient. Evidence also suggests that the SCA will gradually lose its influence over labor costs for the transportation of checks, coins, and currency.

Compliance with the requirements of the SCA hampers the Federal Reserve's ability to achieve the objectives of the Monetary Control Act. The problem is most acute in the area of contracts for the transportation of checks, coin, and currency. To the extent that transportation costs are greater for the Federal Reserve than for its actual or potential competitors, the Reserve Banks cannot press for payments system services that are cost-effective. This article describes the labor-market consequences of the SCA, with particular emphasis on Federal Reserve System costs and operations.

I. The Nation's Payments System and Priced Federal Reserve Services

A tremendous number and variety of transactions take place each year among U.S. consumers, businesses, depository institutions, and governments. Most of these transactions require money payments for their completion, either in cash or in transfers among deposit accounts at depository institutions. The system for making money payments often is referred to as the *payments mechanism*, a complex structure of instruments, procedures, and financial institutions. Payments usually are timely and convenient, and the cost per transaction of making payments is typically very low compared with the value of the payment.

The Federal Reserve System is a unique part of the payments mechanism. The Federal Reserve Banks provide currency and coin to banks and other depository institutions, and participate in the clearing of a major share of all checks and other payments instruments, such as money orders, travelers' checks, and electronic funds transfers. In

1982, for example, the Reserve Banks processed approximately 15 billion checks (almost one-half of the nation's total), 11 billion pieces of currency, 17 billion coins, and 58 million electronic funds transfers. Since all payments mechanism services are provided directly to depository institutions and government agencies, the public has little opportunity to observe these functions.

The Monetary Control Act (MCA) requires the Federal Reserve System to establish a schedule of fees to be charged to depository institutions for certain Federal Reserve services, including check clearing, check collection, and transportation of currency and coin. The MCA requires that these services be made available to all depository institutions, with the same fee schedules and other terms of service for all depository institutions.

II. The SCA and Prevailing Wage Laws

The SCA is the most recent of the nation's three prevailing wage laws. The others are the Davis-Bacon Act, which applies to federal construction contracts, and the Walsh-Healey Act, which applies to federal supply contracts. Virtually all economic research on prevailing wage laws centers on the Davis-Bacon Act, the oldest of the prevailing wage laws; data availability appears most conducive to Davis-Bacon analysis. The Davis-Bacon studies point clearly to many inefficiencies in the contracting process for federal construction.[1] Although the SCA covers different government purchases from Davis-Bacon, the economic principles used to evaluate Davis-Bacon are appropriate to the assessment of the SCA.

Most proponents of prevailing wage laws argue that, in their absence, locally sited federal agencies either might purchase cheaper labor services from distant locations or use their market power to drive local wages below a more natural level. Thus, these wage laws are supposed to insulate local labor markets from competitive forces

external to the local market, or to protect workers from a potentially exploitative employer, the federal government. In the absence of prevailing wage laws, the federal government presumably would incur lower expenses in the conduct of its business. However, the greater labor costs currently incurred have been justified by proponents on equity grounds, i.e., that taxpayers should pay more taxes so that employees of government contractors are treated fairly.

Critics of prevailing wage laws claim that the federal government rarely has enough market power to affect the wages of non-federal employees in most localities, and that there is little evidence that federal agencies have imported cheaper labor from one locality to another. Even if this importation did occur, it could be justified on the grounds that there is insufficient competition in the "high-wage" market. Furthermore, critics argue that prevailing wage laws, at best, transfer money from taxpayers to already well-paid employees. At worst, these laws distort labor markets and promote inefficiencies by artificially increasing the cost of labor and reducing the number of jobs.

Aside from these theoretical considerations, a practical issue commands substantial attention. The most valid objectives of prevailing wage laws can be somewhat corrupted through the administrative process. Many critics fault the methods of DOL in its determination of the prevailing wages for occupations in a locality. Indeed, accurately collecting the required data for literally hundreds of occupations in each of hundreds of localities is an immense task, especially if the information must be current. Not surprisingly, DOL's collection and interpretation of the required labor market data have been subject to intense criticism.

