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# Review

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5 Coping with Bank Failures: Some  
Lessons from the United States and  
the United Kingdom

15 Why Has Manufacturing Employment  
Declined?



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## In This Issue . . .

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Although U.S. bank failures are occurring at an unusually rapid rate, they have neither eroded public confidence in the banking system nor induced bank runs by depositors. The stability of the U.S. banking system in the face of increased bank failures reflects the success of policies designed to prevent banking panics.

In the first article in this *Review*, "Coping with Bank Failures: Some Lessons from the United States and the United Kingdom," R. Alton Gilbert and Geoffrey E. Wood examine the history of banking panics and the evolution of government policies designed to eliminate them in the United Kingdom and the United States. The last U.K. banking panic occurred in 1866. In response to that panic, the Bank of England accepted the responsibility of acting as lender of last resort — by increasing bank reserves when the public withdraws large shares of their deposits in the form of cash — and bank runs ceased to be a problem. In contrast, the United States experienced panics throughout the 19th and early 20th centuries. In response to these panics, the Federal Reserve System was established in 1917 and federal deposit insurance was established in 1933. Since 1933, although individual banks have failed, no banking panics have occurred in the United States.

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Manufacturing employment in the U.S. economy has declined since 1979, furthering the view that the United States is losing out in an international competition for manufacturing jobs. In the second article in this *Review*, "Why Has Manufacturing Employment Declined?" John A. Tatom examines the factors that determine manufacturing employment. He argues that the decline in manufacturing employment has occurred for two reasons. Part of the decline represents a transitory cyclical phenomenon. However, the decline is also due to the relatively rapid growth of productivity in manufacturing that has taken place throughout the post-World War II period. The only recent period in which manufacturing employment grew relatively rapidly since World War II was in the early '60s, when manufacturing wages declined sharply relative to wages paid in the rest of the economy.

Tatom explains that the relatively rapid growth in manufacturing productivity has been an important source of the rising standard of living in the United States and that it has been associated with a declining relative price of these goods. Consumers, however, have not chosen to realize all of the gain in their standard of living through greater consumption of manufactured goods. Instead, they have demanded more of other goods and services as well. Thus, the proportion of labor resources employed in manufacturing has declined fairly steadily, especially since 1969. International competition has played only a small role in overall developments, the author says. In the 1980s, he argues, manufacturing output and employment have strengthened relative to the experience abroad.





# Coping with Bank Failures: Some Lessons from the United States and the United Kingdom

*R. Alton Gilbert and Geoffrey E. Wood*

**T**HE number of U.S. bank failures has risen dramatically in the past few years. Banks failed at the rate of about six per year from 1950 through 1981. In 1984, however, 79 banks failed, and 120 banks failed in 1985.<sup>1</sup> Yet this sharp rise in the rate of bank failure has not produced the kind of public "panic" that accompanied bank failures during much of U.S. history.

In a banking panic, the failure of one bank leads people to fear for the safety of their funds at other banks. Subsequent attempts to withdraw their deposits from other banks put these banks in jeopardy as well. Recent experience suggests that bank failures no longer cause banking panics. There are now well-established and frequently tested principles for preventing a bank failure from turning into a panic.

To fully appreciate the importance of these principles in preventing panics, it is necessary to review some episodes of history during which panics occurred. History illustrates the inherent vulnerability of the banking industry to panics, when there are no policies in place to prevent them; it also illustrates the adverse effects of panics on the operation of banking systems and economic activity.

To prevent banking panics, it is necessary to convince the public that the operation of the banking

system will not be disrupted by the failure of one bank or even by the failure of several banks. The government policies that create this public confidence in the stability of the banking system reflect the history of each nation. This paper contrasts the experience with banking panics in the United Kingdom to that in the United States.

The last banking panic in the United Kingdom occurred in 1866. At that time the Bank of England acted to prevent the disruption of the banking system when banks failed and the public in England came to believe that the Bank of England had accepted that responsibility and would be successful in carrying it out.

The United States established a central bank in 1914, but the Federal Reserve System failed to prevent banking panics in the early 1930s. Thus, the public in the United States did not have the experience of observing a central bank successfully dealing with banking panics. The last banking panic in the United States (1933) occurred in the same year when the federal government established deposit insurance. This observation indicates that federal deposit insurance has been an important feature of the policies in the United States for preventing banking panics.

## WHAT ARE BANKING PANICS AND WHY ARE THEY DANGEROUS?

Two features of the operation of commercial banks make the banking system vulnerable to disruptions when depositors lose confidence in their banks. First,

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<sup>1</sup>A bank is declared to have failed when it is closed by the government authorities. The government authorities close a bank when its net worth falls close to or below zero.



a large part of the liabilities of banks is payable to depositors on demand. Second, the cash reserves of banks are a small fraction of their deposit liabilities. Thus, if large numbers of depositors suddenly wanted to convert their deposits to currency, the banking system would not immediately have enough cash on hand to honor their demands. When a banking panic occurs, people attempt to be among the first to convert their deposits to currency because they remember that during previous banking panics, only those who demanded currency early enough were able to get it.<sup>2</sup>

### Microeconomic Effects of Banking Panics

Deposits and reserves of the banking system decline one-for-one as depositors withdraw currency. If total reserves were just equal to required reserves before the withdrawals of currency, reserves would be deficient after the withdrawals. Each bank responds to its reserve shortage by selling assets, producing a decline in demand deposits that exceeds the initial conversion of demand deposits to currency.

The vulnerability of the banking system to panics is illustrated in tables 1 and 2 by the use of balance sheets. Table 1 presents the hypothetical balance sheet of an individual bank that is required by some regulatory authority to keep a cash reserve of at least 10 percent of total deposits. Because of concern about the viability of the bank, customers withdraw \$10 million in the form of currency, reducing the bank's cash reserves to zero. To raise cash reserves, the bank sells \$9 million of its interest-earning assets.<sup>3</sup>

When the bank sells its assets to increase its cash reserves, however, it draws cash from other banks, causing their reserves and deposits to decline. These banks must now sell some of their assets to eliminate *their* reserve deficiencies. Thus, the initial withdrawal of currency by depositors produces a chain reaction of reductions in deposits payable on demand.

The effects on the banking system of the currency withdrawals are illustrated in table 2. Prior to the banking panic, the banking system has assets of \$1.1

**Table 1**  
**Balance Sheet of an Individual Bank**  
**(millions of dollars)**

Before the banking panic:			
Assets		Liabilities	
Cash	\$ 10	Deposits payable on demand	\$50
Interest-earning assets	100	Time deposits	50
		<b>Net worth</b>	<b>10</b>
After withdrawal of \$10 million in currency:			
Assets		Liabilities	
Cash	\$ 9	Deposits payable on demand	\$40
Interest-earning assets	91	Time deposits	50
		<b>Net worth</b>	<b>10</b>

trillion and deposits payable on demand of \$500 billion. As the banking panic begins, bank customers withdraw \$10 billion in currency from their deposit accounts payable on demand. Given the 10 percent reserve requirement, total deposits must decline until the remaining cash reserves of \$90 billion are 10 percent of total deposits.

This shrinkage in the assets of the banking system may reduce the confidence of the public in the banking system even more, inducing additional withdrawals of deposits in the form of currency. The additional loss of reserves would force even larger reductions in bank deposits, interest-earning assets, net worth of banks and number of banks.

### Macroeconomic Consequences of Banking Panics

A banking panic causes a sharp reduction in the money supply (currency held by the public plus bank deposits payable on demand). Sharp and unexpected reductions in the money supply usually cause reductions in economic activity and, consequently, an increase in unemployment and business failures. The panic will end when the public becomes convinced that banks are safe and that it can withdraw currency from deposit accounts whenever it wishes. At that time, the public will again deposit part of its currency with banks.

<sup>2</sup>Several recent studies develop theoretical models of the behavior of banks and their depositors to investigate the conditions that are likely to cause a banking panic. See Batchelor (1986), Bryant (1980), Diamond and Dybvig (1983), Gorton (1985a), Ho and Saunders (1980), and Jacklin and Bhattacharya (1986).

<sup>3</sup>If many banks sell assets at the same time, the prices of bank assets may fall. In that case, the bank would have to sell additional assets and charge losses against net worth.



**Table 2**  
**Balance Sheet of the Banking System**  
**(billions of dollars)**

**Before the banking panic:**

Assets		Liabilities	
Cash	\$ 100	Deposits payable on demand	\$500
Interest-earning assets	1,000	Time deposits	500
			<b>Net worth</b>
			<b>100</b>

**After withdrawal of \$10 billion in currency:<sup>1</sup>**

Assets		Liabilities	
Cash	\$ 90	Deposits payable on demand	\$400
Interest-earning assets	900	Time deposits	500
			<b>Net worth</b>
			<b>90</b>

<sup>1</sup>In the banking panic, sales of interest-earning assets cause the prices of those assets to fall. In this illustration, banks reduce their net worth by \$10 billion, recognizing that loss on the sale of assets that had a value of \$100 billion before the panic.

## HOW TO PREVENT BANKING PANICS — THE BRITISH EXPERIENCE

How can the failure of one bank be prevented from spilling over into the whole banking system with such catastrophic consequences? Only by removing the fear that *all* banks are in danger of failing. Can this be done in practice? It can, and the way to do it was discovered before the theory behind the method was developed.

