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Contents

Is the Seventh District's economy deindustrializing?

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The Seventh Federal Reserve District is located on the western flank of what has been called the nation's "rustbelt." It is easy to see how this characterization might be applied to the Seventh District. The District's economy is heavily specialized in a number of troubled industries: automotive (Michigan), steel and machine tools (Illinois, Indiana, and Wisconsin), and a set of industries closely linked to the production and processing of food (Iowa). All of these have been adversely affected by structural changes in the national economy arising from international trade, such as the rising tide of auto and steel imports and the fall of grain exports, or changing product demand, such as the emergence of the computer. Indeed, an image of idle factories and massive blue-collar unemployment that seems to pervade the Seventh District has raised fears of nationwide deindustrialization, or an absolute decline of output produced in the nation's manufacturing sector.

Through analysis of manufacturing employment and output for the Seventh District between 1955 and 1984, this article offers new evidence that deindustrialization has in fact been occurring in the Seventh District, but only since 1970. The study shows how evidence of deindustrialization has been obscured by lumping economically diverse regions into a national aggregate. Also, by identifying a dramatic break in the growth trend of manufacturing output around 1970, the study explains why previous studies of regional deindustrialization, which have been limited to data only through 1978, were less conclusive.[1]

In contrast, claims of deindustrialization for the nation as a whole, have been refuted by convincing research.[2] Treating the nation as a single homogeneous region has allowed analysts to show that the popular view that the economy is reducing its manufacturing sector and replacing it with hamburger stands and laundromats is largely a myth. For example, far from declining, manufacturing output nationally has been on a rising trend for many years. More importantly, manufacturing's share of gross national product (GNP) has been remarkably stable at roughly 25 percent over the post-World War II era (allowing for deviations over the business cycle).

But, when regions are analyzed as separate and distinct (though interdependent) economies, what begins to emerge is a dichotomy between regional economies that are still growing and those that are not. Each region has its own economic history, each has its own specialization of products, and each has a different sensitivity to national and world economic events. The purpose of this article is to put the concept of deindustrialization into its proper perspective as a regional issue.

What is deindustrialization?

The term deindustrialization can cause confusion if used too loosely. For example, one definition that has been offered is "widespread, systematic disinvestment in the nation's basic industrial capacity."[3] Using the level of investment as a measure, however, may be too restrictive to find evidence of deindustrialization except in the nation's aging urban centers. In another recent study, deindustrialization was equated with a decline in regional manufacturing output relative to the whole national economy.[4] However, the manufacturing sector of the entire "rustbelt" has been a declining share of the nation's manufacturing sector *since the turn of the century.*[5]

Definitional problems have not been the only source of confusion in understanding deindustrialization. Distinguishing between an underlying trend that is distinct to a region and a national influence that is affecting all regions more or less equally is another problem. A decline in a region's manufacturing sector over a given period of time may be due solely to a

hypersensitivity to the national business cycle. Indeed, both manufacturing employment and output in the nation have for the most part been declining since 1979, which is overwhelmingly a short-term business-cycle phenomenon. As such, the period from 1979 to 1984 should not be interpreted as *prima facie* evidence of deindustrialization. A careful analysis of a region's economy must put recent events into an historical perspective that can distinguish between cycle and trend.

A final problem with analyzing regional trends is that, with the exception of employment measures, economic data for the manufacturing sector are at best fragmented. The Census of Manufacturers (CM) and the Annual Survey of Manufactures (ASM) provides a rich source of data on a region's manufacturing base. However, three critical years are missing from the ASM, preventing time-series analysis beyond 1978. The problem can be overcome by approximating values for the missing observations of the manufacturing output and for nonmanufacturing output (see box).

Employment trends—overstating the decline

Given the completeness of regional employment data, it is not surprising that the image of District trends has been heavily shaped by the relative and absolute performance of manufacturing employment. Although highly cyclical in nature, manufacturing employment in the United States has been virtually flat since the mid-1960s.[6] In contrast, the Seventh District's manufacturing employment has been declining visibly over the same period (see Figure 1). Moreover, once the District's trend is removed from the national data, the rest of the nation can be seen to continue expanding manufacturing employment (again, taking into consideration cyclical swings).[7]

Three problems occur with drawing conclusions about regional deindustrialization that are based on employment trends. First, because the District has a high proportion of both mature and cyclically sensitive industries, some of the observed weakness in the District's economy may be attributed to its industrial mix. Obvious examples are the decline of the domestic steel industry, heavily concentrated in the Chicago-Gary area, and of the automotive

Figure 1
Manufacturing employment trends

SOURCE: Department of Labor, Bureau of Labor Statistics.
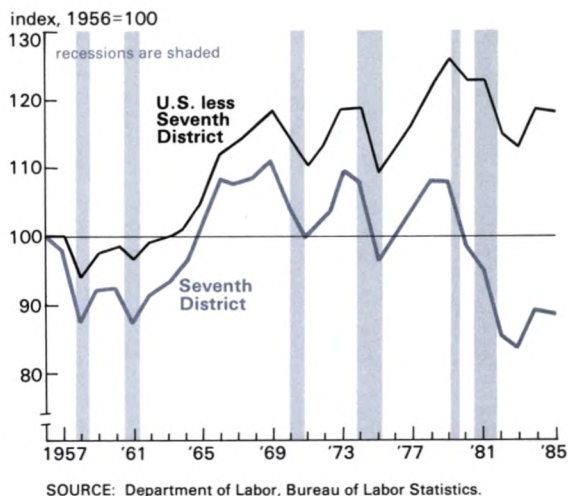
industry, concentrated in the Detroit area. Since virtually all of the District's industries have lagged their national counterparts, however, the problem is clearly not confined to an unfavorable industrial structure.[8]

Second, some of the states in the District could account for all of the decline in the District, while other states were expanding employment. Iowa, for example, is much more of an agriculturally oriented state than the rest of the District and its manufacturing employment growth up until the late 1970s was exceptionally stronger than any of the other states.[9] Wisconsin has also experienced above-average employment growth for a District state. In the three biggest District states, however, manufacturing employment has been declining. So, even within the District there existed a split at least until the 1980s between states that were industrializing and states that were deindustrializing.

The third problem with focusing on employment is that, if labor is becoming more efficient, employment can be declining at the same time that output in the region is rising. Alternatively, a region may shift its production processes away from labor without sacrificing output by substituting capital for labor or by purchasing more business services.[10] Finally, the region may be expanding its capital stock more rapidly than its employment.[11] In each of these cases, labor productivity could rise

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Filling in the blanks

The Bureau of the Census did not publish regional data in the ASM for the years 1979, 1980, and 1981. Data for value added of total manufacturing by state for 1980 was obtained upon request from the Bureau, but estimates had to be made for the remaining years. Estimates of hours worked for all three years were also needed to compute labor productivity. The Longitudinal Establishment Data (LED) file (which was developed by the Bureau of the Census) provided the basis for estimating these missing observations. The LED file contains all of the information originally in the 1972 and 1977 CM and the 1978-81 ASM. From the LED file, a sample of all firms with over 100 employees was obtained. Depending on the state and the particular variable, this LED sample represented between 60 and 80 percent of the ASM data for the years in which the two series overlapped (1972 to 1978). (For further information see James L. Monahan, "Procedures for Using the Longitudinal Establishment Data File," *Technical Notes*, Bureau of the Census, April 1983.)

The formula applied to the LED data for nominal value added (NVALED) to approximate the missing ASM data (NVAASM) during a given year, using 1979 and the Seventh District (7G) as an example, was:

$$\hat{NVA}7G_{79} = NVALED_{79} * \left[\frac{NVAASMUS79}{NVALEDUS79} \div \frac{\sum_{t=72}^{78} \frac{NVAASMUS_t}{NVALEDUS_t} * \frac{NVALEDG_t}{NVAASM7G_t}}{7} \right]$$

aproximated values, $\hat{NVA}\_$, were then deflated by the Producer Price Index for all commodities and converted to their log values to get the final estimated measure of output ($LNVA\_$) that was entered in the model.

The formula is a modification of a simple formula that would compute the average ratio of LED to ASM data during the overlapping years (1972 to 1978) and assume that the ratio holds for the missing years. Because the ratio is known at the national level during the missing years, its inclusion provides useful information for those years. The assumption is that the regional ratio of LED to ASM moves in the same direction as the ratio for the nation. In addition, the inclusion of the national data provides a more stable ratio upon which to estimate the missing regional observations.

enough to offset declines in employment, so that the region's output continues to expand.

In the case of the Seventh District, labor productivity in manufacturing has been rising steadily throughout the post-World War II era. However, its productivity has lagged the rest of the nation. Labor productivity in the District grew 2.0 percent annually between 1955 and 1984 (but only 1.3 percent if Iowa and Wisconsin are excluded). In contrast, the rest of the nation expanded labor productivity at a 2.2 percent annual rate. The question now becomes whether the growth in productivity was enough to offset employment declines in

manufacturing, so that manufacturing output continued to expand. If so, the District's economy could still be industrializing in terms of output, if not in terms of employment.

Output trends—nearer the mark

Observing the underlying trend in the District's manufacturing output from the raw data is more difficult than was the case with employment data (see Figure 2). What is obvious from the data is first that manufacturing output had been trending upwards in both the District and the rest of the nation at least until

Figure 2
Trends in manufacturing output

index, 1955=100

recessions are shaded

U.S. less
Seventh
District

Seventh
District

1956   '60   '64   '68   '72   '76   '80   '84
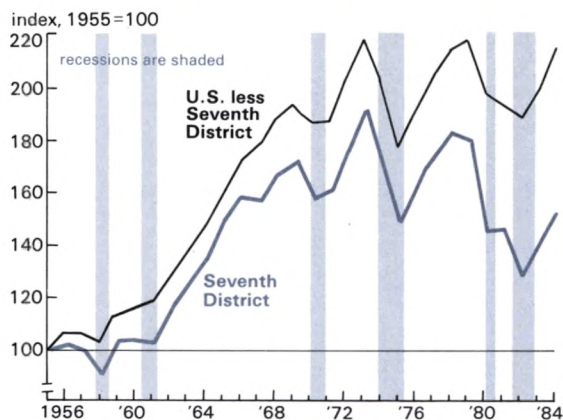
SOURCE: Department of Commerce, Bureau of the Census.

the early 1970s. Second, manufacturing output in the District has yet to surpass its 1973 peak. Recessions in both the early 1970s and 1980s account for some of the difference before and after the early 1970s. But, unless the business cycle can explain all of the difference, the weakness since the early 1970s signals a fundamental break in the underlying output trend.[12]

Separating the influence of business-cycle fluctuations from the underlying trend can be achieved through regression analysis. A model was constructed to determine if there was any period of statistically significant decline in the District's manufacturing output (using value added deflated by the Producer Price Index as a proxy for output). The basic form of the model was:

$$LNVA\_\_ = a_1 + a_2 D71 + bLNGNPCHG + c_1 T + c_2 D71*T + e$$

where $LNVA\_\_$ = natural log of real value added in manufacturing

LNGNPCHG = change in the natural log of real gross national product (the business-cycle variable)

T = time trend

D71 = dummy variable (D71 = 1 beyond 1970 and 0 otherwise).