The administrative challenge of the SCA can better be understood by considering how the SCA is actually implemented by DOL.

The following description of this process appeared in the *Federal Register*:

> The SCA establishes standards for minimum compensation and safety and health protection of employees performing work for contractors and subcontractors on service contracts entered into with the Federal Government and the District of Columbia. It applies to contracts entered into pursuant to negotiations concluded or invitations for bids . . . The provisions of the Act apply to contracts, . . . the principal purpose of which is to furnish services in the United States through the use of service employees. Under its provisions, every contract subject to the Act . . . must contain stipulations . . . requiring, (a) that specified minimum monetary wages and fringe benefits *determined by the Secretary of Labor (based on wage rates and fringe benefits prevailing in the locality or, in specified circumstances, the wage rates and fringe benefits contained in a collective bargaining agreement applicable to employees who performed on a predecessor contract) be paid to service employees by the contractor or subcontractor* . . . [2] [emphasis added]

There are two types of relevant wage and fringe-benefit determinations: (1) those prevailing in the locality, and (2) those contained in collective bargaining agreements applicable to previous contractors. The latter determinations often are required when a contractor is awarded a contract that had previously been awarded (i.e., not a first-time contract), even if the contractor is the incumbent. If a contract were awarded to a new contractor, and if the previous contractor had a collective-bargaining contract with his employees, the successor contractor must pay his SCA-covered employees at rates no lower than the previous contractor would have paid his covered employees.

In either of these two cases, after the contracting Reserve Bank notifies DOL of its intent to contract for services, DOL informs the Reserve Bank of the minimum wages any contractor must pay his service employees who perform on that contract. This information is conveyed to the Reserve Bank in the form of a document called *wage determination*. According to DOL regulations, the wage determination is based on either (1) wage and fringe benefits "prevailing in the locality" of

the service to be performed, as determined by DOL, or (2) the terms set forth in applicable collective-bargaining agreements. Thus, once a unionized firm services a contract, it is difficult for future contracts to entail wages paid below the union wage, regardless of how unrepresentative the union wage may be of the market wage.

Prevailing wages may be determined with reference to Area Wage Surveys conducted by the Bureau of Labor Statistics (BLS) at DOL. The DOL may also consider information provided by employers, employees, and their trade associations. In particular, collective-bargaining agreements may be used as a readily available source of information. Where a *single wage rate* is paid to a *majority* of workers in a job category in a certain locality, that wage rate automatically is determined by DOL to be the *prevailing wage*. For example, if no more than 1,000 janitors are employed in a certain locality and 501 or more janitors are paid identical wages, their pay standards automatically become the *determined wage*. Situations such as this are likely to occur only when a collective-bargaining agreement is in effect, because equal wage and fringe benefits (i.e., to the penny) among so many people do not usually occur otherwise. When prevailing wages cannot be determined through this *majority method*, DOL may use either the median or mean wages of the BLS survey and other data.

DOL is permitted a substantial amount of judgment in determining prevailing wages. In part, this judgment is exercised through its choice of "locality" and its evaluation of compensation data once the locality is defined. The DOL enjoys great latitude in selecting locality, being able to use city, county, SMSA, state, or regional designations. Regardless of the procedure used by DOL in arriving at its wage determination, the contracting agency and other interested parties (actual or potential bidders, employee organizations, other government agencies) may appeal. Appellants may claim that the wage determination varies substantially from true prevailing wages, or that DOL erred in its process by ignoring relevant data, or incorrectly defined the geographic locality.