### *The Bank of England*

The history of the British approach to preventing banking panics involves the history of the Bank of England. The British government chartered the Bank in 1694 as a means of raising funds to fight a war with France. Those subscribing to the stock of the Bank made loans to the British government. In return, the Bank was given some exclusive rights to function as a commercial bank.<sup>4</sup>

Although the Bank was privately owned, there was always a close relationship between it and the government. Some aspects of the relationship, based on

evolving traditions, were implicit rather than spelled out in the Bank's charter or other legislation. For instance, by the 1800s, the government expected the Bank to buy any part of its new debt issues not purchased by others.

The Bank of England maintained a large inventory of gold upon which it could draw in a panic to meet the public's demand for gold. Legislation in 1844 gave the Bank a monopoly on issuing bank notes and made the notes of the Bank legal tender. That legislation set a limit on the amount of the Bank's notes that could be outstanding, though it specified that the limit could be exceeded in an emergency. The limit on the notes of the Bank could be lifted at the discretion of the government. Thus, the Bank of England could expand the monetary base (currency plus reserves) in an emergency, since its notes were used as currency and were held as part of bank reserves.

One aspect of the policies that evolved over time was the Bank's response to a banking panic. The evolution of that policy is described in this section by discussing first, what happened during two banking panics that occurred in England during the 1800s and second, why no panics have occurred in the British banking system since 1866.

### *The Panic of 1825*

In December 1825, a banking panic occurred in London after the failure of a bank (Sir Peter Pole and Company). As people fled from deposits at other banks to gold, gold reserves were drained from the Bank of England. To convince people that their bank deposits were safe, the Bank lent gold freely from its holdings.<sup>5</sup>

The panic was allayed when it became clear to the public that there was nothing about which to panic — that there was indeed sufficient gold to meet the public's increased demand for gold. As a result, the failure of one bank did not turn into a general financial crisis. Unfortunately, however, banking panics continued to occur in England after 1825 because the Bank of England had not made a public commitment to act as

<sup>5</sup>The actions of the Bank in the panic of 1825 are described vividly by Jeremiah Harman, director of the Bank, in Bagehot (1978), p. 73:

We lent it [gold] . . . by every possible means and in modes we had never adopted before; we took in stock on security, we purchased exchequer bills, we made advances on exchequer bills, we not only discounted outright, but we made advances on the deposit of bills of exchange to an immense amount, in short, by every possible means consistent with the safety of the Bank and we were not on some occasions over nice. Seeing the dreadful state in which the public were, we rendered every assistance in our power.

<sup>4</sup>Clapham (1944), Fetter (1965) and Santoni (1984).



the “lender of last resort” in all financial crises. A lender of last resort acts to increase the monetary base if many people want to withdraw cash (gold and notes of the Bank of England) from their banks.

The significance of a lender of last resort in a banking panic can be illustrated by referring to the balance sheets in table 2. If depositors withdraw cash, the lender of last resort acts to increase the reserves of the banking system, thus preventing the contraction of the money supply that could be caused by a banking panic. Until the English public became convinced that the Bank of England would act to increase the monetary base (cash in the hands of the public plus bank reserves) in financial crises, many of them tended to withdraw cash from banks when there were problems in the financial system.

### *The Lesson of 1866*

The last major banking panic in England occurred in 1866. Since then, although events have occurred that could have triggered banking crises (in 1873, 1890, 1907, 1914, 1931 and 1973), they did not do so.<sup>6</sup> What changed after 1866?

The panic of 1866 began with the failure of a major English bank. Overend, Gurney and Company was a large bank, founded early in the 19th century from the amalgamation of two banks that had been important and active in the 18th century. Hit by a variety of setbacks, Overend's was compelled to seek assistance from the Bank of England on May 10, 1866. The Bank refused to provide assistance and that afternoon Overend, Gurney and Company was declared insolvent.

The next day, there were runs on all banks. People scrambled for cash because no bank was trusted.<sup>7</sup> The Bank of England, which was being drained of notes, briefly made things worse by hesitating over whether to make its usual purchases of newly issued government debt. By the evening of Friday, May 11, however, the Bank gave assurance that it would provide support to the banking system, and, though demands for small bills continued for a week, the panic was essentially broken in one day.<sup>8</sup> The important consequence of this episode was that the Bank had implicitly accepted

the responsibility of acting as lender of last resort and the public understood that the Bank had accepted that responsibility. For a discussion of the historical development of the concept of a lender of last resort, see the insert on the opposite page.

## HOW TO PREVENT BANKING PANICS — THE U.S. EXPERIENCE

The U.S. economy suffered the effects of banking panics long after the British discovered how to prevent them. The United States established the Federal Reserve as the central bank in 1914. There were eight major banking panics before then and additional financial crises that had more limited regional impact.<sup>9</sup> The formation of the Federal Reserve, however, did not end the problem of banking panics; the last panic occurred in 1933. The period since the last banking panic coincides with the period of federal deposit insurance.

### *Banking Until the 1860s (Civil War Period)*<sup>10</sup>

**Bank Structure and Regulation** — After the Revolutionary War, the new U.S. government confined its monetary role to the minting of gold and silver coin. State governments assumed responsibility for chartering and supervising commercial banks. State banks issued bank notes, which circulated as currency, and had deposit liabilities against which customers could write checks. Both the bank notes and demand deposits were payable on demand in the form of the coins minted by the federal government.

The first banking panic occurred in 1814 during the War of 1812 with the British. In response to fears about the outcome of the war, many people attempted to redeem bank notes and convert their bank deposits into coin. The banking system responded by suspending coin payments, which kept the contractions of the money supply and bank assets from being as large as they would have been (see the insert on page 10). In all of the major U.S. banking panics through 1907, the banking system suspended cash payments to depositors and holders of bank notes.

**The Panic of 1837** — The panic described above was unusual in that it was triggered by anxieties about the war. Other banking panics in this period occurred

<sup>6</sup>A succinct survey of the history of these episodes can be found in Schwartz (1986).

<sup>7</sup>“Panic, true panic, came with unexpected violence that day.” (Clapham, 1944), p. 263. “Terror and anxiety took possession of men's minds for that and the whole of the succeeding day.” (*Bankers Magazine*, 1866). “No one knew who was sound and who was unsound.” (*The Economist*, 1866).

<sup>8</sup>A detailed description of the failure of Overend, Gurney, and Company and the events surrounding that failure can be found in Batchelor (1986).

<sup>9</sup>The nine major banking panics occurred in 1814, 1837, 1857, 1861, 1873, 1884, 1893, 1907 and 1931–33.

<sup>10</sup>This section is based largely on Hammond (1963).



## The Lender of Last Resort and Walter Bagehot

The name and the work of Walter Bagehot recur continually in the discussion of banking and bank failures.<sup>1</sup> His main proposal called for the Bank of England to *announce* that it was willing to act as lender of last resort and that it would do so unhesitatingly whenever necessary. By lender of last resort, he meant that the Bank would, in times of panic, "lend freely, at high interest rates." It would lend freely, so that banks could satisfy the demands of their customers for cash and thus allay panic. It would do so at penalty high interest rates to ensure that the Bank was truly the lender of *last* resort; banks would come to it only when the whole banking system was short of cash. The policy of setting a high lending rate was designed both to prevent excessive monetary expansion in normal times and to guarantee that banks repaid their borrowings when interest rates dropped after the panic, so that the money stock was not permanently boosted by crisis borrowing.

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<sup>1</sup>Bagehot was, among other things, a journalist. He became editor of *The Economist*, and wrote voluminously on many subjects (including *The British Constitution*). But he is most widely remembered and discussed for his book, *Lombard Street* (first published in 1873) (Bagehot, 1978), and for his campaign in *The Economist* to have adopted his recommendations for the conduct of the Bank of England.

Bagehot emphasized that the Bank should not only behave in this way, but also should announce in advance that it would do so whenever necessary. He saw this "precommitment," which the Bank had never made before the episode of 1866, as vital. A credible precommitment would give assurance that sound banks would not be allowed to fail as a result of the failure of some other bank. Once this assurance was given, panic would be less likely. Indeed, the Bank might not actually have to act as lender of last resort at all; merely standing ready to do so might be sufficient to provide stability.<sup>2</sup>

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<sup>2</sup>Although now traditional, Bagehot's recommendation was not accepted without demur. Thomson Hankey, a director of the Bank, was particularly critical of the proposal. After the Overend and Gurney affair, Hankey denied that the Bank had an unequivocal duty to lend freely in panics. He was concerned with what has become known as "moral hazard." If bankers know that the central bank will lend freely in a panic, he argued, they will take more chances: hold lower reserves, make riskier loans or pay higher dividends.

Hankey is plainly correct. The issue, however, is which is the lesser evil, slightly riskier banks or the prospect of a collapse in the money stock.

Hankey's criticism of Bagehot's principles for running a central bank did not represent the official views of the Bank. Officially the Bank neither accepted nor rejected Bagehot's principles but came to act in a manner consistent with these principles.

when bank failures caused the public to lose confidence in the value of their bank notes and deposits. The panic of 1837 shows the nature of panics in this period before the U.S. Civil War.

The U.S. economy experienced an economic boom from 1834 through 1836, supported by large investments in the United States by Europeans. Many of these large investments were in railroads and purchases of public land by those moving to the western frontier.

The boom stopped in 1837. Gold flowed from the United States to Europe as European investors demanded payment of their loans and liquidated their U.S. investments. This outflow of gold reduced the cash reserves of banks, which, along with failures by business firms, caused some banks to fail. The Dry Dock Bank, a major bank in New York City, closed on

May 8, 1837. All other banks in New York City experienced runs by depositors the next day. The New York City banks suspended coin payments on May 10, and Philadelphia banks followed suit on May 11. Within the next 10 days, banks in all the leading cities suspended coin payments.