By testing a variety of years to serve as the dividing point of the dummy variable in the model, the year 1971 was found to give the best statistical results.[13]

Because the model in effect has two slopes and two intercepts, the actual year of the break in trend may differ from the year chosen for the dummy variable. Therefore, the model must be solved for the break, which was usually during 1970 or 1971 for the Seventh District and its five states. The causes for the break are associated with such factors as technological changes and shifting product demand, whose impact may have been building for several years prior to 1970. It is interesting to note that, while the energy shocks in 1973 and 1979 certainly contributed to the decline, the break occurred about three years prior to the onset of the energy crisis.

The results of the regression analysis show that, after growing on average at an annual rate of 4.4 percent up to 1970, manufacturing output in the District has since been declining at a 1.4 percent annual rate (see Table 1). In other words, even after accounting for the cyclical weakness of the 1970s and 1980s, there is significant evidence that the District has been deindustrializing.

In contrast, the rest of the nation was still edging upward at 0.2 percent per year over the post-1970 period. While that growth rate was not large enough to be significantly different from zero, it supports the argument that the rest of the nation was not deindustrializing. More importantly, the disparity between the District and the rest of the nation helps explain why evidence of deindustrialization has not been discovered at the national level. From a long-term perspective, the level of manufacturing output for the nation as a whole was virtually flat between 1970 and 1984. As in the case of employment, opposing regional trends in manufacturing output are roughly offsetting each other.

Variations in output performance within the District followed a pattern similar to the one found in employment (see Figure 3). Declines in manufacturing output during the post-1970 period were most pronounced in Illinois, Indiana, and Michigan. Both Iowa and Wisconsin behaved more like the national average by flattening out rather than reducing their level of manufacturing output. Both

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Table 1

Regression results: Absolute change in manufacturing value added

Dependent variable	Independent variables					R^2	Break in trend (year)
	Intercept	D71	LNGNPCHG	t	D71*t		
LNVA7G	11.42 (.0001)	.95 (.0001)	2.17 (.0001)	.044 (.0001)	-.058 (.0001)	.83	mid-1970
LNVAUS	12.91 (.0001)	.76 (.0001)	1.41 (.0001)	.048 (.0001)	-0.48 (.0001)	.92	1970
LNVAUSX	12.64 (.0001)	.71 (.0001)	1.21 (.002)	.049 (.0001)	-.045 (.0001)	.93	1970
LNVAIL	10.43 (.0001)	.96 (.0001)	1.50 (.004)	0.41 (.0001)	-0.59 (.0001)	.74	1971
LNVAIN	9.63 (.0001)	1.02 (.0001)	2.30 (.0001)	.049 (.0001)	-.062 (.0001)	.86	mid-1970
LNVAIA	8.37 (.0001)	.93 (.0001)	1.06 (.02)	.061 (.0001)	-0.56 (.0001)	.92	1971
LNVAMI	10.15 (.0001)	1.09 (.0001)	3.57 (.0001)	.045 (.0001)	-.065 (.0001)	.80	1971
LNVAWI	9.37 (.0001)	.69 (.0001)	1.47 (.0004)	.042 (.0001)	-.041 (.0001)	.92	1971

NOTE: Figures in parentheses are levels of significance. A level of less than or equal to .05 (i.e. 5%) indicates that the variable has a significant impact on the dependent variable.
To correct for 1st-order serial correlation, a two-step full transformation method was applied.

The dependent variables: *LNVA___* = natural log of real value added for the Seventh District (7G), the U.S., the US excluding the 7G (USX), Illinois (IL), Indiana (IN), Iowa (IA), Michigan (MI), and Wisconsin (WI).

The independent variables: D71 = dummy variable for years $\geq$ 1971.
LNGNPCHG = change in natural log of real GNP.
t = the time trend.
D71*t = the product of the time trend (t) and D71 (i.e., growth rate post 1971).

states began to plateau about the same time as the national slowdown, rather than one to two years before when the other three states began to decline. In addition, the model was able to explain only 70 percent of the variation in the data for Michigan and Illinois, compared to about 90 percent for the nation, which suggests that other factors that are unique to these states have been influencing their growth.

It is interesting to note differences in sensitivity to the business cycle, which help obscure the differences in trend growth among the District states. On average, the District (with an elasticity of 1.78) is about two and a half times more sensitive to the business cycle than the rest of the nation (with an elasticity of 0.72). Iowa again turns out to be more similar to the rest of the nation, while Michigan is more than four times as sensitive as Iowa to swings in national business-cycle activity.

The variations in behavior with respect to both cycle and trend raise the possibility that differences in industrial structure may account for the District's poor output performance relative to the nation. For example, the domestic auto and steel industries are both highly cyclical and mature industries. The District's declining manufacturing output might simply be due to the exceptionally high concentration of these two industries in the Seventh District. The data used in this study do not adjust for structural differences among regions. Other estimates of District output, such as the Midwest Manufacturing Index (MMI), can be ad-

Figure 3
Seventh District manufacturing output trends by state

index, 1955=100
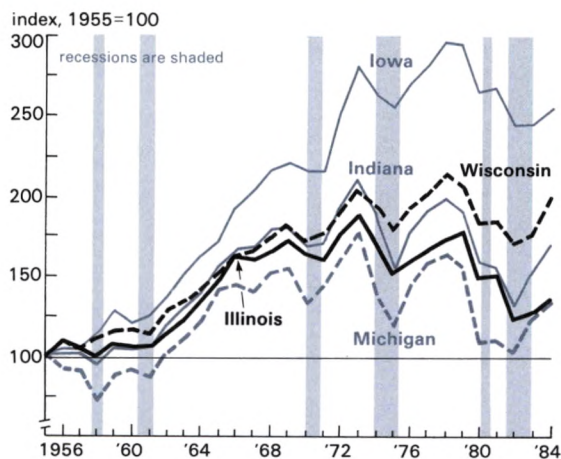
SOURCE: Department of Commerce, Bureau of the Census.

justed for industrial structure. However, adjusting the MMI shows a similar (but less severe) pattern of decline since the early 1970s.[14] Thus, an unfavorable mix of industries (i.e., industries that are performing poorly across the nation, but are concentrated in the Seventh District) can not alone explain the decline in the District's manufacturing output.

Another concern is the extent to which productivity differences between the District and the rest of the nation may account for the District's declining manufacturing output. Indeed, if labor productivity for the rest of the nation were applied to the District's level of manufacturing employment, the hypothetical level of District output that is attained does not show a statistically significant decline during the post-1970 period. However, the District would still have experienced more of a slowdown during that period than the rest of the nation. This finding indicates that productivity differences are important in explaining the District's deindustrialization, but are not the only explanation. Competitive disadvantages of District producers, often attributed to wage rate differentials, unionism, and shifting regional markets, are also important.[15]

Some qualified answers

The volatile behavior of the Seventh District's economy in recent years has raised many questions and concerns about its future viability. Among the most pressing is whether deindustrialization is a valid description of what is afflicting the District's economy. This study provides evidence that since 1970 the Seventh District's manufacturing sector has been producing fewer and fewer goods. This decline represents deindustrialization in the sense of an absolute decline in output.

The exact causes of the District's deindustrialization are complex and beyond the scope of this study. The fact that growth of manufacturing output in the District has been lagging the nation over the past four decades or so indicates that the stage was being set for absolute deindustrialization whenever the national economy faltered. And, indeed, a break in the trend since 1970, which represented a national slowdown in the growth of manufacturing output, finally translated into an absolute decline in the District's output. Of course, a resurgence in the national economy might provide a short-term solution to the District's decline in output by literally pulling the District out of its deindustrialization.

A strong national expansion, however, would not change the underlying factors in the District's economy that have caused the District's manufacturing sector to lag the nation. Viewed from this perspective, the period of deindustrialization has been a culmination of underlying factors that became the dominant forces shaping regional growth after 1970. Further research in identifying these factors and quantifying their impact on regional growth patterns may help state and local governments design policies to help District producers improve their competitiveness and to reverse the District's current trend in manufacturing output.

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[1] Studies of regional deindustrialization to date have generally been inconclusive and often differed as to what they meant by deindustrialization. See, for example, Bluestone, 1984 and Bartholomew, et al., 1986.

[2] See Lawrence, 1984, for the most persuasive argument on the subject to date.

[3] See Bluestone, 1984, p. 39.

[4] See Bartholomew, et al., 1986.

[5] See North and Rees, 1979.

[6] See Tatom, 1986, for a detailed discussion of manufacturing employment trends at the national level.

[7] Taking a simple regression of employment levels over time and controlling for the business cycle indicates that the District was declining at a 1.1 percent rate, compared to a 0.3 percent growth for the nation excluding the District, while the nation as a whole was virtually flat.

[8] For an extensive set of data that compares industry growth rates by state with their national counterparts, see *The Iowa Economy: Dimensions of Change, 1987.*

[9] For more details of Iowa's economy, see *The Iowa Economy: Dimensions of Change, 1987*

[10] A good example is the case of General Motors (GM) acquiring Electronic Data Systems (EDS). When GM transfered approximately 6000 of its employees to EDS, it reduced its labor force without affecting output, which caused its productivity to show a rise.

[11] Hulten and Schwab, 1984, attribute much of the regional differences in output growth to expansion of labor and capital, rather than to differences in efficiency of the work force.

[12] Johnson, 1981, also cites the effects of a weak economy on investment and capital formation in the 1970s.

[13] In this model, the slope of the time trend in the post-1970 period would be the sum of the time trend coefficient, c_1, and the dummy variable times the trend coefficient, c_2. A separate model was necessary to test whether the coefficient for the time trend after 1970 was significantly different from zero. In the second model, separate dummy variables were incorporated for pre-1971 and post-1970 in both the intercept and the time trend variable. Coefficients for the post-1970 trend variable were significantly different from zero at the 0.05 probability level for Illinois, Indiana, and Michigan. However, the model using pooled data for the District states (with dummy variables controlling for the states) did confirm that the coefficient for the trend was significantly different from zero after 1970. Tests to see if a dummy variable should be applied to the cycle variable (i.e., if cycles were more intense in the post-70 period than the pre-71 period) proved negative and, therefore, were not included in the final model.