Consider a hypothetical Federal Reserve Bank that requests bids to service an armored-carrier route (see figure 1). In this example, the successful bidder services 12 depository institutions along the route, with initial and terminal stops at the Reserve Bank. Notice that all depositories are located in counties other than the county in which the Reserve Bank is located. The Reserve Bank is located in the center of a large metropolitan area; the depositories are located outside this area in smaller cities. The crucial issue related to the bidding process for this route is the determination of the locality to be served. Under current regulations, once a locality is designated, all bidders—regardless of their location—must conform to the prevailing wages in that locality. For many situations, this policy is reasonable, especially where the work is to be performed at a single location such as a particular building. In the case of transportation service contracts, however, the service may not inherently be confined to a small geographic area. Should the locality be the city in which the Reserve Bank is located, or the surrounding metropolitan area? Or, should the locality be one or both of the counties in which the depositories are located? Or, would a combination of the counties and the metropolitan area be most appropriate? Since the wages that prevail in one locality may differ significantly from those prevailing in another, the choice of locality very much influences both the wage determination and the winning bid price.
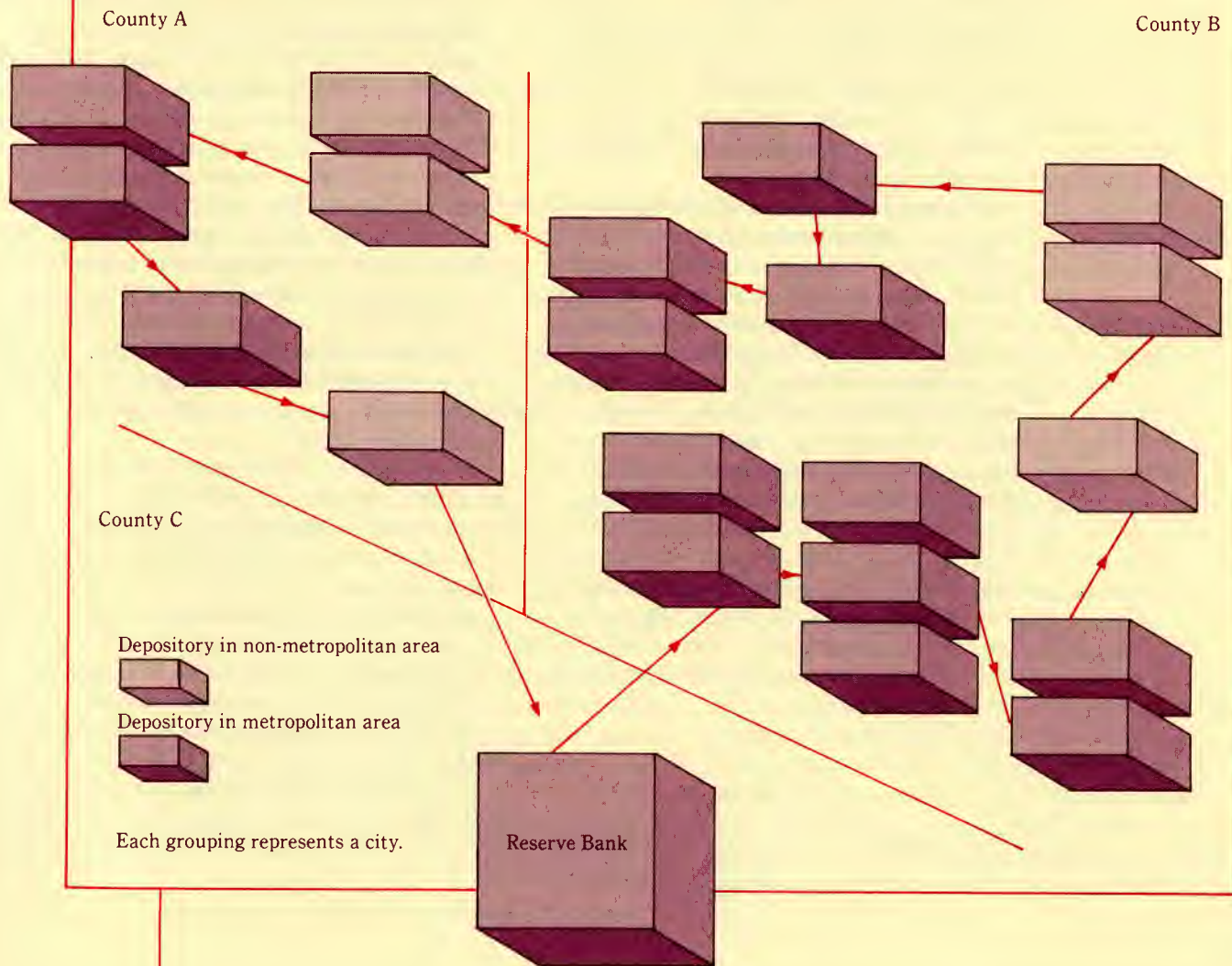
The definition of locality also can influence the set of the actual bidders. In our example, suppose that DOL chooses the city in which the Reserve Bank is located as the locality, and that wages prevailing there are 20 percent greater than wages prevailing in the outlying counties. Since the contract must be awarded to a contractor paying the wages