New York City banks resumed coin payments to holders of bank notes and deposits on May 10, 1838, exactly one year after the suspension. Banks in the rest of the nation resumed coin payments between August 1838 and early 1839.

This episode illustrates the vulnerability of the banking system to disruption. Without a central bank, the supply of cash in the economy was determined by the coins minted by the federal government and international movements of precious metals. The bank runs following the failure of the Dry Dock Bank



## Suspending Cash Payments

Commercial banks in the major urban areas in the United States suspended payments of cash to depositors and note holders during each of the major banking panics from 1814 through 1907. During suspensions, banks in an area would agree to act together in refusing to pay out cash. Until the 1860s, the form of cash demanded by depositors during panics was metal coins. In the early 1860s, the cash demand during panics included currency.

During these general suspensions of cash payments, banks remained open for business and permitted their customers to use deposits to make payments to others. Checks were cleared and deposit liabilities were transferred among banks. Non-redeemed bank notes continued to circulate as currency. When banking panics were over, banks

resumed the payment on demand of coin for bank notes and deposits.

The significance of the suspension of bank payments in the form of coin or currency can be illustrated by referring to table 2, the balance sheet of the banking system. As soon as bankers realized that the public was attempting to convert its money holdings to coin or currency, the bankers as a group refused to meet this demand for cash. In this case, their cash reserves would stay at \$100 billion, and with that cash available to meet reserve requirements, the banking system would not have to sell assets and reduce its liabilities. By suspending cash payments, the banks would prevent the contraction of the assets and liabilities of the banking system.

showed that the public's confidence in banks could be undermined quickly when an important bank went under. At this time, however, the U.S. banking system had no institution comparable to the Bank of England, which had a reputation for financial strength and an inventory of cash that could cut short a panic. Consequently, some banking panics in the United States, like the panic of 1837, were followed by long periods of suspended cash payments.

### *Money and Banking from the 1860s to the Formation of the Federal Reserve System in 1914*<sup>11</sup>

**The National Banking System** — Reforms were begun in the 1860s to achieve two purposes: to establish a national currency, with all currency accepted at par value in exchange throughout the nation, and to make the banking system less vulnerable to panics. As a first step, the federal government began chartering national banks whose notes were to be the primary national currency. National banks were required to hold both collateral with the Treasury Department against their notes as well as cash reserves that were a percentage of their deposit liabilities and notes. The collateral and reserve requirements were imposed to

restrain the growth of bank liabilities and to promote greater public confidence in the banking system.

The basic flaw in the design of the new system was the absence of a central bank with the power to increase the monetary base should the public lose confidence in the value of bank deposits. In this period, there were major banking panics in 1873, 1884, 1893 and 1907. Banks acted cooperatively during these panics to increase their reserves by creating clearing house loan certificates (see the insert on the opposite page). The creation of clearing house loan certificates, however, did not permit banks to meet the public demand for currency. During each of these panics they also suspended payments of coin and currency to depositors.

**The Panic of 1907** — The nature of banking panics in this period can be illustrated by the panic of 1907, which occurred in October and November of that year. This panic is interesting for several reasons. Its effects on the nonfinancial sectors of the economy were relatively severe, and its events provide a good illustration of how the loss of public confidence in one bank can lead to loss of confidence in the banking system. Finally, political reaction to this panic led to the formation of the Federal Reserve System.

For several years prior to 1907, gold flowed from Europe to the United States because Europeans invested heavily in the U.S. economy. In the fall of 1906,

<sup>11</sup>This section is based largely on Cagan (1963), Robertson (1964), pp. 302–30, Scroggs (1924), and Sprague (1910).



## Increasing the Monetary Base by Creating Clearinghouse Loan Certificates

The banking system attempted to cope with the banking panics through emergency actions other than the suspension of cash payments. One approach involved the issuance of clearinghouse loan certificates. Clearinghouses were cooperative institutions established by banks to economize on the resources used in clearing checks and notes among themselves. Checks and notes drawn on other members of a clearinghouse were presented to the clearinghouse for collection, rather than being sent to each bank for collection. Banks deposited cash with their clearinghouses and, in turn, received certificates that were accepted by the other banks for covering net debit positions in clearinghouse settlements. Originally, the clearinghouse certificates were merely receipts for cash held by clearinghouses.

In each of the banking panics from 1857 through 1907, the banking system acted cooperatively to expand the monetary base by increasing the amount of clearinghouse certificates outstanding. The certificates issued during the panics were not simply receipts for cash held by the clearinghouses but were loans to banks with their assets pledged as collateral. The standard practice was for a clearinghouse association to accept some of the assets of a bank as collateral and issue certificates payable by the clearinghouse association. A bank that received such certificates would pay interest on them until they were redeemed after the panic was over. These

transactions effectively converted the clearinghouses into fractional reserve banking institutions by creating certificates that exceeded their holdings of cash.

Initially, clearinghouse certificates circulated only among banks that were members of the clearinghouse. During panics, clearinghouse members agreed to accept these certificates in payment from other member banks, rather than insisting on payment in cash. The circulation of these certificates among banks in place of cash payments allowed the participating banks to use their cash to meet the cash demands of their depositors. In some panics, however, clearinghouse associations issued certificates in small denominations that banks offered to their depositors as substitutes for cash. These small-denomination certificates then circulated as currency. This use of clearinghouse certificates was not legal, but the government banking authorities did not challenge their use during panics.<sup>1</sup>

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<sup>1</sup>Gorton (1985a,b) and Timberlake (1984). The Aldrich-Vreeland Act of 1908 established a procedure for the emergency issuance of national bank notes that was copied after the procedures that banks had used for issuing clearinghouse loan certificates during panics. The panic of 1914 tested the effectiveness of this innovation just before the Federal Reserve System began operations. By issuing notes that were available for such an emergency, banks did not have to suspend cash payments. See Cagan (1963), pp. 26–28, and Sprague (1915).

European investors began liquidating their U.S. investments, resulting in large gold outflows from the United States. This disinvestment was associated with sharp drops in U.S. stock prices in March and August 1907. The U.S. economy went into a recession after May 1907; the rate of decline in real economic activity was relatively low until the banking panic in the fall of that year, but relatively rapid after the panic.

The Panic of 1907 began with a depositor run on the Mercantile National Bank in New York City, which had suffered large losses. The New York clearinghouse

came to the aid of the Mercantile National Bank in October 1907, after the bank was put under new management. This action, however, was insufficient to stem the panic. Depositor runs began at other institutions, reflecting a general loss of public confidence in the stability of the banking system. Within a few days, all depository institutions in New York City faced depositor runs. Banks in New York City suspended cash payments in November 1907, and the suspension of payments spread quickly to other cities. The panic and suspension of payments ended in early 1908, but only after a sharp decline in economic activity and a



rise in bankruptcies in the nonfinancial sectors of the economy.

### ***Banking Crises of the 1930s and the Beginnings of Federal Deposit Insurance***<sup>12</sup>

After the long series of banking panics, culminating in the Panic of 1907, Congress finally responded by passing legislation in 1913 to establish the Federal Reserve System. There were no banking panics from 1914, when the Federal Reserve System began its operations, until the early 1930s. Then, however, a series of banking crises resulted in the closing of all banks in the nation in March 1933.

The Federal Reserve did not respond to these banking crises as the Bank of England had nearly 70 years before. U.S. commercial banks came under liquidity pressures because of cash withdrawals by depositors and outflows of gold from the United States. Yet, except for a few months in 1932, the Federal Reserve did not increase the monetary base in response to these cash withdrawals from banks. Moreover, commercial banks did not act cooperatively to suspend cash payments to depositors as they had in earlier banking crises.<sup>13</sup> Consequently, the deposit liabilities of the banking system declined sharply.

Congress took various approaches to dealing with the general collapse of the banking system in the 1930s. The most significant legislation was the establishment of federal deposit insurance. There have been no general banking panics in the United States since 1933.

## **HAS DEPOSIT INSURANCE PREVENTED BANKING PANICS IN THE UNITED STATES?**

### ***The Pros and Cons of Federal Deposit Insurance***

Recent experience indicates that large numbers of bank failures do not induce nationwide banking panics. A controversial issue, however, is whether federal deposit insurance could be eliminated without undermining public confidence in the banking system.

The British solved the problem of banking panics more than 100 years before they adopted a program of deposit insurance administered by the government.<sup>14</sup> Some argue that it is time to eliminate federal deposit insurance in the United States.<sup>15</sup> In their view, banking panics are best prevented by a credible lender of last resort, and they argue that the Federal Reserve has learned how to function as such. Federal deposit insurance gives depository institutions the incentive to assume greater risk than if deposit insurance were eliminated or offered by private firms.

An opposing view is that federal deposit insurance is essential for preventing banking panics. Since federal deposit insurance has been in effect for over 50 years, depositors rely on it, rather than on their assessment of the financial condition of their banks. In this view, banks would be vulnerable to runs by depositors as they had been prior to 1933 if federal deposit insurance were cancelled.