[14] The Midwest Manufacturing Index is a weighted combination of 17 manufacturing industries. To see the effect of industrial structure, the District weights were replaced with national weights. The resulting combination of District industries would then reflect the District's performance, if it had the same proportional mix of industries as the nation. For a discussion of the Index, see Schnorbus and Israilevich, 1987.

[15] See Hekman and Strong, 1980.

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Some macroeconomic effects of tariff policy

David Alan Aschauer

The exchange value of the dollar against the currencies of most of the United States' major trading partners—especially Japan and West Germany—has fallen significantly since reaching a peak in early 1985. Yet U.S. current account deficits with these countries have yet to show substantial reductions. Impatience on the part of export industries has been reflected in some recent protectionist legislation, with the promise of more to come.

A typical argument for protectionist legislation emphasizes two supposed results from higher tariffs. First, by making foreign goods more expensive, tariffs cause imports to fall and thus improve the current account. Second, as domestic residents shift expenditure patterns from foreign to domestic goods, home employment and production are stimulated. Fewer Americans driving Toyotas and BMW's mean more jobs for blast furnace operators in Gary, for tire producers in Akron, and for assembly line workers in Flint.

This article explores some of the effects of tariff policy on the macroeconomic levels of employment, output, and the trade deficit within a simple model that describes our economy functioning over a period of time. This model allows us to manipulate economic factors to analyze the effects of various policies (see box). The focus of the analysis is on the validity of the two asserted results of import taxation listed above. Although it is possible for tariff policy to engineer a reduction in the trade deficit, by altering the structure of foreign goods prices over time, it is crucially important to distinguish between tariffs which are temporary and those which are permanent. Indeed, permanent tariffs may have little discernible impact on the trade deficit.

Also, the likely associated effect of increased tariffs will be a reduction in the level of domestic production. The taxation, via tariffs, of the consumption of foreign-produced goods will ultimately encourage a substitution into nonmarket activities, such as leisure and household production, and away from market activities of labor force participation, employ-

ment, and measured production. Thus, the basic conclusion of this article is that it may be well to avoid protectionist policies if the goals of macroeconomic policy are to sustain high levels of employment, output, and exports.

Macroeconomic effects of tariffs

Using the model described in the box on pages 12 and 13, we can examine some of the effects of temporary and permanent tariffs. Figure 1 shows how tariffs affect the levels of domestic consumption of domestic goods (c_0 in the figure) and imported goods (c_0^*) ; of domestic output (y_0); and of the balance of trade (ϕ_0). The level of domestic demand ($y_0^d = c_0 + c_0^*$) depends negatively on the world rate of interest (r) because a higher rate of interest implies a higher cost (in terms of future goods forgone) of current consumption. For instance, higher credit rates induce some consumers to postpone buying both domestic and import goods. On the other hand, the aggregate supply of domestic goods (y_0^s) depends positively on the world rate of interest because a higher rate of interest implies (in terms of future goods) a higher return to current production. For example, by producing when interest rates are high, a company could invest the net revenues from production in financial assets and get a higher payoff in the future. The current trade deficit equals the difference, at any interest rate, between the aggregate demand curve (y_0^d) and the aggregate supply curve (y_0^s) as by definition it equals the amount we consume above what we produce. For an interest rate below r, a trade deficit arises because the low rate of return has raised the quantity of goods demanded while lowering the quantity of goods supplied. However, for an interest rate above r a trade surplus arises since the higher interest rate has the opposite effect on production and demand. Thus, the trade deficit depends inversely on the rate of interest; it is graphed as the ϕ_0 curve.

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Figure 1
Domestic consumption, output, and the balance of trade

Domestic consumption and output

Balance of trade
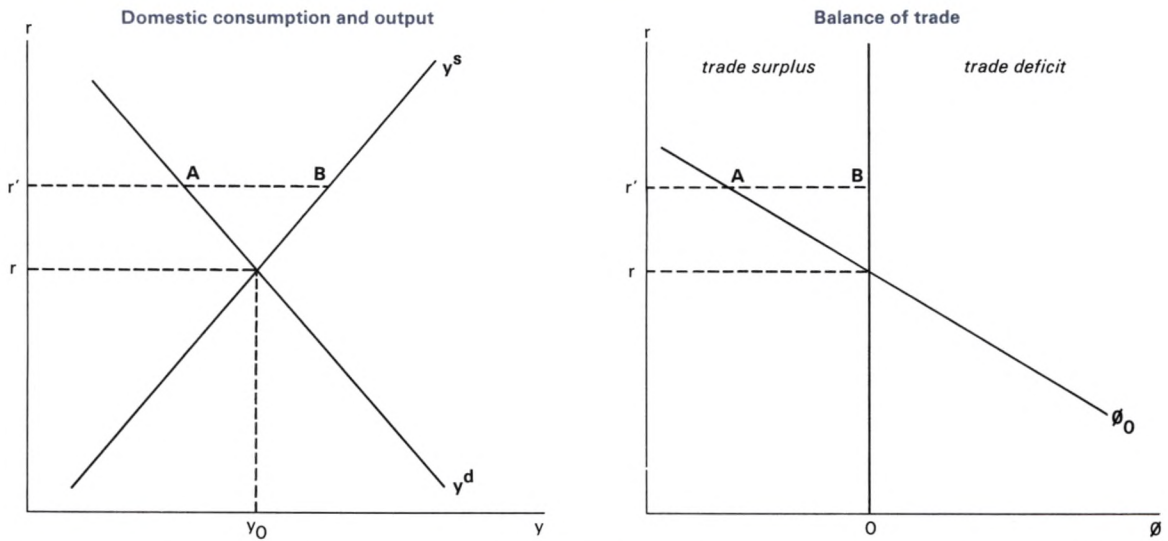
NOTE: $y^d \equiv$ domestic consumption (home and foreign goods); $y^s \equiv$ domestic production; $\phi \equiv$ trade balance ($\phi > 0$ denotes a trade deficit, $\phi < 0$ a trade surplus); $r \equiv$ world interest rate.

Figure 2
A temporary tariff

Domestic consumption and output

Balance of trade
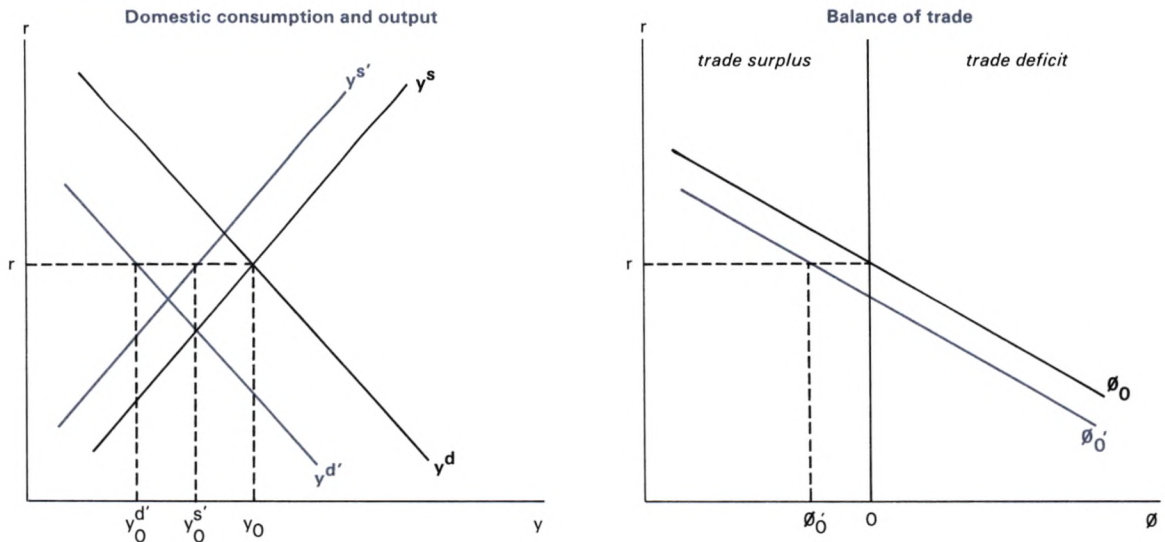
A temporary tariff

Consider, now, the effect of a temporary tax on the importation of goods so that $\mu_0 > 0$ while $\mu_1 = 0$. This tariff raises the contemporaneous price of foreign goods and induces a substitution into current home-produced goods and, over time, into future home- and foreign-produced goods. Thus, on net, the tariff will reduce the consumption of current foreign goods by more than it raises the consumption of domestic goods and the *total* demand for goods falls. In Figure 2, the y^d curve shifts from y^d to $y^{d'}$ reflecting this incom-

A macroeconomic model of an open economy

In this box a model is constructed for the purpose of analyzing the macroeconomic effects of tariffs. The model economy is composed of a representative agent with an infinite planning horizon who chooses levels of consumption of domestic and foreign goods as well as the level of work effort over all periods. These choices are made to maximize the utility function

$$\underline{u} = u(c_0, c_0^*, n_0) + \frac{1}{\rho} u(c_1, c_1^*, n_1) \quad (1)$$

where $c_i \equiv$ consumption of domestic goods in period i, $c_i^* \equiv$ consumption of foreign goods in period i, n_i work effort in period i, and $\rho \equiv$ a subjective rate of time preference such that $0 < \rho < 1$. The momentary utility function $u(c_i, c_i^*, n_i)$ is assumed to depend positively on the consumption of home and foreign goods and negatively on work effort. Further, the function is characterized by the feature that successive unit increases in consumption (work effort) raise (lower) utility by lesser (greater) amounts. Implicitly it is assumed that all "future" periods 1,2... are identical so that it is appropriate to consider period 0 as the present and period 1 as the future.*

The agent's opportunities are summarized by the intertemporal budget constraint

$$c_0 + (1 + \mu_0)c_0^* + \frac{c_1 + (1 + \mu_1)c_1^*}{r}$$

$$= f(n_0) + t_0 + \frac{f(n_1) + t_1}{r} \quad (2)$$

which states that the present value of expenditures on home and foreign goods must equal the present value of income from production and transfers from the domestic government to domestic residents. Here, μ_i is the tax rate imposed on foreign goods in period i, t_i are transfers in period i, and $f(n_i)$ is production in period i, accomplished with the use of labor in-

put. The production technology is assumed to be characterized by a positive but nonincreasing return to labor. The form of equation (2) implies that if the individual's planned consumption and production levels do not match for a particular period, he may visit the domestic or international capital markets to borrow or lend at the world rate of interest r, subject only to the constraint that such borrowing and lending cancel over time. In this section, the world rate of interest is assumed to be unaffected by actions taken by the domestic economic agents.