prevailing in the Reserve Bank's city, contractors based in the outlying areas (i.e., counties A and B) may not bid on the route. Were one to win the bid, that contractor would be required to pay some of its employees 20 percent more on the Reserve Bank's route than they are paid on other routes. This situation could be considered untenable and thus would discourage bidding by those contractors.

Under new rules adopted by DOL, a two-step wage-determination process would be used in cases where the performance of the service is unknown at the time of bidding. An example would be a contract for data processing that could be performed in any one of several localities. First, the contracting agency would request bids and identify all interested bidders; DOL then would issue a wage determination to each bidder, requiring conformance to wages prevailing in his locality. This procedure certainly could be superior to the current rules. It is unclear whether DOL would agree that transportation contracts of Federal Reserve Banks are site-unknown at the time of bidding.

Fig. 1 Relationship between a Reserve Bank and an Armored-Carrier Route

County A

County B

County C

Depository in non-metropolitan area

Depository in metropolitan area

Each grouping represents a city.

Reserve Bank

3. Federal Register, *vol. 45, no. 157 (August 14, 1981), pp. 41382-83.*

4. Robert S. Goldfarb and John S. Heywood, "An Economic Evaluation of the Service Contract Act," Industrial and Labor Relations Review, *vol. 36, no. 1 (October 1982), pp. 56-72.*

III. Labor-Market Consequences: The Wage Impact of SCA Coverage

In the SCA, the judgment of the federal government is substituted for the judgment of the marketplace, at least where the wages of government service contractors are concerned. The SCA has no effect on most service contractors when wage determinations are at or below market wages. When determinations are greater than market rates, however, there are direct and indirect effects. The direct SCA effect is the cost increase associated with paying greater-than-market wages. One indirect SCA effect is the longer-run cost of restricting the number of vendors who would bid on government contracts. If the number of participants in a market is appreciably reduced, contract bidding can become less than competitive. This is especially important in the case of transportation services, where federal and state laws already limit by regulation the number of carriers in a market.

The methodology used to calculate the SCA impact on an occupation in an area is quite explainable. First, sum the wages actually paid to all of the employees in the occupation in the given area. This dollar amount is called the *wage bill.* Next, locate the employees paid less than the determined wage. Sum up, for these individuals, the differences between their actual wages and the determined wage. This calculation yields the *SCA burden,* because it assumes that all below-SCA wage rates must be raised to SCA levels. Finally, the SCA burden is divided by the wage bill and converted to a percentage figure. This step puts the dollar figure for the SCA burden in perspective relative to the dollar size of the wage bill. Mathematically, the formula is

$$\text{SCA impact} = \frac{\sum_{i=1}^{N} f(w_i)(w_D - w_i)}{\sum_{j=1}^{M} f(w_j)w_j} \times 100 \, ,$$

where

w_D = the wage determined by DOL,
w_i = the ith wage $w_i < w_D$,
$f(w_i)$ = the number of employees earning w_i,
N = the number of different wage rates less than W_D in the occupation,
M = the total number of different wage rates in the occupation.