### ***The Importance of Credible Insurance: The S&L Experience***

Developments in Ohio and Maryland in 1985 provide some evidence on the importance of federal deposit insurance in preventing banking panics in the United States. The deposits of 80 Ohio savings and loan associations (S&Ls) had been insured by the Ohio Depository Guarantee Fund (ODGF), a private deposit insurance fund founded by the S&Ls themselves to insure their deposits. On March 4, 1985, the largest S&L insured by the ODGF incurred losses because of the failure of a government securities dealer with which the S&L had large investments. These losses exceeded the capital of the S&L and the entire reserves of the ODGF. When these events were publicized, depositors at other ODGF-insured S&Ls began to withdraw their deposits. Their confidence in the safety of their funds was destroyed when the reserves of the ODGF were wiped out.<sup>16</sup> Eleven days later, the governor ordered all of the S&Ls insured by the ODGF closed. One of the conditions for reopening was that

<sup>14</sup>The British program of deposit insurance was introduced under the Banking Act of 1979. With few exceptions, all depository institutions are covered and must contribute to an insurance fund. Coverage is 75 percent of each account, with a maximum compensation of £10,000 for each depositor. This program was introduced in response to the secondary banking crisis of the early 1970s.

<sup>15</sup>Ely (1985), England (1985), O'Driscoll and Short (1984), Short and O'Driscoll (1983), and Wells and Scruggs (1986).

<sup>16</sup>Federal Reserve Bank of Cleveland (1985).

<sup>12</sup>This section is based largely on Friedman and Schwartz (1963).

<sup>13</sup>Friedman and Schwartz (1963, pp. 311–12) argue that banks did not suspend cash payments because they thought the need to do so had been eliminated by the establishment of the Federal Reserve.



they obtain federal insurance for their deposits.<sup>17</sup>

The loss of confidence in the ODGF-insured institutions did not lead to a general loss of confidence in depository institutions. There were no runs on *federally* insured banks or S&Ls in Ohio.

Similar events transpired in Maryland in May 1985. A private fund insured the deposits of 102 Maryland S&Ls. Losses at the largest S&L insured by the private fund triggered runs by depositors on the privately insured S&Ls throughout the state. Once again, there were no runs on federally insured institutions. The Maryland state government required the privately insured S&Ls to obtain federal deposit insurance. In reaction to these developments in Ohio and Maryland, several other states have required their privately insured thrift institutions to obtain federal deposit insurance coverage.

## SUMMARY AND IMPLICATIONS FOR THE UNITED STATES

The rate of bank failure in the United States is currently high relative to failure rates in most years since World War II. There have been many episodes in U.S. history when increased bank failures led to banking panics that disrupted the operation of the nation's banking system.

To prevent banking panics, it is essential that the public maintain confidence in the safety of their deposits even though *some* banks are failing. In the United Kingdom, public confidence in the stability of the banking system was established through the commitment of the Bank of England to act as the lender of last resort in financial crises. This policy was established in the banking panic of 1866, and the U.K. banking system has not experienced a banking panic since. The basic feature of that policy involves a commitment to increase the monetary base (currency held by the public plus bank reserves) when bank runs occur.

Policies in the United States reflect a different historical development. After various banking panics, the Federal Reserve was established in 1914 as the central

bank with the responsibility of acting as the lender of last resort if a banking panic occurred. The Federal Reserve failed in that responsibility in the early 1930s, which resulted in a nationwide banking panic in the United States in 1933. There have been no banking panics in the United States since the federal government established deposit insurance in the 1930s. Runs by depositors on privately insured savings and loan associations in Ohio and Maryland during 1985 provide some evidence that federal deposit insurance is an essential feature of the policies in preventing banking panics in the United States.

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<sup>17</sup>The Federal Reserve attempted to stop the depositor runs by lending cash to the privately insured S&Ls. Federal Reserve employees from throughout the System were put on special assignment to accept the assets of these S&Ls as collateral for the cash loans. This response, however, did not stop the depositor runs. This indicates that, in a nation in which depositors have come to rely on deposit insurance to maintain their confidence in the safety of their funds, the central bank may not be able to maintain that confidence by lending cash to depository institutions when the protection of deposit insurance is suddenly eliminated.



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# Why Has Manufacturing Employment Declined?

*John A. Tatom*

UNITED STATES manufacturing employment grew little in 1986. Currently at about 19 million workers, it is below the 21 million employed at its peak in 1979. This disappointing performance often is attributed to the declining international competitiveness of U.S. manufacturing. Such arguments, however, are tenuous at best: U.S. manufacturing output expanded more rapidly during the period of dollar appreciation from 1980–84 than it had over the previous four years when the dollar's value was falling. More importantly, the growth of manufacturing abroad has been anemic during this decade. A variety of output, cost and productivity measures reveal that the competitiveness of U.S. manufacturing has actually improved.<sup>1</sup>

Concern over the recent performance of manufacturing employment, however, is not so easily rebutted. Indeed, viewed alongside the strength of U.S. manufacturing output growth, there seems to be a “Jekyll-Hyde” quality to the U.S. manufacturing sector performance.<sup>2</sup> A longer-run perspective on manufacturing employment and an understanding of economic forces contributing to it, however, reveals that the recent decline is not unusual and simply reflects the

strength of U.S. manufacturing productivity growth in the 1980s.

## DOMESTIC MANUFACTURING EMPLOYMENT: CYCLICAL WITH NO PERSISTENT TREND

Chart 1 shows manufacturing employment and output (1982 prices) since 1948. As one can see by examining the shaded periods of business recession, both manufacturing employment and manufacturing output are strongly cyclical. What is equally evident is that manufacturing employment has shown little tendency to grow over the prior three decades, except for its sharp rise from 1960 to 1967. Indeed, at its peak in 1979, there were fewer than one million more workers in the manufacturing sector than in mid-1969, and only about four million more workers than in 1956 and early 1957. Thus, temporarily negative growth in manufacturing employment is neither unprecedented, nor should it be assessed relative to a presumption that manufacturing employment has exhibited any significant growth since 1948.

The cyclical explanation, however, does not fully account for the decline in employment from 1979 to 1986. At manufacturing employment's peak in 1979, unemployment equaled 5.8 percent of the civilian labor force. If the nation's output increased enough to reduce the current unemployment rate (7.0 percent) back to 5.8 percent, about 1.4 million jobs would result, given today's labor force. Up to one-half of these jobs would likely be in manufacturing. Even with these

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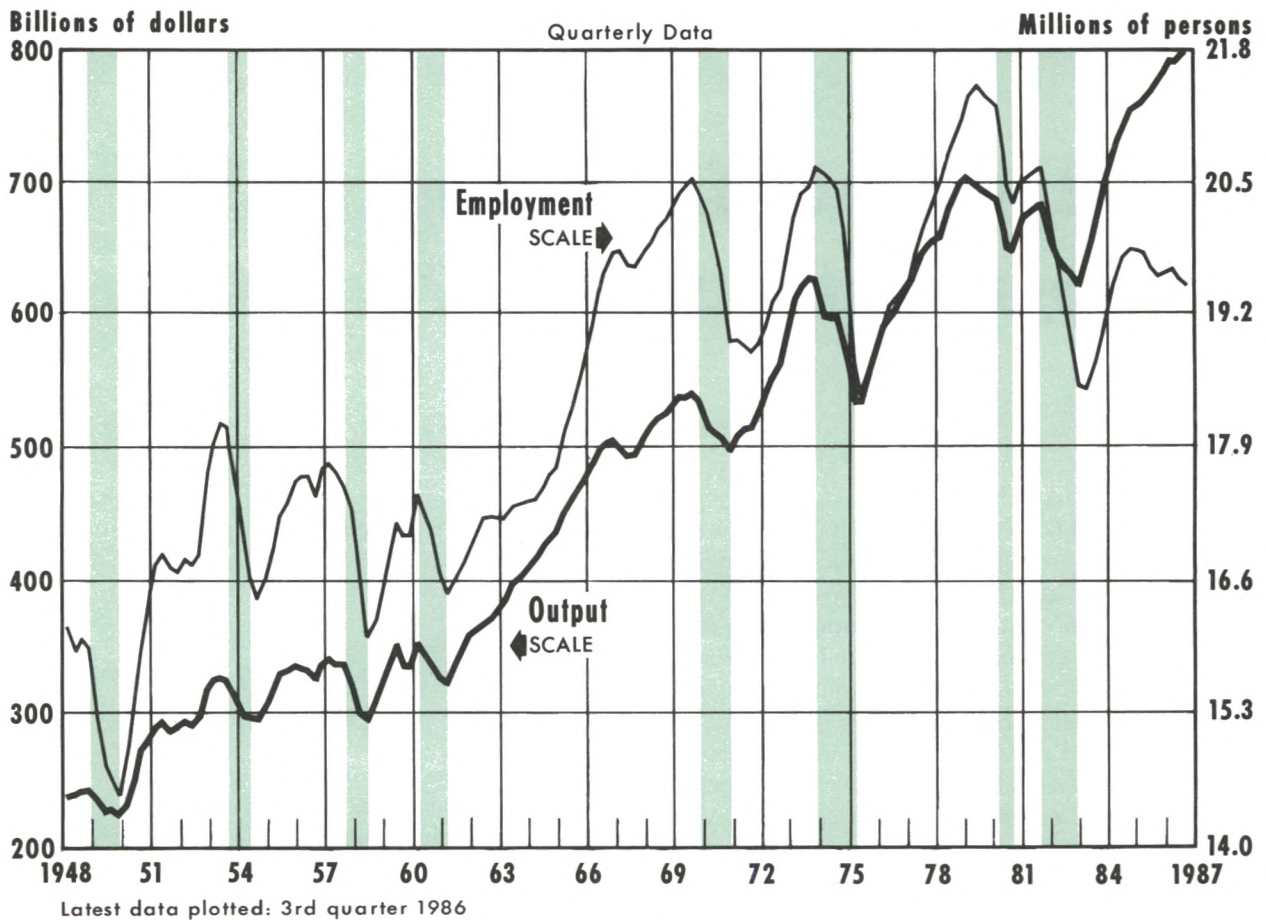
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<sup>1</sup>See Tatom (1986). Clark (1986) has pointed to the unusual strength of manufacturing output in recent years.