The maximization of the objective function subject to the budget constraint leads to the first order necessary conditions

$$u_n(.i) = -f'(.i)U_c(.i) \quad 1 = 1,2 \quad (3.1, 3.2)$$

$$u_c^*(.i) = (1 + \mu_i)U_c(.i) \quad 1 = 1,2 \quad (4.1, 4.2)$$

$$u_c(.0) = \frac{r}{\rho} U_c(.1) \quad (5)$$

along with the budget constraint (2). Equation (3) states that the marginal disutility of work effort in any period, U_n, must be equal to the marginal return to work effort, f', times the marginal utility of the consumption of that return, U_c. Equation (4) dictates that the marginal utility of the consumption of foreign produced goods, U_c^*, must be equal to the foregone utility from consumption of domestic goods, $(1 + \mu_i)U_c$. Finally, equation (5) ensures that the individual chooses consumption over time in an optimal fashion; by forgoing a unit of current consumption the utility loss would be $U_c(.0)$, which must be matched by the utility gain of r extra units of consumption in all future periods, $(r/\rho)U_c(.1)$.

The government derives revenue from the taxation of foreign goods, which could be used to purchase goods and services. However, to isolate the pure effects

of tariff policy, it is assumed here that the government transfers the tariff revenues in a lump sum way to the private sector. Accordingly, its intertemporal budget constraint is given by

$$\mu_0 \overset{*}{c_0} + \frac{\mu_1 \overset{*}{c_1}}{r} = t_0 + \frac{t_1}{r} \qquad (6)$$

which equates the present value of tariff revenue to the present value of transfers. The form of this constraint allows the government to borrow or lend in the international capital market on the same terms as the private agent.**

The model is closed by defining the trade deficit to be equal to the difference between total consumption and total production, or

$$\phi_i = c_i + \overset{*}{c_i} - f(n_i). \qquad (7.1, 7.2)$$

For instance, if the consumption of home produced and foreign produced goods were to equal domestic production, exports $(f(n_i) - c_i)$ and imports $(\overset{*}{c_i})$ would be balanced and the trade deficit (ϕ_i) would be zero. Alternatively, one may view ϕ_1 as the surplus in the capital account because, if the current account is in deficit, individuals must be borrowing (exporting bonds) in an equivalent amount for overall balance in international payments.† Lastly, equations (2), (6), and (7) imply that the trade account must balance intertemporally, or

$$\phi_0 + \frac{\phi_1}{r} = 0 \qquad (8)$$

Equilibrium

The model's general equilibrium is described by equations (3), (4), (5), (7), and (8) in the endogenous variables $(c_0, \overset{*}{c_0}, n_0, c_1, \overset{*}{c_1}, n_1, \phi_0, \phi_1)$ These can be reduced to five equations by first using equation (7) to substitute for c_0 and c_1 in equations (3), (4), and (5) and then using equation (8) to eliminate ϕ_1 in these revised equations. This yields

$$U_n(f(n_0) - \overset{*}{c_0} + \phi_0, \overset{*}{c_0}, n_0) =$$
$$-f'(n_0) U_n(f(n_0) - \overset{*}{c_0} + \phi_0, \overset{*}{c_0}, n_0) \qquad (9)$$

$$U_n(f(n_1) - \overset{*}{c_1} - r\phi_0, \overset{*}{c_1}, n_1) =$$
$$-f'(n_1) U_c(f(n_1) - \overset{*}{c_1} - r\phi_0, \overset{*}{c_1}, n_1) \qquad (10)$$

$$U_c^*(f(n_0) - \overset{*}{c_0} + \phi_0, \overset{*}{c_0}, n_0) =$$
$$(1 + \mu_0) U_c(f(n_0) - \overset{*}{c_0} + \phi_0, \overset{*}{c_0}, n_0) \qquad (11)$$

$$U_c^*(f(n_1) - \overset{*}{c_1} - r\phi_0, \overset{*}{c_1}, n_1) =$$
$$(1 + \mu_1) U_c(f(n_1) - \overset{*}{c_1} - r\phi_0, \overset{*}{c_1}, n_1) \qquad (12)$$

$$U_c(f(n_0) - \overset{*}{c_0} + \phi_0, \overset{*}{c_0}, n_0) =$$
$$\frac{r}{\rho} U_c(f(n_1) - \overset{*}{c_1} - r\phi_0, \overset{*}{c_1}, n_1) \qquad (13)$$

which are five equations in current and future imports, current and future employment, and the current trade deficit. Comparative statics techniques may be used to determine the impact of changes in tariff policy on these endogenous variables.

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*See Aschauer (1985) "Fiscal Policy and the Trade Deficit."

**As it turns out, whether or not the government actually runs a surplus or deficit is irrelevant to the analysis. This is because lump sum transfers do not appear in the set of equations (9) through (13) which describe the economy's general equilibrium. Hence the timing of the transfer of tariff revenue back to the private sector is irrelevant.

†As there is no initial debt in this model, in the first period the trade and current accounts are equivalent.

Figure 3
A permanent tariff

Domestic consumption and output

Balance of trade

trade surplus   trade deficit
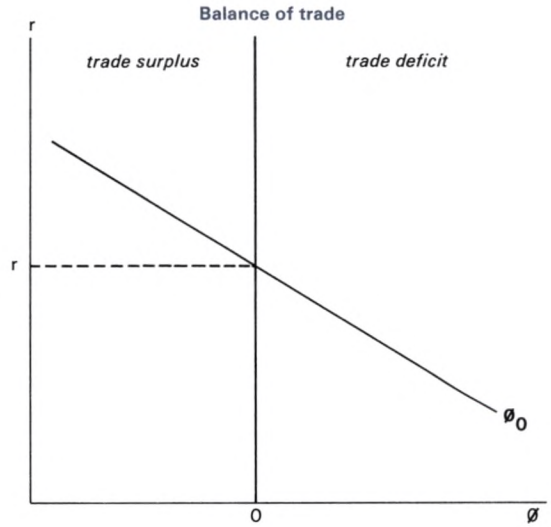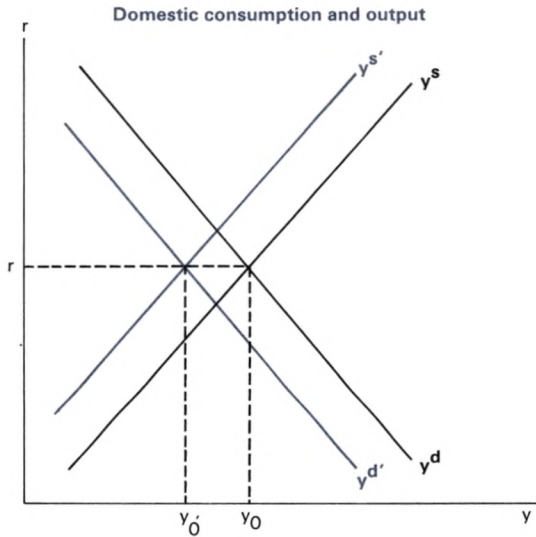
plete current substitution of home for foreign consumption goods.

On the supply side of the economy, an effect of the tariff is to raise the price of imported consumption goods relative to leisure; this promotes a shift away from the market activity of production, because the return to current production as measured by the ability to purchase foreign goods has been diminished. For example, rather than working as much and spending his earnings at an expensive restaurant serving Japanese beef, a lawyer may instead buy cheaper domestic beef and use the time to cook at home. In Figure 2, this effect is illustrated by a shift in aggregate supply from y^s to $y^{s'}$.

The net effect of the temporary tariff is to reduce the total demand for goods by a larger amount than the fall in the level of domestic production. This is because individuals recognize that the tariff is a temporary tax on total consumption and increase savings in order to shift consumption to the future where consumption goods are now relatively less expensive. This, in turn, creates a capital account deficit and a current account surplus equal to $\phi'_0 = y^s_0 - y^{d'}_0$. So, the temporary tariff has the effect of improving the trade account.

The improvement in the trade account, however, comes about by a reduction in domestic production. Along with the result that

the consumption of domestic goods has risen, we see that exports

$$x_0 = y^s_0 - c_0$$

must fall in response to the temporary deficit. The current account improves because the reduction in import demand dominates the reduction in exports.

In summary, a temporary tariff acts as a tax on foreign goods, domestic production, and exports, and as a subsidy to domestic goods consumption and leisure. In the formulation of public policy, it is important that these general equilibrium effects on production, exports, and so on, be kept in mind so as to avoid significant policy blunders. In particular, *the argument that a tariff will have the effect of raising domestic employment and output is found to be erroneous in this particular model.*

A permanent tariff

Now let us investigate the impact of a permanent tariff on foreign goods. As before, the rise in the price of foreign goods relative to home goods causes a demand shift away from foreign products and toward domestically produced consumption goods. On net, the level of total demand for consumption goods falls and, in Figure 3, the y^d curve shifts to $y^{d'}$. Also, the return to production as measured in

Figure 4
World equilibrium interest rates
and trade flows
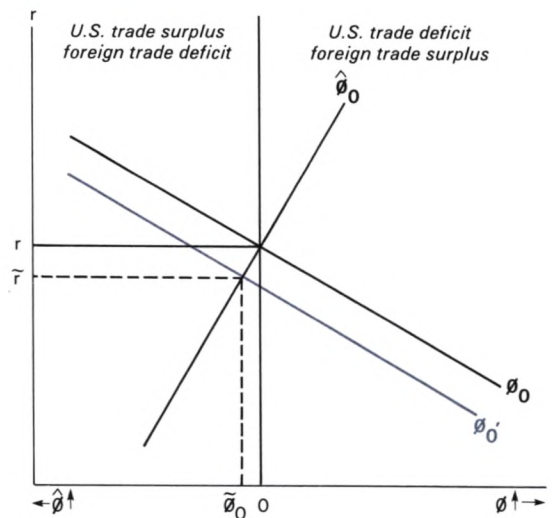
Figure 4
World equilibrium interest rates and trade flows

Figure 5
U.S. temporary tariff (no retaliation)
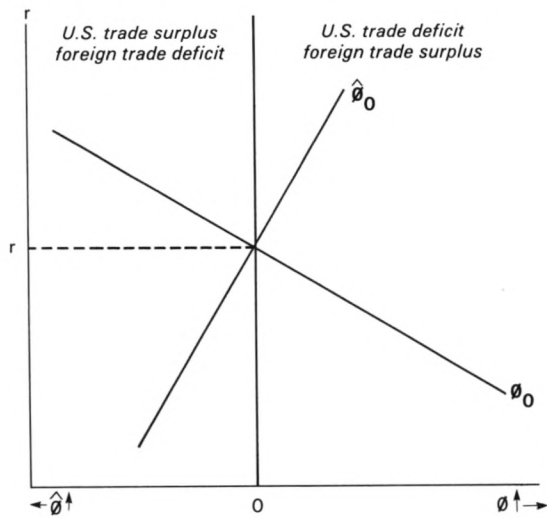
units of foreign goods has fallen; this induces a decrease in domestic production, which shifts y^s to $y^{s'}$.