Using this methodology in a recent analysis of economic impact, the DOL concluded that in 1981, for 23 technical and clerical occupations in 30 areas of the United States, the SCA impact was only 4 percent[3] Several points need to be raised regarding this finding. The DOL did not state how either the occupations or the locations were selected for its analysis. Nor can one determine how representative the sample is of all contracts subject to the SCA. Furthermore, DOL understated the overall impact of SCA wage determinations by choosing technical and clerical occupations. Because collective-bargaining agreements are so important to some wage determinations (especially via successorship requirements), SCA burdens should be relatively larger in transportation-related occupations than clerical and technical occupations because of the relatively stronger union presence in the transportation industry. In addition, the wage measure should, in principle, include only private-sector wages not already affected by the SCA.

Goldfarb and Heywood (1982) provided an estimate similar to that of DOL (5 percent) for a 1981 sample of 6 technical and clerical occupations in 11 cities.[4] However, Goldfarb and Heywood noted that in their sample the SCA effect was as small as 0 percent (for a draftsman in Memphis) and as large as 12 percent (for a draftsman in Columbus). This degree of variation in the SCA effect is of critical importance because it indicates that it is possible for the SCA to increase wages consistently in a locality regardless of occupation or in an occupation regardless of locality. The variation demonstrates that the

SCA might regularly increase wages by a large amount for some occupations without appreciably raising aggregate wages in a large sample of occupations and localities. Consequently, the SCA impact on wages may be seen as moderate when viewed across a large sample of occupations and/or localities. However, a government agency that must contend with the SCA for a few occupations or localities may view the SCA impact as being quite large.

For this study I compared wage determinations issued by the DOL with Area Wage Survey data compiled by the BLS for 12 areas in which Reserve Banks purchase transportation services. Although my sample of locations was not random, it was not chosen to reveal unusual circumstances; the same methodology should provide similar findings for other areas. The chosen occupations—drivers and guards—constitute virtually 100 percent of labor costs for armored transportation services purchased by Federal Reserve Banks.

The SCA burden was shockingly greater when applied to transportation service employees than for employees in technical and clerical occupations (see table 1). For armored-car drivers, the SCA impact ranged from 1 percent in Buffalo, NY, and Hartford, CN, to 30 percent in Poughkeepsie, NY. For armed guards, the SCA impact ranged from 5 percent in New York City, NY, to 59 percent in Pittsburgh, PA. Most impacts for guards were close to 30 percent. Across all locations and both occupations, the SCA impact averaged 17 percent. These findings indicate that wage determinations applicable to Federal Reserve Bank contracts generally exceed market wages.

Surely, the differences between the nationwide SCA impact of 4 percent cited by the DOL and these figures for drivers and guards must lead to the conclusion that Federal Reserve transportation contracts are considerably more costly because of the SCA. These added expenses must show up in the prices charged for Federal Reserve services because of the requirements of the MCA.

IV. A Case Study: The Fourth Federal Reserve District[5]

The Cleveland experience demonstrates how the SCA can dramatically increase transportation expenses. The Federal Reserve Bank of Cleveland solicits bids in some areas from common carriers, which are exempt from the SCA by statute. *Common carriers* are transport companies that receive freight from the public and charge according to tariffs established by a regulatory body (state or federal). *Common carriers* are exempt from the SCA, because their freight rates are already regulated. Carriers not *common* are *contract* carriers that ship according to agreements negotiated by the firm and its customers. Many Federal Reserve Banks cannot take advantage of the common-carrier exemption to SCA, because carriers licensed to operate in their districts are often only contract carriers. Few Federal Reserve Banks have many opportunities to solicit bids from several competing common carriers. When competitors bid for Federal Reserve transportation routes, a common carrier paying market wages usually has an edge over contract carriers paying above-market wages.

During summer and fall 1978, the Pittsburgh office of the Federal Reserve Bank of Cleveland bid 18 intrastate armored routes regulated by the Pennsylvania Public Utilities Commission. Company A, a contract carrier, was the dominant armored carrier in western Pennsylvania, although independent common carriers and one small contract carrier provided armored service in some restricted areas. Prior to bidding, company A serviced the 18 routes.