<sup>2</sup>See Clark (1986).



Chart 1  
**U.S. Manufacturing Output and Employment**



additional jobs, however, manufacturing employment would remain lower than in 1979.<sup>3</sup>

### WHAT DETERMINES MANUFACTURING EMPLOYMENT?

Economic theory points to several factors that influence manufacturing employment. At the simplest level, firms choose their desired employment of labor based on a comparison of the expected cost and the expected revenue obtained from hiring additional workers. The latter depends on both the change in output associated with employing more (or less) work-

ers and the expected output price. Another way of expressing this choice is to compare the relative price of labor, the wage relative to the price of the output produced, and the productivity of additional workers.<sup>4</sup> A rise in the manufacturing wage or a fall in the price of manufactured goods raises the cost of labor relative to its productivity, reducing the incentive to employ labor. Similarly, a rise in the productivity of workers for a given level of employment increases the incentive to employ workers, given the relative cost of labor.

<sup>3</sup>The appendix to this article further discusses the importance of cyclical movements in the decline of manufacturing employment since 1979.

<sup>4</sup>The relevant productivity measure is the marginal product of labor; normally, however, output per worker, or average productivity, is the most commonly used measure. As long as the ratio of the marginal to average product of labor does not change, movements in the average product of labor will reflect the same proportional movements in the marginal product of labor.



The manufacturing sector is only one part of the economy. Producers of manufactured products, therefore, must compete with producers in other sectors, such as agriculture, services, construction, mining, transportation, utilities and government, for sales and for resources, including workers. Thus, manufacturing wages and prices must be competitive in order to attract workers and sales. A simple statement of this relationship can be derived from the identical employment decisions made by firms throughout the economy. In particular, if wages equal some fraction ( $\beta_m$  for manufacturing, or  $\beta$  for the whole economy) of the revenue per worker in manufacturing and in the whole economy, then:

$$(1) W_m/W = (\beta_m/\beta) (P_m/P) (\pi_m/\pi),$$

where  $W_m$  and  $W$  are wages in manufacturing and in the whole economy, respectively,  $P_m$  and  $P$  are the prices of output in the two sectors, and  $\pi_m$  and  $\pi$  are the output per worker, or productivity, in the respective sectors. Because productivity is measured as the ratios of output to the number of workers in each sector, equation 1 can be rearranged to the following:

$$(2) L_m/L = (\beta_m/\beta) (X_m/X) (P_m/P) (W_m/W)^{-1},$$

where  $L_m$  is the employment in manufacturing and  $L$  is total civilian employment, and  $X_m$  and  $X$  represent their respective output levels. According to equation 2, the share of manufacturing employment ( $L_m/L$ ) depends positively on the share of manufacturing in the nation's total output ( $X_m/X$ ) and the price of manufacturing output relative to prices generally ( $P_m/P$ ), and is inversely related to wages in manufacturing relative to wages generally ( $W_m/W$ ). Relative wages, of course, depend on relative skill differences, nonpecuniary differences of jobs in manufacturing compared with the remainder of the economy, and barriers to labor movement across sectors of the economy. Differences in the relative degree of unionization or in regulation can affect the latter factor.

Manufacturing output's share in total output depends on the demand for manufacturing output compared with other goods. This demand is influenced by permanent or transitory movements in real income and by the relative price of manufactured product. The share of manufacturing product in total output can also be influenced by international trade. Lower prices for imported manufactured products could reduce both the share of domestic manufacturing pro-

duction and its relative price. Similarly, a rise in the relative price of manufactured goods due to a rise in foreign demand can increase domestic manufacturing production (for export) relative to the economy's total output.

Manufacturing output's share is of interest not just because of its influence on employment; more importantly, it indicates the direct role of manufacturing in generating real income in the economy. In addition, comparisons of the employment and output shares of the manufacturing sector indicate the relative performance of productivity, or output per worker. The next section examines the employment and output shares in the manufacturing sector. Then the implications of productivity growth for prices and output are discussed. The discussion links two of the three factors influencing the employment share, according to equation 2. The third factor, relative wages, is discussed subsequently.

## THE SHARE OF MANUFACTURING EMPLOYMENT AND OUTPUT

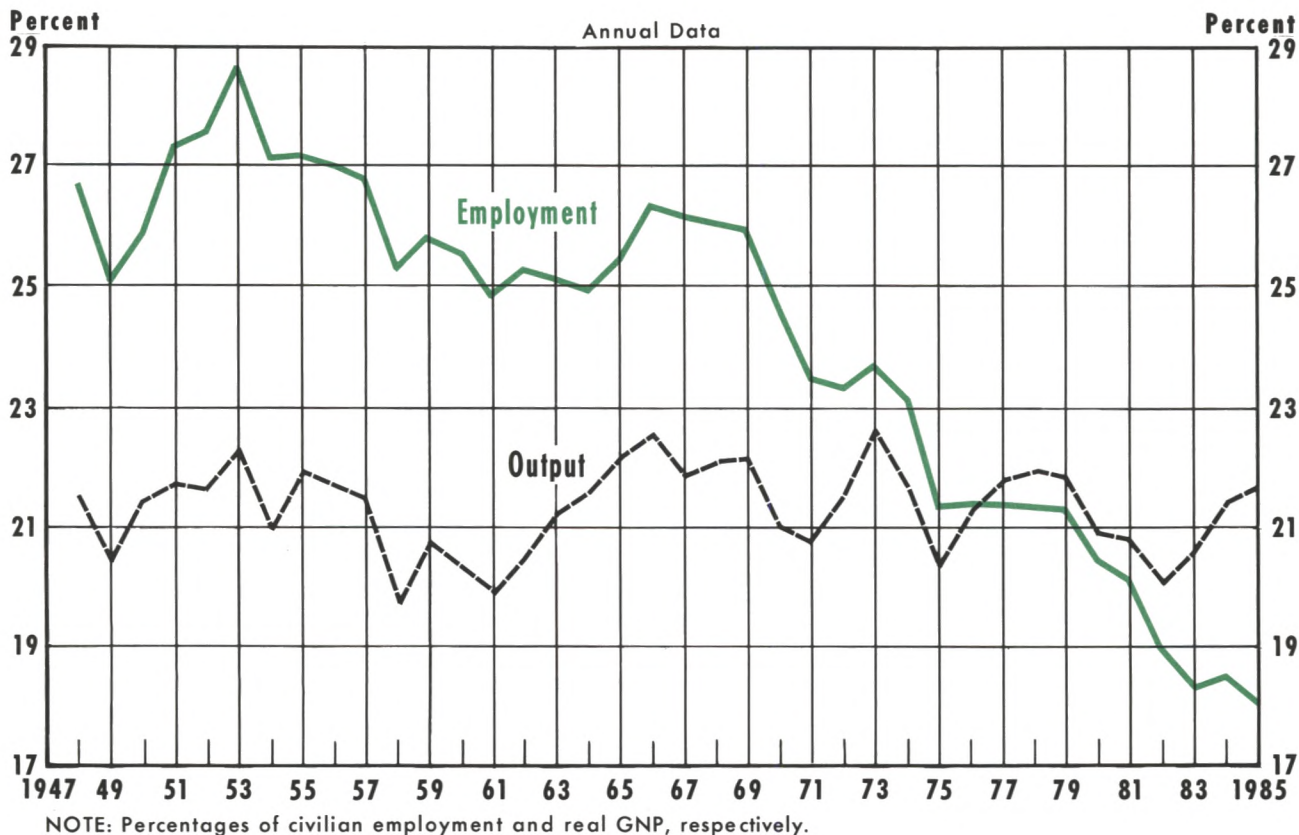
Chart 2 shows the share of manufacturing employment and output as percentages of civilian employment and real gross national product (GNP) respectively. The share of manufacturing output has fluctuated cyclically, but shows no trend. Employment in manufacturing has been declining as a share of total employment for a long time. The principal factor accounting for this decline has been relatively more rapid growth in labor productivity in manufacturing than in the remainder of the economy.

Chart 3 shows the ratio of labor productivity in manufacturing to that for the business sector as a whole. Labor productivity is measured by output per worker. From 1948 to 1960, there was little difference in the growth rates of productivity in manufacturing and elsewhere, so the relative productivity level shown in the chart changed little. Note that in chart 2, the share of labor employment in manufacturing also changed little over this period. Since then, productivity has grown faster in the manufacturing sector, so that between 1960 and 1985, labor productivity in manufacturing increased almost 50 percent more in the manufacturing sector than in the business sector. As chart 2 shows, this rise in productivity was associated with a decline in the share of labor employment rather than a rise in the share of manufacturing output.



Chart 2

# Share of Employment and Output in Manufacturing



## Productivity Growth, Prices and Output

Why have productivity gains in manufacturing resulted in a relative decline in employment rather than a rise in the share of output? A simple perspective on this question is to examine the effect of productivity growth in a supply-demand framework. In figure 1, the initial supply curve and demand curves are labeled S and D, respectively. Given other factors that influence supply or demand decisions, the curves indicate that as the price of manufactured product rises, the quantity supplied rises and the quantity demanded falls. At the initial equilibrium price,  $P_0$ , producers desire to produce and sell exactly the quantity of product that buyers wish to purchase.