The major qualitative difference between a temporary and permanent tariff is reflected in the fact that the former brings about a change in the price structure of foreign goods over time. A permanent tariff raises the relative price of foreign goods in all periods so that there is no reason for agents to reallocate resources over time in the pursuit of relatively cheaper goods. Thus, the shifts to total consumption demand and supply are equal to one another and the permanent tariff has no effect on the trade account.

Although net exports are left unaffected, this is accomplished through a mutual, equal reduction in imports and exports. In this sense, a permanent tariff, as a tax on imported goods, is identical in its effect on the trade balance as would be a tax on exports. This points out, dramatically, the likely fruitlessness of a policy of tariffs: *The net result of a policy of imposing and sustaining higher tariffs is to reduce employment and output while leaving the trade balance virtually unchanged.*

Finally, note that the logic of the model implies that the anticipation of an increase in tariffs in the future will bring about an increase in the current trade deficit as agents attempt to avoid the tax on future foreign goods by importing and consuming in the present. The

expectation by economic agents that the government will respond to a trade deficit of a certain magnitude by future tariff legislation may very well help to increase the severity of the external trade imbalance. Of current relevance, it may partially explain why the trade account appears to be taking such a long period of time to respond to the large depreciation of the dollar since early 1985.

World equilibrium, interest rates, and retaliation

In order for the analysis to be relevant to the current situation in the international economy, two assumptions of the model must now be relaxed. First, as the United States is a major player in international capital markets, it is unreasonable to maintain that world interest rates generally will be unaffected by U.S. tariff policies. Second, the analysis so far assumes that foreign economies respond passively to any changes in their net exports as a result of U.S. tariffs.

We may conceive of the rest of the world as being aggregated into a second "country" with much the same characteristics as those of the home economy. Let us denote variables determined in the foreign economy by a caret (for example, foreign consumption of home-produced goods—our exports—is given by $\hat{c}^{*}$).

Figure 6
Temporary tariff with foreign retaliation

U.S. trade surplus
foreign trade deficit

U.S. trade deficit
foreign trade surplus

$\hat{\emptyset}_0$ $\hat{\emptyset}_0'$

$_0\emptyset$

$\emptyset_0'$

$\leftarrow -\hat{\emptyset}\uparrow$

$\emptyset\uparrow\rightarrow$
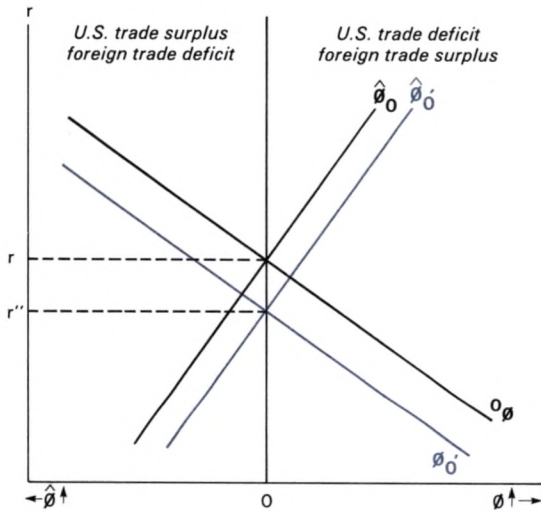
NOTE: $\hat{\emptyset} \equiv$ foreign trade balance.

Now, the world interest rate changes in such a way as to clear the world market for goods, or

$$\phi_0 = \emptyset_0 + \hat{\emptyset}_0 = 0 \qquad (14)$$

in the world economy, which means that a domestic current account deficit must be matched by a foreign current account surplus.

Next, consider Figure 4, wherein the world level of interest rates and the pattern of trade is determined graphically. Here, the curve $\emptyset_0$ is as derived in Figure 1. However, the curve $\hat{\emptyset}_0$ is plotted differently. Measurement of the quantity $\hat{\emptyset}_0$ is such that to the left of the vertical line the foreign current account is in deficit while to the right it is in surplus. The intersection of the two lines is the graphical counterpart of equation (14), that is, world equilibrium.

We restrict our attention to the impact of a temporary tariff. The result depicted in Figure 2 when translated to Figure 5 implies that the world level of interest rates declines in the face of a transitory tariff imposed by the U.S. The fall in world interest rates reestablishes equilibrium in the world economy by raising demand—and by reducing supply—in both the domestic and foreign economies. In this fashion, *the negative effect of tariffs on U.S. employment is transmitted to the foreign economy, with the result that the world level of employment falls.* Still, the

pattern of trade has shifted in favor of the U.S., in the sense that in the world equilibrium the U.S. current account has shifted into a surplus position.

However, the implied fall in foreign employment would very likely be cause for retaliation on the part of the government of the foreign economy. This would have the effect, shown in Figure 6, of restoring the world pattern of trade to its pre-tariff position (assuming the exact extent of retaliation required) but of reducing the level of world interest rates even more significantly. This is because the foreign tariff also works to reduce foreign consumption by more than it reduces foreign production, just as in the domestic case. Thus, at the initial level of interest rates, the foreign tariff creates a surplus of goods world-wide. To eliminate this surplus, world interest rates must fall by more than before, which further reduces both home and foreign production and employment levels. As an example, U.S. tariffs on Japanese autos and Japanese tariffs on U.S. autos have the effect of creating a general surplus of autos. As the prices of both U.S. and Japanese cars rise, a reduction in interest rates would be needed to stimulate purchases. As world interest rates fall, car purchases will expand and production will fall (because future production becomes more profitable relative to present production) until equilibrium is reestablished, with the same direction of trade flows. Thus, *accounting for the possibility of foreign retaliatory legislation allows for further skepticism of the presumed favorable impact of U.S. tariffs on the position of the U.S. trade balance.*

Conclusion

The analysis of the effects of tariffs within a simple intertemporal optimizing model leads to the following conclusions. Abstracting from foreign retaliatory protection, a U.S. tariff which is perceived by private agents as a temporary measure will, by distorting the intertemporal pricing structure, bring about an improvement in the trade account. However, such improvement is at the expense of a reduction in employment, output, and gross exports; the trade deficit falls because agents purchase debt to shift consumption of foreign goods to future periods when they will be relatively less expensive. In a more detailed model, this attempt to save would also drive down the

Temporary and permanent tariffs, a technical example

The impacts of temporary and permanent tariffs are here reported for the particular case of logarithmic utility

$$\underline{u} = 1n(c_0 c_0^*(\bar{n} - n_0)) +$$

$$\frac{1}{\rho} 1n(c_1 c_1^*(\bar{n} - n_1)) \qquad (1')$$

and linear technology $y_i = \alpha n_i$. The maximization yields the following set of five equations in $(\phi_0, n_0, n_1, c_0^*, c_1^*)$:

$$2\alpha n_0 - c_0^* + \phi_0 = \alpha\bar{n} \qquad (9')$$

$$2\alpha n_1 - c_1^* + r\phi_0 = \alpha\bar{n} \qquad (10')$$

$$(2 + \mu_0)c_0^* + \alpha n_0 - \phi_0 = 0 \qquad (11')$$

$$(2 + \mu_1)c_1^* - \alpha n_1 + r\phi_0 = 0 \qquad (12')$$

$$\phi_0 - \frac{1}{1 + \rho}[\alpha(\frac{\rho}{r}n_1 - n_0) -$$

$$(\frac{\rho}{r}c_1^* - c_0^*] = 0 \qquad (13')$$

Totally differentiating this system of equations and using standard comparative statics techniques leads to the results in the table below. For instance, a temporary tariff has the effect of lowering the trade deficit in the amount

$$\frac{d\phi_0}{d\mu} = \frac{1}{A} \frac{6\alpha^2 c^*}{1 + \rho} < 0$$

while a permanent tariff leaves the trade account unaffected

$$\frac{d\phi_0}{d\mu} = 0$$

The results listed in the table are for the case of zero tariffs in the original equilibrium. For the case where $0 < \mu_0 \le 1, 0 < \mu_1 \le 1$, some qualifications to the analysis above arise. For example, a permanent tariff now has the following effect on the trade account:

$$\frac{d\phi_0}{d\mu} = \frac{1}{\hat{A}} \frac{2\alpha^2 c_0^*}{1 + \rho}(\mu_1 - \mu_0)$$

where $\hat{A} < 0$. Suppose, for instance, that the original equilibrium entailed a higher tariff in the future than in the present. Then, raising the tariff by equal amounts in the present and future would reduce the distortion in the intertemporal relative price of foreign goods. Consequently, there would be a relative shift away from current consumption into future consumption which would require a capital account deficit (the purchase of debt instruments) and would induce a current account surplus, i.e.,

$$\frac{d\phi_0}{d\mu} < 0.$$

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temporary tariff
$d\mu_0 > 0$

	ϕ_0	c_0^*		c_0	y_0	x_0
	$\dfrac{1}{A} \dfrac{6\alpha^2 c_0^*}{1+\rho}$	$\dfrac{1}{A} \dfrac{6\alpha^2 c_0^*}{1+\rho} +$	$\dfrac{4\alpha^2 c_0^*}{1+\rho}$	$\dfrac{-1}{A} \dfrac{2\alpha^2\rho c_0^*}{1+\rho}$	$\dfrac{1}{A} \dfrac{2\alpha^2\rho c_0^*}{1+\rho}$	$\dfrac{1}{A} \dfrac{4\alpha^2\rho c_0^*}{1+\rho}$

permanent tariff
$d\mu_0 = d\mu_1 > 0 \qquad 0 \qquad \dfrac{1}{A} 4\alpha^2 c_0^* \qquad\qquad \dfrac{1}{A} 2\alpha^2 c_0^* \qquad \dfrac{1}{A} 2\alpha^2 c_0^* \qquad \dfrac{1}{A} 4\alpha^2 c_0^*$

$$A = \alpha^2(\rho - 1)/(1 + \rho) < 0$$

spread between domestic and foreign interest rates, induce a move toward a capital account deficit and, as the balance of payments must balance, a fall in the dollar to accomplish the reduced trade account deficit. A temporary tariff would help bring down the dollar, but also would reduce the gross volume of exports and domestic production.