Company B, a Pennsylvania common carrier, was the dominant carrier in eastern Pennsylvania, but did not operate out of Pittsburgh although licensed to do so. Company B bid $30,000/month on 15 of the 18 routes, while company A bid $68,000/month. Company B's costs were lower, in part, because it hired at a market wage below the union wage paid by company A and because

it staffed at levels not subject to the work rules in company A's union contract. Company B was awarded these 15 routes, and company A was awarded the remainder. Although the Cleveland Fed was subject to the SCA at the time it awarded routes to company B, company B was exempt from the SCA because of its common-carrier status.

Table 1 Impact of SCA on Wage Costs in Selected Cities in 1980

Location/ category	SCA-determined wage, dollars	Wage impact, percent	Area Wage Survey	
			Date	Wage distribution[a]
Boston, MA				
Drivers	8.77	7.56	8/1980	Medium truck drivers (all)
Guards	8.63	52.55		Guards (Class A)
Buffalo, NY				
Drivers	5.41	1.26	10/1980	Medium truck drivers (all)
Guards	5.32	16.34		Guards (Class A)
Cincinnati, OH				
Drivers	8.03	10.60	7/1980	Medium truck drivers (all)
Guards	7.91	19.08		Guards—manufacturing (all)
Eugene, OR[b]				
Drivers	8.08	1.74	8/1981	Medium truck drivers (all)
Guards	8.52	6.43		Guards—manufacturing (all)
Hartford, CT				
Drivers	5.65	1.29	3/1980	Medium truck drivers (all)
Guards	6.20	14.21		Guards—manufacturing (Class A)
Los Angeles, CA[c]				
Drivers	8.28	12.69	10/1979	Medium truck drivers (all)
Guards	7.94	30.59		Guards (Class A)
New York, NY				
Drivers	7.82	7.32	5/1980	Medium truck drivers (all)
Guards	7.67	5.09		Guards—manufacturing (Class A)
Pittsburgh, PA				
Drivers	8.27	8.71	1/1980	Medium truck drivers (Mfg)
Guards	8.22	59.15		Guards (Class A)
Portland, ME				
Drivers	5.95	18.22	12/1980	Medium truck drivers (all)
Guards	5.85	11.89		Guards—manufacturing (all)
Portland, OR[b]				
Drivers	9.70	2.59	6/1981	Medium truck drivers (all)
Guards	9.53	29.39		Guards—manufacturing (all)
Poughkeepsie, NY[d]				
Drivers	7.82	29.86	6/1980	Medium truck drivers (all)
Guards	7.67	31.63		Guards—manufacturing (all)
Trenton, NJ[d]				
Drivers	7.87	2.49	9/1980	Medium truck drivers (all)
Guards	7.67	21.80		Guards—manufacturing (all)

a. Occupations selected represent the closest available category incorporating drivers and guards in each Area Wage Survey.
b. SCA-determined wages not available for Eugene and Portland, OR, in 1980.
c. Wage determination of May 1979.
d. New York City's determinations were assigned to carriers in these cities, as was done by the DOL.

Had the services of company B not been available and its routes awarded to company A, the Cleveland Fed would have paid an additional $456,000/year for the transportation services on these 15 routes.

In May and June 1979, seven remaining armored routes running out of Pittsburgh were bid, five intrastate and two interstate. Company A bid $39,000/month for all seven routes. Company C, a common carrier, bid $11,000/month for the five intrastate routes. Company B, now operating as a contract carrier, bid $9,000/month for the two interstate routes. The combined total of the bids from companies B and C ($20,000/month) was 52 percent of company A's bid. It is notable that company B raised its bid from $6,000 to $9,000 only 14 days after discovering that it was subject to SCA's wage provisions. Companies B and C received awards for these seven armored-carrier routes. One year later, company B lost its two interstate routes to a new market entrant operating as a common carrier. The routes rate fell from $9,000/month to $5,600/month. In addition, company A ceased operation in Pittsburgh. At this time, company A had routes costing $5,000/month; these routes were awarded to common carriers for $3,800/month.