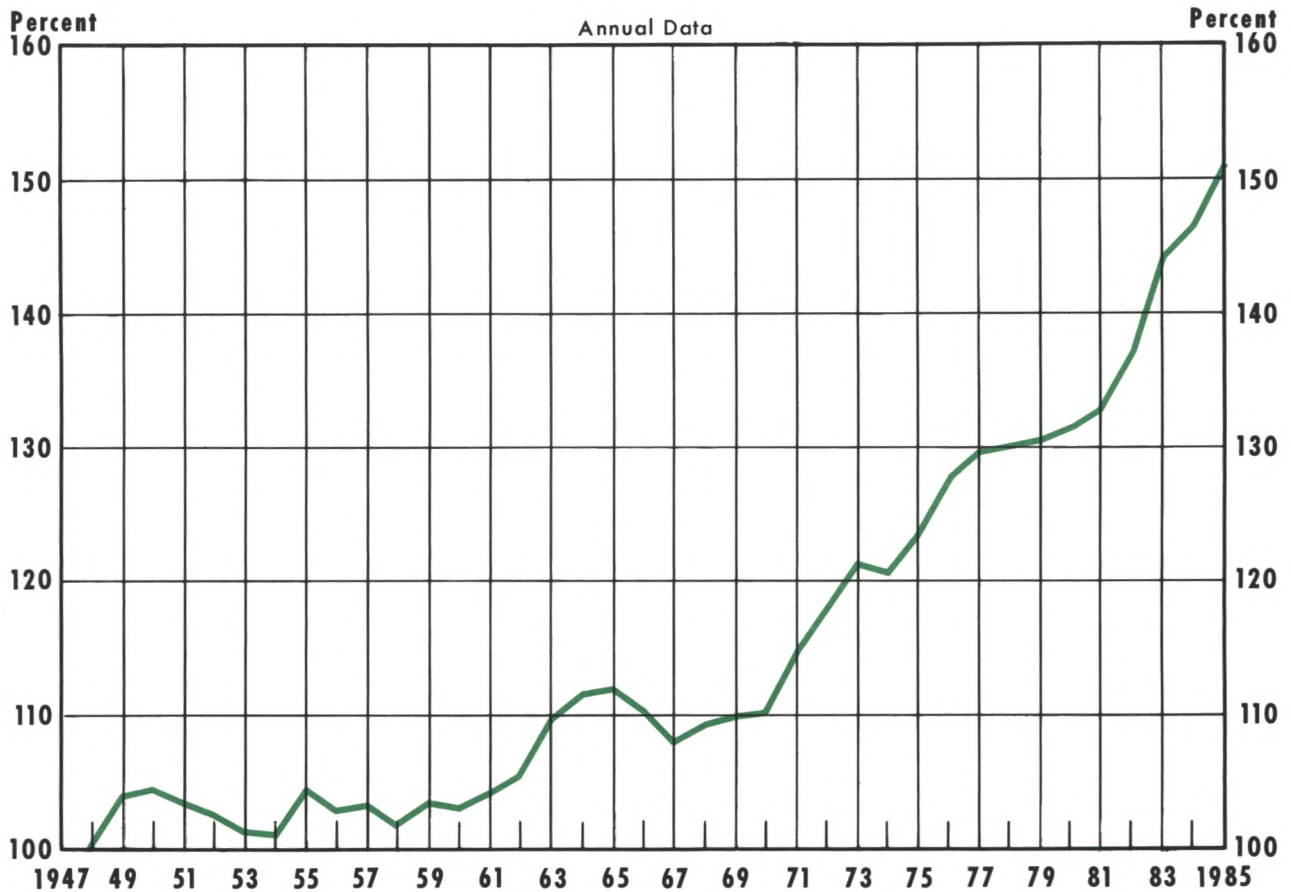
A gain in output per worker, or productivity, raises the quantity that producers could profitably produce, given factor and product prices. Such a gain shifts the

supply curve to the right, as shown in the shift from S to S' in the figure. The shift in the supply results in an excess supply.<sup>5</sup> Buyers are unwilling to purchase more, given the price,  $P_0$ , and the other factors influencing demand. Thus, the product price falls as producers compete to enlarge their sales. At a new equilibrium price,  $P_1$  in the figure, buyers purchase more and sellers are selling exactly the output they

<sup>5</sup>Productivity growth in manufacturing also has a significant effect on real GNP since this sector accounts for more than 20 percent of real GNP. For example, a 10 percent increase in output per worker would tend to increase real GNP by (0.2) (0.1) or 2 percent, other things the same. This change in real GNP would raise the demand for all normal goods and services. This shift is omitted in the figure. The initial excess supply created by a productivity improvement in manufacturing is reduced somewhat by this shift, as is the associated decline in price.



Chart 3  
**Relative Productivity in Manufacturing**



profitably choose to sell along the new supply curve  $S'$ . Thus, productivity growth increases output only to the extent that buyers are willing to increase their purchases; this willingness is influenced by the responsiveness of demand to a decline in the price of the product.

The effect of productivity growth on the size of the output increase in an industry is determined by purchasers of the product, not by the producers. If demand is quite responsive to price, then price falls relatively less and the quantity purchased rises relatively more. Economists refer to this responsiveness as the "own price elasticity of demand"; it measures the percentage change in quantity demanded induced by a given percentage change in price. If the elasticity

equals one, a given percentage-point decline in price induces an equal percentage rise in the quantity demanded. If the elasticity exceeds one, the product is said to have elastic demand; a given percentage decline in price induces a larger percentage rise in quantity demanded. If the own price elasticity of demand is less than one, demand is said to be inelastic, indicating a lower degree of responsiveness of demand to price changes.

An important implication of the magnitude of the demand response to a price change is the effect of a supply shift on total spending on the product. When supply shifts from  $S$  to  $S'$  in the figure, the product of price times quantity, or total spending on the product, can change. If demand is elastic, the percentage rise in



quantity demanded will exceed the percentage decline in price that caused it; as a result, total spending ( $P_1 X_1$ ) will rise ( $P_1 X_1$  exceeds  $P_0 X_0$ ). If demand is unit elastic, total spending will not change. If demand is inelastic, the price will fall relatively more than quantity demanded rises and total spending falls.

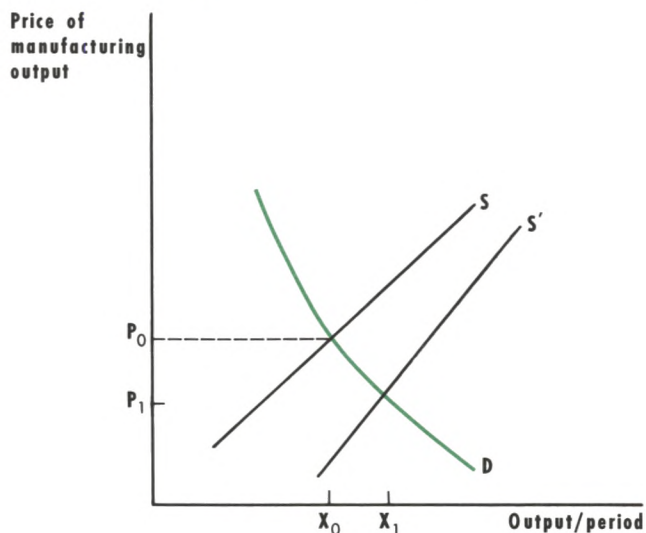
### Implications for the Manufacturing Sector

The estimated demand for manufacturing output shown in the appendix has a price elasticity that is less than one, or inelastic. Thus, according to equation 2, faster productivity growth in manufacturing has resulted in a declining share of employment because relative price reductions have more than offset the price-induced gains in output.<sup>6</sup>

Relatively faster productivity growth in manufacturing also has reduced the share of nominal income generated in manufacturing products. In effect, the gain in the nation's income and output occasioned by productivity growth in manufacturing has been realized in increased output elsewhere. To the extent that consumers of manufactured and other products are unwilling to buy the increased manufacturing output, resources that are saved by productivity improvement are moved into other activities to produce goods or services. The rise in the price of nonmanufactured product relative to prices of manufactured goods reflects this shift. Moreover, the share of income spent on the manufactured product declines, or the share of income spent on other products rises.<sup>7</sup>

The relative price of the manufactured product is shown in chart 4; it is the ratio of the implicit price deflator for manufacturing output to that for business sector output, where the price indexes are set to 1 in 1982. The share of nominal GNP originating in domes-

Figure 1  
The Supply and Demand for Manufacturing Output



tic manufacturing is also shown in chart 4. The decline in the relative price of manufacturing output since 1960 has been quite rapid and reflects the relative gain in labor productivity in that sector.<sup>8</sup> Since the proportion of output has been unchanged (chart 2), the share of income originating in or spent on manufacturing has declined in line with the falling relative price of manufactured product.

Two of the principal factors determining the share of labor employment devoted to manufacturing in equation 2 are summarized in the nominal spending share in chart 4. The dominant factor of the two has been the declining relative price of manufacturing output, which reflects relative productivity gains in the sector. Of course, its share of output and its relative price could both fall if the demand for manufac-

<sup>6</sup>The price elasticity is not the only factor that influences the share of spending on manufacturing output. The "income elasticity," the sensitivity of demand to real income changes, is also an important determinant of the share of such output and spending in a growing economy. As real income expands, the demand for all goods and services normally rises, given unchanged prices. But if the income elasticity of demand for manufactured product is less than one, then the share of manufacturing output in total output would fall, given unchanged product prices. This elasticity, with respect to permanent income, is estimated to be less than one in the appendix. Transitory or cyclical changes in income have much larger effects.