On the other hand, a tariff which is viewed by the private sector as more or less permanent will have little or no impact on the current account position in the balance of payments, while lowering domestic production and exports. The absence of any significant impact on the trade account arises because foreign goods have now been made equally costly across time through the permanent rise in their after-tax price and, as a result, agents do not attempt to shift resources, by saving, to the future. In a more elaborate model, there would be no downward pressure on domestic interest rates, no effect on the dollar, and no impact on the status of the current account.

Allowing for the likelihood of higher foreign tariffs in response to raised U.S.

tariffs further offsets the ability of protection to have a positive net effect on the trade position of the U.S. Indeed, given complete retaliation, the result of a "tariff war" would be to lower world interest rates, employment, and output levels while maintaining the level of net capital flows.

Consequently, from the perspective of positive analysis, the model indicates that if tariff policy is to be successful in reducing the trade deficit it is essential that tariff legislation be such as to leave the perception that the imposed taxes on foreign goods will be of only short duration and not induce retaliation by foreign governments.

From the viewpoint of normative analysis, tariffs—temporary or permanent in nature—should be avoided since what effects they do have on macroeconomic variables come about by a distortion of resources both contemporaneously and across time. Unless particular examples of market failure to which tariff policy is an appropriate response can be cited, such distortions of market activities typically will culminate in a reduction in aggregate social welfare.

The federal safety net: Not for banks only

George G. Kaufman

In 1985, the financial insolvencies of some larger thrift institutions in Ohio and Maryland led to widespread runs on these institutions. A consequence was the insolvency and disappearance of the state-sponsored deposit insurance agencies that insured them. In 1987, after many years of increases in the number and size of savings and loan association failures, Congress was forced to recapitalize the Federal Savings and Loan Insurance Corporation (FSLIC) in order to keep it in operation. Although solvent, the Federal Deposit Insurance Corporation (FDIC) has been weakened by the large number of commercial and savings bank failures. In addition, serious attention is being devoted to a possible merger of the FDIC and FSLIC, if the capital infusion to the latter proves insufficient.

This article does not consider why the deposit insurance funds are in trouble nor the potential solutions. This has been examined in a large number of other studies. Instead, it documents the history and scope of federal guarantees. It argues that the problems faced by deposit insurers are not unique and that the real policy debate is not "Should bank deposits be insured?" but "Should the federal government engage in insurance activities of any kind?"

In the United States, bank deposits appear to have been the first financial claims to be insured either directly or indirectly by governmental agencies. The first bank deposit insurance in the United States was adopted by New York State in 1829. This plan fully guaranteed bank deposits and circulating notes. All New York state-chartered banks (federal charters were not available until 1863) were required by statute to join the system upon renewal of their charters and to make contributions scaled to their capital into a safety fund. Depositors and noteholders of failed banks were reimbursed by the fund for the difference between the par value of their claim and the pro rata recovery value from liquidation of the banks' assets. Deposit insurance was subsequently adopted by other states and, in 1933, by the federal government.[1]

Today, a wide variety of private financial assets and claims carry some form of government insurance or guaranty. More or less modeled after federal bank deposit insurance is insurance of deposits at thrift institutions (1934), share capital at credit unions (1970), customer credit balances and the market value of security holdings at security brokers and dealers (1970), and employee claims on defined benefit pension programs (1974). In addition, federal guaranteed lending programs are operated by numerous federal government departments, bureaus, and agencies, independent agencies, off-budget agencies, and so forth. More than 125 such programs are listed in a *Catalog of Federal Loan Guarantee Programs* published by the House Committee on Banking, Finance and Urban Affairs in 1982 and in a catalog of *Federal Credit Programs and Their Interest Rate Provisions* published by the General Accounting Office, also in 1982 (see Table 1). But even these lists omit programs, such as the Federal National Mortgage Corporation, which have limited de jure power and almost unlimited de facto power to borrow from the U.S. Treasury. In addition, Congress is currently considering the establishment of a Federal Agricultural Credit Corporation (to be nicknamed "Farmer Mac") to guarantee the creditworthiness of farm loans sold by commercial banks and other lenders on the secondary market. It would have a $1.5 billion line of credit with the U.S. Treasury. Thus, federal government guarantees of deposits at depository institutions are exclusive neither in scope nor in dollar coverage.

The historical justification for each program differs and reflects the pressing economic and political concerns of the day, particularly the existence of an actual or perceived national or regional crisis. The rationale generally was put in terms both of protecting the individual lender or borrower and of protecting or promoting the corresponding industry or sector. The degree of coverage, the size of the

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government's liability in case of default, the fees or premiums charged, and the forms of administration also differ greatly from program to program.

The pace of new federal government insurance and guarantee programs is accelerating. About one-half of the programs listed in the 1982 Congressional catalogue had been established since 1967.

Background

The first bank insurance program was adopted by New York State in 1829.[2] The chief sponsor of the plan was Joshua Forman, a Syracuse businessman. He attributed his idea to a scheme among the Hong merchants in Canton, China, who had exclusive rights to trade with foreigners, in which all participants were liable for each other's debts. Forman reasoned that by virtue of receiving a charter, banks received a similar exclusive arrangement allowing them to issue notes that served as a circulating medium. As a result, they should be similarly obligated to redeem each other's notes. By 1837, more than 90 percent of all New York State commercial banks were members of the note insurance plan. The New York plan was followed shortly by six other states before the Civil War. The success of these plans varied considerably.

The motivations for these plans also differed, but focused primarily on the need to preserve the circulating medium in a community and to protect small noteholders. After reviewing the legislative debates leading up to the adoption of the state plans, Carter H. Golembe, an authority on bank history, concluded that the

> primary object has not been to guard the individual depositor or noteholder against loss but, instead, to restore to the community, as quickly as possible, circulating medium destroyed or made unavailable as a consequence of bank failures. In this view, bank-obligation insurance has a monetary function, and the protection of the small creditor against loss is incidental to the achievement of the primary objective.[3]

Golembe buttressed this conclusion by quoting from Supreme Court Justice Oliver W. Holmes in a 1911 decision upholding the constitutionality of later state deposit insurance plans:

> Few would doubt that both usage and preponderant opinion give their sanction to enforcing the primary

conditions of successful commerce. One of these conditions at the present time is the possibility of payment by checks drawn against bank deposits, to such an extent do checks replace currency in daily business ... the primary object of the required assessment is not a private benefit ... but ... is to make safe the almost compulsory resort of depositors to banks as the only available means of keeping money on hand.[4]

The same rationale appears to underlie the implementation of the proviso of the National Bank Act of 1863 that collateralized national bank notes with U.S. Treasury securities. The government decided that the notes would be guaranteed by the Treasury at full face value at all times regardless of the market value of the collateral Treasury securities at the issuing bank. In his first report to Congress, the Comptroller of the Currency stated:

> If the banks fail, and the bonds of the government are depressed in the market, the notes of the national banks must still be redeemed in full at the Treasury of the United States. The holder has not only the public securities but the faith of the nation pledged for their redemption.[5]

Soon after the National Bank Act was enacted, national bank notes in circulation were about equal in dollar magnitude to total bank deposits.[6] State bank notes were taxed out of existence by an amendment to the Act in 1865. Although it is not possible to distinguish statistically between demand and time deposits at that time, the Treasury's policy insured, at a minimum, 50 percent of the nation's circulating media. But the rapid growth of bank deposits soon reduced the relative importance of national bank notes as a medium of exchange and thereby also reduced the significance of the guarantee for protecting the money supply. By the 1880s, national bank notes were only 25 percent as important as total bank deposits and insurance covered only 20 percent of notes and bank deposits.

State insurance funds for bank liabilities, all of which had disappeared with the outbreak of the Civil War, started to reappear again following the bank crisis of 1907. Even before this, a growing number of bills calling for federal deposit insurance were introduced in Congress. By 1933, the total number of such bills had reached 150.[7] Federal deposit insurance finally was enacted in 1933 as part of the comprehensive Banking (Glass-Steagall) Act effective January 1, 1934. The initial de jure account limit was $2,500. At that time, the total maximum dollar amount of insured de-

Table 1
Federal Loan Guarantee Programs

Agency and program	Year adopted
Department of Agriculture:	
Alcohol fuels and biomass loans (guaranteed/insured)	1979-80
Business and industrial loans (guaranteed/insured)	1971-72
Community antenna television loans (guaranteed)	1971-72
Community antenna television loans (insured)	1971-72
Community facilities loans (insured)	1971-72
Domestic farm labor housing loan program (insured)	1965-66
Emergency disaster loans (insured)	1971-72
Farm operating loans (guaranteed)	1961-62
Farm operating loans (insured)	1961-62
Farm ownership loans (guaranteed)	1971-72
Farm ownership loans (insured)	1971-72
Grazing association loans (insured)	1971-72
Indian tribe acquisition loans (insured)	1967-68
Irrigation, drainage and other soil and water conservation (insured)	1971-72
Low to moderate income housing loans (insured)	1949-50
Recreation facilities loans (insured)	1971-72
Resource conservation and development loans (insured)	1961-62
Rural electrification loans (guaranteed)	1935-36
Rural electrification loans (insured)	1935-36
Rural housing site loans (insured)	1965-66
Rural telephone loans (guaranteed)	1935-36
Rural telephone loans (insured)	1935-36
Soil and water loans to individuals (guaranteed)	1971-72
Soil and water loans to individuals (insured)	1971-72
Water and Waste Disposal Systems for Rural Communities (insured)	1971-72
Watershed protection and food prevention loans (insured)	1953-54
Department of Commerce:	
Business development loan guarantees (guaranteed)	1965-66
Coastal energy impact program (guaranteed)	1971-72
Federal ship financing guarantees (guaranteed)	1971-72
Fishing vessel obligation guarantee program (guaranteed/insured)	1971-72
Trade adjustment assistance for communities (guaranteed)	1973-74
Trade adjustment assistance for firms (guaranteed)	1961-62
Department of Defense:	
Defense Production Act (guaranteed)	1947-48
Foreign military credit sales (guaranteed)	1967-68
Department of Education:	
Guaranteed student loan program (guaranteed) (including parent loans for undergraduate students program)	1965-66
Department of Energy:	
Alcohol fuel loan guarantees (guaranteed)	1979-80
Loan guarantees for alternative fuels development (guaranteed)	1973-74
Biomass loan guarantees (guaranteed)	1979-80
Coal loan guarantee program (guaranteed)	1975-76
Electric and hybrid vehicle loan guarantees (guaranteed)	1975-76
Geothermal loan guarantee program (guaranteed)	1979-80
Municipal waste energy project loan guarantees (guaranteed)	1979-80
Loan guarantees for synthetic fuels development (guaranteed)	1979-80
Urban wastes demonstration facilities guarantee program (guaranteed)	1973-74