In spring 1981, armored-carrier routes in the Cincinnati, OH, area were bid. All carriers in Ohio were obliged to adhere to a wage determination under the successor provisions of the SCA. The Federal Reserve Bank of Cleveland was informed by one carrier, who had the necessary operating authority, that he would not bid for the routes because his wage rates were 50 percent below the wage determination. If this potential bidder had been an actual bidder, he would have bid about $22,000/month. Costs before the bid were $38,000/month; costs after the bid were $42,000/month. Because, in the absence of the SCA, contract costs would have been about $22,000/month, the impact of the SCA raised the contract price by roughly $20,000/month, or $250,000/year.

Currently, approximately $100,000/month is paid for transportation contracts elsewhere in Ohio on routes that have never been bid competitively among common carriers. Realizing that these routes would soon be bid, a number of contract armored carriers applied for and received permission from the Public Utilities Commission of Ohio to convert to common carrier status. Consequently, through competitive bidding, the Cleveland Fed reduced its expenses for these routes by about 40 percent, or nearly $500,000/year.

V. Summary and Conclusions

The SCA increases the federal government's cost of obtaining many services, even when those services are contracted through a "competitive" bidding process. Although the SCA, in theory, protects labor markets against federal government abuses, in practice the federal government may abuse labor and product markets through its application of the SCA. The usual consequences of such circumstances are revenue losses to the Treasury, fewer services provided to the public, and fewer people employed.

For some government agencies, economically efficient operation is not of paramount importance. In these agencies, the SCA and other prevailing wage laws may encumber operations, but they probably do not conflict with prime directives. This situation is not the case for the Federal Reserve.

In the Monetary Control Act, Congress instructed the Federal Reserve System to promote an efficient payments mechanism in the United States by pricing Federal Reserve services at their long-run costs. Because of the SCA, some Federal Reserve costs are greater than private-sector (competitive) costs; thus, Federal Reserve prices for some services are not as likely to force depository institutions to be more efficient.

The Federal Reserve services that are most affected by the SCA are those requiring ground transportation—check processing and cash services. These services are somewhat labor intensive and therefore price-sensitive

to labor costs. Data from DOL wage determinations and Area Wage Surveys indicate that the SCA increases the wages that Federal Reserve contractors must pay for truck drivers and armed guards by 17 percent on average. The increases generally are quite large for drivers and even more substantial for guards.

A difficulty associated with estimating the SCA burden on Federal Reserve transportation activities is the fact that transportation services themselves are usually regulated by some government agency. Even in the absence of the SCA, some Federal Reserve Banks would find few firms licensed to service some of their routes. The SCA screens firms from already thin markets. Firms with common-carrier status, exempt from the SCA, are frequently able to offer substantial savings, a point that is amply illustrated by the case study of the Fourth Federal Reserve District.

Despite the paucity of qualified firms competing in some localities, deregulation of the trucking industry is steadily leading to more competition for Federal Reserve business throughout the nation. The Federal Reserve System has been expanding its contractor base during the past few years, and it will continue to do so. While the SCA will impede this diversification, it will not prevent it. In markets where the SCA dramatically increases Federal Reserve costs, depository institutions not subject to the SCA may contract for their own transportation services. A Federal Reserve Bank simply would become another stop on the route. Market forces eventually would push market participants toward the most efficient mode of service provision, regardless of the SCA. Those high-wage jobs currently "protected" by the SCA would be lost to more efficient contractors.

The problems in letting market forces alone undermine the SCA are twofold. The process may take a considerable amount of time, especially because the transportation and financial services industries are not completely competitive. Furthermore, the Federal Reserve would not be able to discipline the market with low-cost service if it were the only competitor affected by the SCA.