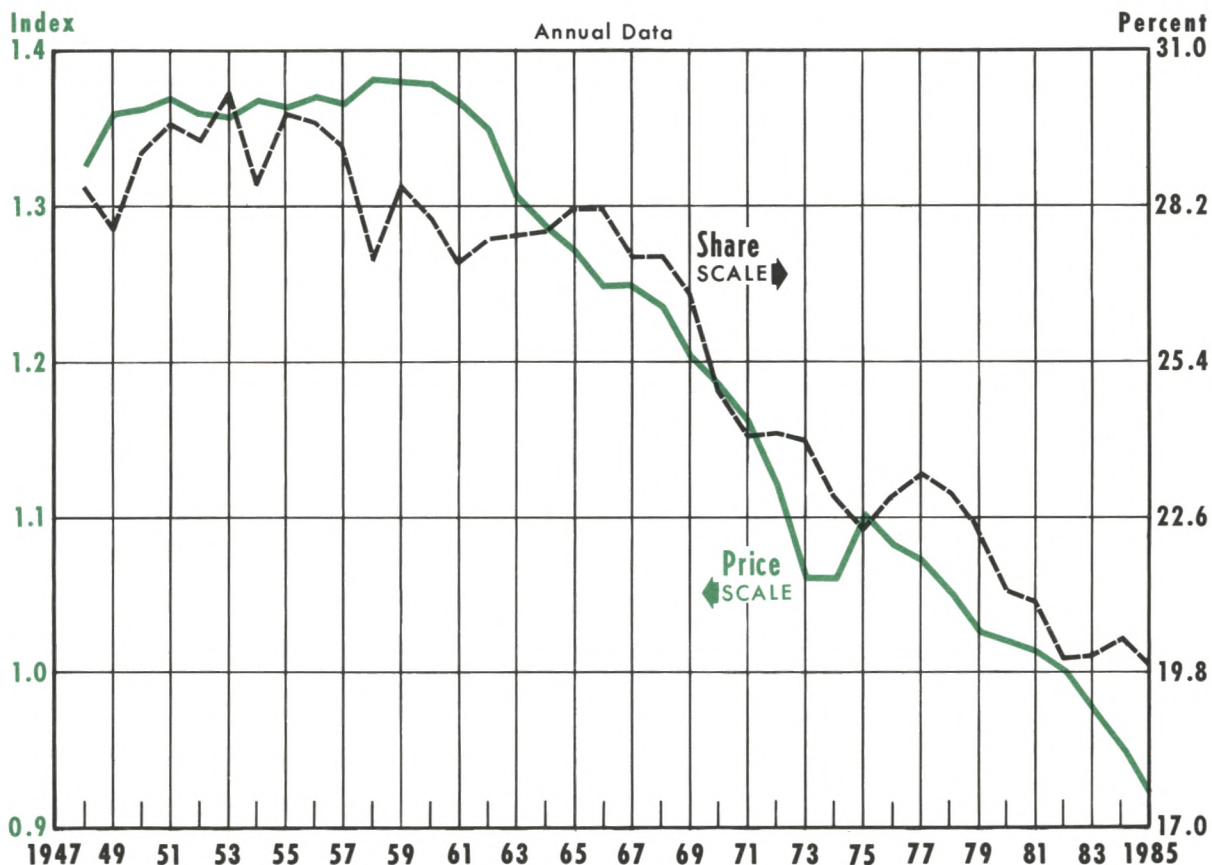
<sup>7</sup>The agricultural sector is a more well-known area in which productivity gains have given rise to sharp increases in the nation's real income, despite a declining share of income being spent on the product and relatively large flows of resources out of the sector.

<sup>8</sup>The sharp decline in the relative price of the manufactured product from 1971 to 1973 and subsequent recovery to its previous path may be due to errors in measurement. Darby (1974) has argued that wage and price controls in this period initially biased down price measures and artificially raised real output measures. If wage and price patterns in 1971–75 were artificially distorted by controls, the share of employment (chart 2) would not have been so flat in 1971–73, nor would it have subsequently declined so sharply in 1973–75.



Chart 4

# The Relative Price and Share of Nominal Income in Manufacturing



tured goods were declining. Chart 2 clearly indicates, however, that this has not been the case; the share of manufacturing output has been nearly unchanged for the past 40 years.<sup>9</sup>

## RELATIVE WAGES AND EMPLOYMENT IN MANUFACTURING

The final factor in equation 2 that influences the share of employment in manufacturing is the relative level of compensation in manufacturing. When wages

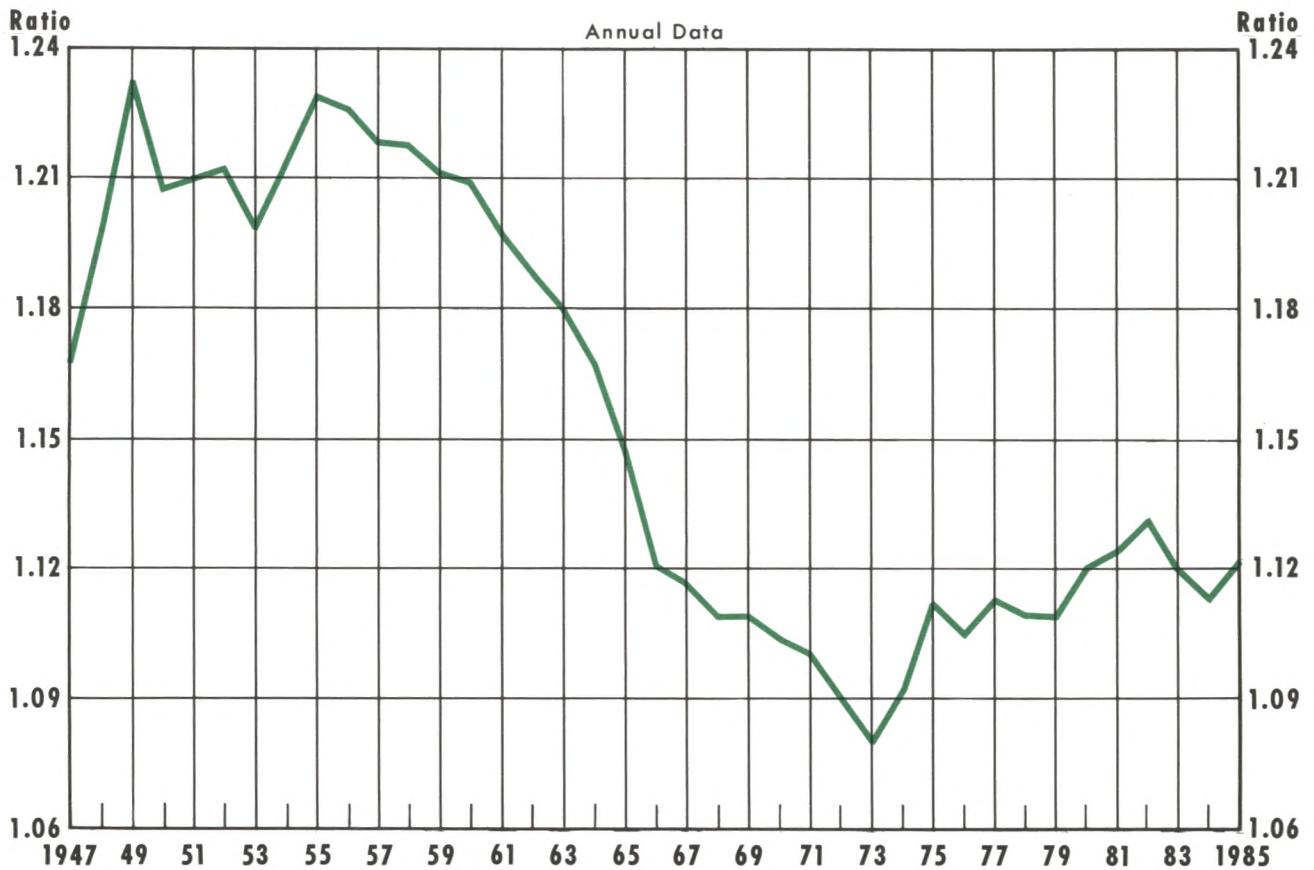
rise more (less) in one sector relative to the rest of the economy, the relative amount of employment generally is reduced (increased), given initially unchanged relative price and output levels. One way to understand this makes use of equation 1. If relative wages in manufacturing rise, it either reflects a relative improvement in the value of manufacturing productivity for a given level of employment or will be reflected in such an improvement obtained by changing employment.<sup>10</sup> In the latter case, a rise in wages relative to prices forces firms to both substitute other factors of

<sup>9</sup>In agriculture, even the share of output has declined, making it more difficult to see the sector as an important source of expanding real income.

<sup>10</sup>That is, the relative employment demand depends on relative wages. If relative wages change, there is either a movement along, or a shift in, the relative demand for labor in manufacturing.



Chart 5  
**Relative Labor Compensation in Manufacturing**



production for labor to offset some of the cost increase and to reduce production, which tends to raise product prices. Both types of adjustment raise productivity, but output declines and product prices rise when the source of the productivity gain is an increase in relative wages.

Relative wage movements have not been the dominant force in U.S. manufacturing. Chart 5 shows compensation in manufacturing relative to compensation in the business sector generally. Over the past 38 years, there has only been one major shift in the relative compensation levels that would induce a major change in relative output, price or employment patterns. From 1948 to 1960, compensation was over 20 percent higher in the manufacturing sector. This differential narrowed from 1960 to 1966, resulting in employment growth that was quite rapid (charts 1 and

2). With the exception of that period, however, movements in relative wages do not appear to have been large enough to have affected the share of labor employed in manufacturing significantly.