Table 1 (continued)
Federal Loan Guarantee Programs

Agency and program	Year adopted
Department of Health and Human Services:	
Health education assistance loans (guaranteed)	1975-76
Health maintenance organizations (guaranteed)	1973-74
Medical facilities construction (guaranteed)	1969-70
Department of Housing and Urban Development:	
Armed services housing for civilian employees, sec. 809 (insured)	1955-56
Armed services housing in impacted areas, sec. 810 (insured-inactive)	1973-74
Community development block grant sec. 108 loan guarantee program (guaranteed)	1973-74
Construction or substantial rehabilitation of condominium projects, sec. 221(i) (insured-inactive)	1967-68
Construction or substantial rehabilitation of condominium projects, sec. 234(d) (insured)	1963-64
Combination and mobile home lot loans, title I (insured)	1973-74
Cooperative financing mortgage insurance, sec. 203(n) (insured)	1947-48
Development of sales-type cooperative projects, sec. 213 (insured)	1947-48
Experimental homes, sec. 233 (insured)	1961-62
Experimental projects other than housing, sec. 233 (insured)	1967-68
Experimental rental housing, sec. 233 (insured)	1961-62
Graduated-payment mortgages, sec. 245 (insured)	1973-74
Group practice facilities, title XI (insured)	1965-66
Historic preservation loans, title I (insured)	1933-34
Homes assistance considerations, sec. 203(b) (insured)	1933-34
Homes for certified veterans, sec. 203(b) (insured)	1933-34
Homes for disaster victims, sec. 203(h) (insured)	1933-33
Homes for low and moderate income families, mortgage, insurance, sec. 221(d)(2) (insured)	1933-34
Homes for lower income families, sec. 235(i) (insured)	1967-68
Homes in military impacted areas, sec. 238(c) (insured)	1973-74
Homes in outlying areas, sec. 203(i) (insured)	1933-34
Homes in urban renewal areas, sec. 220 (insured)	1953-54
Housing in older, declining areas, sec. 223(e) (insured)	1967-68
Investor sponsored cooperative housing, sec. 213 (insured)	1955-56
Land development, title X (insured)	1965-66
Management-type cooperative projects, sec. 213 (insured)	1933-34
Mobile home loans, title I (insured)	1933-34
Mobile home parks, sec. 207 (insured)	1955-56
Mortgage insurance for hospitals, sec. 242 (insured)	1967-68
Mortgage insurance for servicemen, sec. 222 (insured)	1967-68
Multifamily rental housing supplemental loan insurance, sec. 241 (insured)	1967-68
New communities loan guarantees (guaranteed—inactive)	1967-68
Nursing homes and intermediate care facilities, sec. 232 (insured)	1959-60
Property improvement loan insurance for improving all existing structures and building of new nonresidential structures, title I, sec. 2 (insured)	1933-34
Purchase by homeowners of fee simple title from lessors, sec. 240 (insured)	1967-68
Purchase of sales-type cooperatives, sec. 213 (insured)	1949-50
Purchase of units in condominiums, sec. 234(c) (insured)	1961-62
Purchase or refinancing of existing multifamily housing projects, sec. 223(f) (insured)	1973-74
Rehabilitated housing for low income families, sec. 221(h) (insured)	1965-66
Rehabilitation mortgage insurance, sec. 203(k) (insured)	1933-34

Table 1 (continued)
Federal Loan Guarantee Programs

Agency and program	Year adopted
Rental housing mortgage insurance, sec. 207 (insured)	1937-38
Rental housing for the elderly, sec. 231 (insured)	1957-58
Rental housing for moderate income families, sec 221(d)(4) (insured)	1957-58
Rental housing in urban renewal areas, mortgage insurance, sec. 220 (insured)	1953-54
Rental and cooperative housing for low and moderate income families, sec 221(d)(3) (insured)	1953-54
Single family home mortgage coinsurance, sec. 244 (insured)	1973-74
Special credit risks mortgage insurance, sec. 237 (insured)	1967-68
Department of the Interior:	
Guarantee of certain obligations of the Guam Power Authority (guaranteed)	1975-76
Guarantee of Virgin Islands Bonds (guaranteed)	1975-76
Guarantee of Virgin Islands Loans (guaranteed)	1975-76
Indian loans—economic development (guaranteed)	1973-74
Department of Transportation:	
Emergency Rail Services Act of 1970 guarantee of trustee certificates (guaranteed)	1969-70
Loan guarantees for purchase of aircraft and space parts (guaranteed)	1957-58
Loan guarantees issued under the Rail Passenger Service Act of 1970 (guaranteed)	1969-70
National Capital Transportation Act revenue bond guarantee program (guaranteed)	1969-70
Railroad rehabilitation and improvement (guaranteed)	1975-76
Department of the Treasury:	
Chrysler Corporation loan guarantees (guaranteed)	1979-80
New York City loan guarantees (guaranteed)	1977-78
Agency for International Development:	
Agricultural and productive credit and self-help community development program (guaranteed)	1969-70
Housing guaranty program (guaranteed)	1969-70
Environmental Protection Agency:	
Loan guarantees for construction of treatment works (guarantee)	1975-76
Export-Import Bank:	
Cooperative financing facility (CFF)—participating financial institution guarantees and guarantees on certificates of loan participation (guaranteed)	1945-46
Financial guarantees (guaranteed)	1945-46
Medium-term commercial bank guarantees (guaranteed)	1945-46
Medium-term export credit insurance (insured)	1945-46
Short-term export credit insurance (insured)	1945-46
General Services Administration:	
Federal building loan guarantees (guaranteed)	1953-54
Overseas Private Investment Corporation:	
Foreign investment guarantees (guaranteed)	1969-70
Small Business Administration:	
Bond guarantees for surety companies (guaranteed)	1957-58
Disaster assistance to nonagricultural business (guaranteed)	1969-70
Economic injury disaster loans (guaranteed)	1957-58
Economic opportunity loans for small businesses (guaranteed)	1957-58
Handicapped assistance loans (guaranteed)	1957-58

Table 1 (continued)
Federal Loan Guarantee Programs

Agency and program	Year adopted
Physical disaster loans (guaranteed)	1957-58
Small business loans (guaranteed)	1957-58
Small business energy loans (guaranteed)	1977-78
Small business investment companies (guaranteed)	1957-58
Small business pollution control financing guarantees (guaranteed)	1975-76
State and local development company loans (guaranteed)	1957-58
U.S. Railway Association:	
Loans for railroads in reorganization (guaranteed)	1973-74
Loans to state, local, or regional transportation authorities (guaranteed)	1973-74
Veteran's Administration:	
Veterans housing loans (guaranteed and insured)	1943-44
Veterans mobile home loans (guaranteed)	1969-70

Source: *Catalog of Federal Loan Guarantee Programs, Subcommittee on Economic Stabilization, House Committee on Banking, Finance, and Urban Affairs, 97 Cong. 1 Sess. (GPO, 1981).*

posits plus the dollar amount of national bank notes represented about 50 percent of the sum of currency and bank deposits, about the same percentage as had initially been insured by the National Bank Act 70 years earlier.

The debate on federal deposit insurance in Congress was long and emotional. It was strongly opposed by the Roosevelt administration; many bankers, particularly from larger banks; and most bank regulators. Golembe concluded that the primary reasons for the ultimate adoption of the program were a desire to end the destruction of the medium of exchange and to preserve, or at least not end abruptly, the existing structure of independent unit banks. To achieve the latter purpose, the proponents of deposit insurance had to engage in a political tradeoff with larger banks, who favored, among other things, wider branching. Thus, ironically enough, the Act also expanded the ability of national banks to branch on the same basis as state banks in the home state.

The FDIC served as an impetus for other federal insurance programs. In 1934, the FSLIC was established by the National Housing Act with basically the same powers as the FDIC. But it was placed within the Federal Home Loan Bank Board rather than created as a separate and independent agency. The primary intent of deposit insurance at savings and loan associations appears to have been less to preserve the money supply and structure of the industry or to protect small depositors as to

preserve the channeling of household funds into the residential mortgage market. It was feared that households would transfer their funds from uninsured savings and loan associations to insured commercial banks and that this would reduce the flow of funds for household mortgages. Thus, protecting SLAs was a means, not an end. A study prepared for the Federal Home Loan Bank Board concluded that Congress established FSLIC more to "stimulate additional home mortgage credit through increased capitalization of S&L's than in preventing the demise of these institutions."[8]

The national concern with housing at this time was also reflected in the large number of federally guaranteed loan programs for housing adopted at the same time. All of the 10 federal loan guarantee programs enacted by the 73rd Congress in 1934-35 were located in the predecessors of the Department of Housing and Urban Affairs. These included housing loans to veterans, disaster victims, and to low- and moderate-income families as well as for cooperative projects and rehabilitation projects.

In 1970, federal deposit (share capital) insurance was extended to credit unions through the National Credit Union Share Insurance Fund (NCUSIF) in the National Credit Union Administration. In contrast to the environment at the time of the establishment of the FDIC and FSLIC, the NCUSIF was established at a time of no unusual financial problems either for credit unions or the fi-

nancial system as a whole. Rather, its creation appears motivated purely by a desire for competitive equality with federally insured commercial banks and thrift institutions. Contrary to the battle lines at the enactment of the FDIC, smaller institutions opposed creation of NCUSIF, primarily out of fear of increased federal regulation, while larger institutions favored it, primarily for competitive reasons relative to commercial banks and thrift institutions. The majority of credit unions had successfully blocked creation of federal deposit insurance from 1956 until 1970.