Variance hearings are a cumbersome method for eliminating the SCA burden. Nevertheless, Federal Reserve Banks have successfully used, and are currently using, this process to alleviate undue SCA burdens. Variance hearings are not completely satisfactory for another very important reason, however. In some labor markets, wages might be high precisely because the SCA prevents potential competitors from entering the market. When this happens, it might be difficult to estimate correctly the true market wage for drivers and guards in the armored-carrier industry.

Unfortunately, there seems to be no simple remedy for the Federal Reserve. The DOL may grant exemptions to the SCA when it is "necessary and proper in the public interest" and to avoid the "serious impairment of Government business." The Federal Reserve has requested from the DOL an exemption for its priced transportation services in the interest of a more efficient national payments system. In rejecting the request, DOL did not agree that the statutory criteria for exemption were met.

If the social goals of the SCA are indeed valid, then merely showing that they interfere with *other* valid social objectives does not, by itself, imply an exemption is warranted. However, the evidence and analysis in this article argue that the DOL cannot ensure Federal Reserve contracts to high-wage firms in transportation markets that are becoming increasingly populated by SCA-exempt firms. Furthermore, as private financial institutions become more aware of the profit potential in these transportation services, they will seek to engage contractors directly and compete against the Federal Reserve. In the end, although DOL may not exempt the Federal Reserve System from the SCA, market forces operating through the explicit pricing of Federal Reserve services will ensure that market wage rates ultimately prevail. The potential inefficiencies of the SCA will become less important because of the law's increasing ineffectiveness.

Economic Commentary

Michael L. Bagshaw is a statistician with the Federal Reserve Bank of Cleveland; William T. Gavin is an economist, also with the Federal Reserve Bank of Cleveland.

Working Paper Review

Michael L. Bagshaw and
William T. Gavin
**Forecasting the Money Supply
in Time Series Models**
Working Paper 8304,
December 1983.
23 pp. Bibliography.

In this paper the authors develop a multivariate simultaneous equation model of the dynamic correlations among growth in money, credit, the interest rate, output, and prices. The Tiao-Box multivariate time series procedure is used to identify and estimate the model.

The Tiao-Box procedure is interactive, similar in principle to that used in single-equation Box-Jenkins modeling. The steps involved are (1) tentatively identifying a model by examining autocorrelations and cross-correlations of the series; (2) estimating the parameters of this model; and (3) applying diagnostic checks to the residuals. If the residuals do not pass the diagnostic checks, then the tentative model is modified and steps 2 and 3 are repeated. This process continues until a satisfactory model is obtained.

The model was estimated using both pre-seasonally adjusted and "raw" data. As one would expect, the conventional census X-11 seasonal adjustment procedures introduce a significant change in the dynamic cross-correlations among the variables.

Using not-seasonally adjusted data results in a forecasting model that is block recursive with two independent leading blocks, the price equation by itself, and the money and interest-rate equations. The credit equation depends on the money and interest-rate block. The output equation depends on both leading blocks. This result suggests that a bivariate model including just the interest rate and M-1 would predict M-1 as well as the five-variate model. Both should outperform a univariate model of the money supply process.

Using seasonally adjusted data results in a block recursive forecasting model in which the credit equation forms the leading block, the money and interest equations form the second block, the inflation equation is the third block, and the output equation is the final block. In this case the forecasts of M-1 from the five-variable model should outperform the bivariate and univariate models.

Forecasts of M-1 from the five-variate model were compared with forecasts from univariate and bivariate models. The results from the forecasting experiment were mixed. In five of the eight experiments, the five-variate model gave better forecasts than the smaller models. In two of the other cases, the results were very close. This was a turbulent period for monetary policy. The Federal Reserve adopted a new operating procedure in October 1979. The change in regimes was followed by unpredicted swings in the interest rate and more volatile growth in the money supply. In spite of this, the out-of-sample quarterly prediction error of M-1 was on the order of 1 percent when we intervened for the period of credit controls. This error is of the same magnitude as that found when standard econometric models are used. Overall, the forecasting results from this short period do not distinguish sharply between the three time series models.

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