### INTERNATIONAL TRADE

The view that foreign competition has led to relatively large losses in manufacturing employment in the 1980s is widely held. But there is no evidence above that the share of domestic manufacturing (chart 2) has been depressed by the appreciation of the dollar or by increased imports.<sup>11</sup> There is also no apparent

<sup>11</sup>Fieleke (1985) has shown that there was no significant negative correlation between employment changes in domestic employment in manufacturing industries and changes in import penetration in these industries over the period 1980 to 1984.



evidence that relative wages in manufacturing (chart 5) have been depressed in the early part of this decade due to trade-induced reductions in the demand for U.S. manufacturing output and employment. More careful attention to the argument would further clarify the analysis, however.

Domestic manufacturers compete with foreign producers. The dollar price of domestic manufactured product, therefore, must be competitive with the dollar price of the foreign product. The latter price can be expressed as  $(P_m^*/E)$ , where  $P_m^*$  is the price of the foreign product in its own currency and  $E$  is the price of a dollar in units of foreign currency. In the analysis in the figure, productivity improvement lowers the price of domestic product; for foreign goods, this requires that the value of the dollar,  $E$ , rise to the same extent for foreign goods to remain competitive with U.S. products. In other words, productivity improvement in U.S. manufacturing, given foreign prices, tends to raise the value of the dollar.

Many analysts, however, emphasize the causality running in the opposite direction. Falling prices of foreign goods or a rise in the value of the dollar depress the domestic prices of foreign goods. Of course, a decline in  $P_m$  due to foreign competition alone would lead to a reduction in the quantity of U.S. output supplied and increased purchases along the demand curve; the difference between U.S. purchases of manufactured products and U.S. production (supply) would be made up by imports of foreign products.

The evidence presented earlier is inconsistent with the trade hypothesis. If this hypothesis were correct, the share of domestic manufacturing output in total real income would have fallen in the 1980s. Instead, the share has been relatively strong, especially when adjusted for the domestic business cycle.<sup>12</sup> Also, if the international hypothesis were correct, the growth of manufacturing output and employment abroad would have risen. But neither, in fact, occurred.<sup>13</sup>

Moreover, the appendix to this article shows that the exchange value of the dollar has not significantly affected the demand for domestic manufacturing output.

## CONCLUSION

Manufacturing employment in the United States has declined slightly in recent years, but this decline should be assessed against a previous sharply declining trend relative to overall employment in the economy. Part of the recent decline is associated with a reduction in the relative demand for the manufacturing product due to cyclical forces in the U.S. economy. In 1979, when manufacturing employment was slightly larger, the nation's unemployment rate for civilian workers was 5.8 percent, compared with recent levels of about 7 percent.<sup>14</sup> Losses in income associated with cyclical increases in unemployment reduce the demand for manufacturing output relatively more than demand in other sectors of the economy.

But the longer-term "problem" is the strength of productivity improvement in the manufacturing sector generally. Faster productivity growth in this sector has contributed significantly to real income growth in the nation; it has also contributed to a significant decline in the relative price of manufactured goods, reflecting their increased availability. While the share of manufacturing output has been maintained, its shares of employment and total spending have declined. This long-standing pattern has continued from 1979 to 1985. Thus, there is no need to blame other popular villains for manufacturing employment's failure to regain its previous peak level.

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<sup>12</sup>The share of manufacturing output in real GNP was 21.7 percent in 1985 and the first three quarters of 1986. This was higher than the 1948–80 average of 21.3 percent, despite the fact that measures of transitory income losses due to unemployment or low capacity utilization indicate a significantly lower-than-average share would have been expected. Tatom (1986) indicates that manufacturing sector growth exceeded that predicted by income growth alone by about 1.6 percent per year for the period 1980–85.

<sup>13</sup>See Tatom (1986). The other countries examined were Canada, Belgium, Denmark, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom.

<sup>14</sup>The change in the unemployment rate is an accurate index of cyclical output and income losses when the "natural rate" of unemployment, the noncyclical component, is unchanged. The substantial slowing in the growth of new entrants into the labor force in the 1980s, especially young, inexperienced people, reduced the natural rate significantly. Of course, the latter implies that a return to a 5.8 percent rate would leave the economy with a larger percentage cyclical output loss than that associated with the same unemployment rate in 1979.







although insignificant.<sup>2</sup> According to these estimates, a 2.7 percent rise in real GNP, given prices and potential output, would result in a 6.2 percent gain in manufacturing output. Such a gain would put the share of manufacturing output at about 22.5 percent, essentially the same as at the post-World War II peak achieved in 1966 and 1973.

Of course, a cyclical gain in manufacturing output of this size would be associated with a cyclical rise in output per worker, so that the increase in employment would be smaller than that for output. Equation 2 in the text and the demand equation estimate above may be used to find the manufacturing employment gain. The product  $(PM/P)$  ( $X_m/X$ ) in equation 2 in the text is the share of nominal spending (GNP) on manufacturing product. Changes in this spending share result in proportionate changes in manufacturing employment relative to total employment.

Cyclical variations in the share of nominal GNP

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<sup>2</sup>When the relative price of imports is used instead of the trade-weighted exchange rate, its coefficient has the "expected" negative sign,  $-0.02$ , but it is not statistically significant ( $t = -0.72$ ). None of the elasticity estimates is significantly affected in this test either. The relative price of imports is the ratio of the implicit price deflators for imports from the National Income and Product Accounts and for the domestic manufacturing sector.

originating in domestic manufacturing equal [ $\Delta \ln X_M - \Delta \ln X + \Delta \ln (PM/P)$ ]; according to the demand equation estimate above, holding  $(PM/P)$  and  $XP$  constant, this sum is  $1.284 \Delta \ln X$ . For a 2.7 percent change in real GNP ( $\Delta \ln X = 2.7$  percent), the change in the nominal spending share is 3.5 percent. With an unchanged relative compensation level, equation 2 in the text and the demand function here indicate that a movement from a 7 percent to a 5.8 percent unemployment rate will result in a difference ( $\Delta \ln LM - \Delta \ln L$ ) equal to 3.5 percent; since  $\Delta \ln L$  is about 1.2 percent,  $\Delta \ln LM$  is about 4.7 percent.<sup>3</sup> Thus, manufacturing employment would increase from about 19.2 million workers in manufacturing to about 20.1 million, still below the 21 million level observed in 1979.<sup>4</sup>

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<sup>3</sup>A more direct method of estimation gives about the same conclusion. When  $\Delta \ln LM$ , where  $LM$  is manufacturing employment, is regressed on a constant and the current and past two quarters' growth rates of real GNP, quarterly for the period IV/1948–II/1986, the sum of the coefficients on real GNP growth yield a manufacturing employment elasticity of 1.5, so that a 4 percent gain in manufacturing employment is associated with a 2.7 percent rise in real GNP, about the same as that indicated above.

<sup>4</sup>These calculations presume that relative wages and prices would be unchanged by a cyclical rise in real GNP. There is no indication, either in the charts of these variables in the text, or in correlation analysis, that these variables are cyclical.







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# FEDERAL RESERVE BANK OF ST. LOUIS

## REVIEW INDEX 1986

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### JANUARY

*Michael T. Belongia*, "Estimating Exchange Rate Effects on Exports: A Cautionary Note"

*Keith M. Carlson*, "Recent Revisions of GNP Data"

### FEBRUARY

*R. W. Hafer*, "The FOMC in 1985: Reacting to Declining M1 Velocity"

*R. Alton Gilbert*, "Requiem for Regulation Q: What It Did and Why It Passed Away"

### MARCH

*R. W. Hafer*, "The Response of Stock Prices to Changes in Weekly Money and the Discount Rate"

*G. J. Santoni*, "The Effects of Inflation on Commercial Banks"

### APRIL

*John A. Tatom*, "Domestic vs. International Explanations of Recent U.S. Manufacturing Developments"

*Kenneth C. Carraro and Daniel L. Thornton*, "The Cost of Checkable Deposits in the United States"

### MAY

*Alex Cukierman*, "Central Bank Behavior and Credibility: Some Recent Theoretical Developments"

*Zalman F. Shiffer*, "Adjusting to High Inflation: The Israeli Experience"

### JUNE/JULY

*Mack Ott and Paul T. W. M. Veugelers*, "Forward Exchange Rates in Efficient Markets: The Effects of News and Changes in Monetary Policy Regimes"

*John A. Tatom*, "How Federal Farm Spending Distorts Measures of Economic Activity"

### AUGUST/SEPTEMBER

*Daniel L. Thornton*, "The Discount Rate and Market Interest Rates: Theory and Evidence"

*Salam K. Fayyad*, "A Microeconomic System-Wide Approach to the Estimation of the Demand for Money"

### OCTOBER

*Jerry L. Jordan*, "The Andersen-Jordan Approach after Nearly 20 Years"

*Dallas S. Batten and Daniel L. Thornton*, "The Monetary-Fiscal Policy Debate and the Andersen-Jordan Equation"

*Keith M. Carlson*, "A Monetarist Model for Economic Stabilization: Review and Update"

*Leonall C. Andersen and Jerry L. Jordan*, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization"

*Leonall C. Andersen and Keith M. Carlson*, "A Monetarist Model for Economic Stabilization"

### NOVEMBER

*G. J. Santoni*, "The Employment Act of 1946: Some History Notes"

*Michael T. Belongia*, "The Farm Sector in the 1980s: Sudden Collapse or Steady Downturn?"

### DECEMBER

*R. Alton Gilbert and Geoffrey E. Wood*, "Coping with Bank Failures: Some Lessons from the United States and the United Kingdom"

*John A. Tatom*, "Why Has Manufacturing Employment Declined?"