In 1970, federal insurance was also extended to customer credit balances and security holdings at security dealer and broker firms by the Securities Investor Protection Act which established the Securities Investor Protection Corporation (SIPC). In contrast to the lengthy debates and earlier failures surrounding the adoption of federal insurance for depository institutions, SIPC was established only two years after the first bill for such insurance was introduced in Congress. The Act was adopted in response to a sudden jump in the number of failures of brokerage houses with significant losses to customers. The Report accompanying the bill from the Senate Committee on Banking and Currency states that

> The Securities Investors Protection Corporation (SIPC), like the Federal corporations that ensure savings and demand deposits, is intended to serve several purposes: to protect individual investors from financial hardship; insulate the economy from the disruption which can follow the failure of major financial institutions; and to achieve a general upgrading of financial responsibility requirements of brokers and dealers to eliminate, to the maximum extent possible, the risks which lead to customer loss.[9]

It is evident that, as with the previous insurance plans, the objectives of SIPC insurance are multiple.

In 1974, employee claims on defined benefit employer pension funds were federally insured by the Pension Benefit Guaranty Corporation (PBGC) established by the Employment Retirement Income Security Act (ERISA). The Act defines the purposes of the insurance to 1) encourage the maintenance of private pension plans and 2) provide for the timely and uninterrupted payment of pension benefits. The program was enacted after a number of failed firms had sold the pension funds' assets which they were administering.

As a result, the employee's pensions were reduced or wiped out altogether.

An examination of the federal loan guarantee programs enacted by the 96th Congress in 1979-80, the latest included in the Congressional catalog cited earlier, suggests that the emphasis was on encouraging or preserving particular industrial sectors or firms, such as alternative energy sources and Chrysler Corporation, rather than on protecting the financial security of households or of the nation as a whole.

Conclusions

The above analysis shows that the federal insurance safety net is not unique to banking. The net has been spread under a progressively increasing number of activities. This has important implications for understanding both the behavior of activity in the insured sectors and the potential pressures on the federal government budget. By its very nature of reducing the cost of loss to the insured, insurance of any kind changes the behavior of the insured by making them unintentionally a little less careful. Thus, persons are less likely to double check whether they have locked their car doors or to install burglar alarm systems after they acquire theft insurance than before or to install fire alarms and sprinkler systems after they acquire fire insurance than before. This change in behavior attributable to insurance is termed "moral hazard."

Private insurance firms generally attempt to protect themselves against moral hazard on the part of their customers by scaling their premiums to the risk assumed, by including provisions for rate reductions if the insured agrees to accept specified precautions, such as installing burglar or fire alarms, and by excluding certain types of events, such as floods and wars. If the premiums and their provisions are structured correctly, the insured will have less incentive to take additional risk and the insurer will be compensated for any additional risk that the insured does take. The premium will represent the actuarially fair value of the expected loss.

Like private insurance, government insurance and guarantee programs are apt to lead to additional risk taking by the insured. However, unlike private insurers, government insurers rarely scale their premiums to the

The Pension Benefit Guaranty Corporation: A Case in Point

The federal deposit insurance programs are not the only federal guarantee programs currently experiencing severe financial difficulties. Indeed, the number of troubled programs is large and increasing rapidly, and the dollar magnitude of the losses is mounting even faster. Most if not all of the programs appear to suffer from the same underlying problem—a serious design flaw that produces incentives for the insured to take excessive risks and passes most of the resulting frequent and large losses through to the insurance or guarantee agency. The two most seriously troubled programs appear to be the Farm Credit System and the Pension Benefit Guaranty Corporation (PBGC).* This box discusses the PBGC.

The PBGC, which was established by the Employee Retirement Income Security Act of 1974 (ERISA), guarantees up to a potential maximum of nearly $2,000 per month per individual participant in all defined benefit pension programs in the United States. The program currently covers more than 30 million participants in some 110,000 pension programs. For this service, the PBGC charges the plan sponsor a fixed premium per pension plan participant, regardless of how well or poorly the particular plan is funded. Thus, as with the FDIC and FSLIC structure, there is an incentive for sponsors to underfund their pension plans in order to use the resources elsewhere. Also, as with the federal deposit insurance programs, better funded plans subsidize more poorly funded plans. But although PBGC's premium structure resembles those of the federal deposit insurance agencies, its enforcement and claimant powers are considerably weaker.

Unlike the FDIC and FSLIC, the PBGC has effectively no selection, monitoring, supervisory, and regulatory powers over the pension funds it insures. It can neither disqualify plans nor influence the funding behavior of the plans. Indeed, it has little ability even to monitor the on-going performance of the funds. Also unlike the FDIC and FSLIC, its ability to borrow from the U.S. Treasury is severely restricted, amounting to only $100 million. In case of plan termination, the Corporation has a first claim only up to 30 percent of the sponsor's net worth (which is frequently negligible as the plan is terminated because of the bankruptcy of the sponsor) and a second less valuable claim against the sponsors's recoverable assets up to 75 percent of the loss less any amount previously recovered from positive net worth. However, because the PBGC has de facto paid less than the full potential of the monthly benefits lost, it may encourage greater monitoring and discipline by the pension plan participants than is exerted by depositors at federally insured commercial banks and particularly thrift institutions.

The PBGC has operated with deficit net worth (i.e., the present value of its liabilities exceed that of its assets) almost from its inception. The deficit ballooned in 1985 when both Allis-Chalmers and Wheeling-Pittsburgh terminated their large and underfunded pension plans and jumped substantially further in 1986 when LTV terminated its pension plan, which was underfunded by some $2.5 billion. This increased the present value of PBGC's liabilities to almost $4 billion. (In September, PBGC announced that it was returning responsibility for LTV's pension plan to the Company. LTV is contesting the transfer. If PBGC is successful, the effect would be to reduce PBGC's deficit by half to near $2 billion.) It is of interest to note that, at present, nearly 80 percent of PBGC's deficit is attributable to the iron and steel industry. But, because it was operating on a cash flow surplus until recently, actions to correct the deterioration were delayed in Congress until 1986 when annual premiums were more than tripled from $2.60 to $8.50 per participant. This

was the first increase since 1978. However, even this substantial increase was enacted before LTV's plan termination and has proved to be inadequate. As a result, the PBGC has been forced to sell investment assets to meet its scheduled payments.

In April 1987, the Reagan administration, at the urging of PBGC, proposed legislation that would scale the premiums to the insured plan's risk of default as measured by the degree of underfunding. Under the proposal, employees with insured plans that are funded below 125 percent of the plan's vested liabilities would pay an annual surcharge of $6 per $1,000 of underfunding up to a maximum of $100 per employee. The surcharge would affect an estimated 8 percent of employers. The surcharge would be adjusted every three years according to actual loss experience. In addition, all premiums would be indexed to inflation. If enacted by Congress, the surcharge scheme may be expected to encourage employers to reduce underfunding in order to reduce their expenses.

As was the case for the federal deposit insurance programs, the flaw in the design of the PBGC's structure and the resulting potential dangers were identified and analyzed a number of years before the seriousness of the problem became evident to the public. In her article "Guaranteeing Private Pension Benefits: A Potentially Expensive Business," published in the New England Economic Review of the Federal Reserve Bank of Boston in 1982, Alicia Munnell concluded that "since the agency has little control over the industry that provides the benefits it guarantees .... the PBGC will always remain financially vulnerable and the federal government may well end up as the insurer of the nation's private pension system." In addition, unlike the FDIC and FSLIC, the PBGC itself went public with its concerns early and proposed, among other things, that its insurance premiums be scaled to the degree of underfunding of each pension plan. Nevertheless, as with the FDIC and FSLIC, these warnings were not heeded sufficiently by policy-makers to prevent or at least mitigate the magnitude of the later crisis.

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*The market value deficit in the Farm Credit System has been estimated to be as high as $9 billion.

insured's risk exposure. Explicit premiums are generally a fixed flat percentage of the insured's asset, activity, or loan-size base. The FDIC and FSLIC, for example, both charge premiums that are a flat percentage of the total domestic deposits of the insured institutions.

When the insurance agencies attempt to control risk, they generally do so by imposing minimum standards or regulations that specify the types of activities in which the insured may engage. In addition, the bank agencies supervise and periodically examine their institutions to ensure conformity with the regulations. However, it is unlikely that such provisions will be as effective in offsetting moral hazard as risk-based premiums. As a result, one would expect to see greater risk taking by those insured by federal programs than by those insured by private programs and thereby greater losses to federal insurance agencies. The very large losses experienced by FSLIC, estimated to be in excess of $40 billion, that would have driven it into insolvency if market value accounting were applied, and the moderate decline in FDIC reserves, if the same standards were applied, support this hypothesis.

Additional support is provided by the economic insolvencies of the Farm Credit System and the Pension Benefit Guaranty Corporation, both of which also effectively charge flat insurance premiums. Because the insured and other creditors of the insurance program perceive the federal government as supporting all demands on the insurance agencies, these agencies can continue to function even though they may be insolvent. The losses will eventually be borne in large part or in total by the taxpayers.

The broadening of the insurance safety net beyond banking to other financial activities may thus be expected to increase both risk taking in our society and the liabilities of the federal government. Whether and to what extent this is desirable, is a choice for the

electrate to make. They are likely to do so more intelligently if the benefits and costs of these programs were carefully and explicitly quantified.

[1] The United States was the second country to adopt federal government bank deposit insurance after Czechoslovakia in 1924.

[2] Thorough histories of deposit insurance in the United States appear in Carter H. Golembe, "The Deposit Insurance Legislation of 1933," *Political Science Quarterly* (June 1960), pp. 181-200 and George J. Benston, "Bank Examination," *Bulletin of the Institute of Finance* (89-90), New York University (May 1973).

[3] Golembe, p. 189.

[4] Golembe, p. 192.

[5] Federal Deposit Insurance Corporation, *Annual Report,* 1952 (Washington, D.C.: 1953), p. 6.

[6] This was about the same percentage as in 1820. Federal Deposit Insurance Corporation, *Annual Report,* 1950 (Washington, D.C.: 1951).

[7] "Predecessors of the Federal Deposit Insurance Law," FDIC, *Annual Report,* 1950, pp. 63-101.

[8] Federal Home Loan Bank Board, *Agenda for Reform* (Washington, D.C.: 1983), p. 34.

[9] *Securities Investor Protection Corporation Report,* Senate Committee on Banking and Currency, 91 Cong. 2 Sess. (GPO, 1970), p. 4.

Call for papers

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Chicago, Illinois, May 11-13, 1988

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