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In This Issue . . .

In the first article in this *Review*, "Domestic vs. International Explanations of Recent U.S. Manufacturing Developments," John A. Tatom examines two alternative explanations for the recent behavior of the manufacturing sector. The first, the international explanation, suggests that the rise in the international value of the dollar has reduced U.S. competitiveness, depressing manufacturing output. The second, the domestic view, emphasizes that, while cyclical fluctuations in U.S. real income have led to sharp changes in U.S. manufacturing output growth in the 1980s, overall, manufacturing output has actually been stronger than its relation to domestic income alone would suggest.

Tatom's evidence shows that, after accounting for normal cyclical movements in real income, manufacturing output has been unusually strong in the 1980s. More important, it is positively and significantly related to the appreciation in the value of the dollar. The author explains that these results are consistent with the view that movements in the value of the dollar reflect supply-side improvements in the relative cost of traded goods. Tatom shows that various measures of factor cost and productivity across countries provide additional support for this view.

The evidence that Tatom examines does not support the notion that the rise in the dollar has resulted in a loss in U.S. manufacturing output or employment to foreign competitors. Instead, the rise in the dollar appears to reflect U.S. relative cost and productivity improvements that also have raised the U.S. share of world manufacturing output. Tatom concludes that economic policies that promote low inflation and faster, more stable growth appear to be relatively more important for U.S. manufacturing than the exchange rate consequences of economic policy or other exchange rate developments.

* * *

In the second article in this issue, "The Cost of Checkable Deposits in the United States," Kenneth C. Carraro and Daniel L. Thornton look at the cost of holding various types of money, in particular, checkable deposits. The authors approach this issue from both an analytical and a pragmatic perspective. The various implicit and explicit costs of holding money are discussed, and recent survey data are used to estimate the total annual costs of holding four types of checkable deposits for "representative" depositors. This article should provide readers with useful information that will better enable them to choose the least costly checking alternative given their particular needs for checking account money.

Domestic vs. International Explanations of Recent U.S. Manufacturing Developments

John A. Tatom

THE value of the U.S. dollar in foreign exchange markets rose sharply from 1980 to 1985, prompting the emergence of a hypothesis that links the growth of the nation's manufacturing sector and developments in the foreign exchange market. This hypothesis holds that the appreciation of the dollar has raised the cost of U.S. goods, especially manufactured goods, to uncompetitive levels in the world market.[1] As a result, manufacturing output in the United States has stagnated, especially relative to manufacturing in competing nations.

This international explanation suffers from a common analytical problem in economic analysis: the failure to distinguish between supply and demand changes. In the simplest analysis, for example, an increase in the supply of a product, given prices, is expected to reduce the price of the product so that purchasers will be induced to buy more. Thus, the price falls, just as it would if demand fell at initially unchanged prices. The principal difference is this: when a cost or productivity shift initiates the price reduction, the industry expands; when a demand shift initiates the price reduction, the industry shrinks.

The international hypothesis focuses on the effects of an exchange rate change only on the demand for goods. But if the *supply* of output grows in one country because of an increase in its resources or productivity, the prices of affected products will fall and the domestic industry will expand. A rise in the exchange rate then will be required to restore the equality of product prices across countries. Thus, it is not necessarily correct to expect that an appreciation of the dollar reduces the output and employment of domestic exporters and import-competing firms.

What's more, a decline in U.S. manufacturing output can occur as much due to a shift in domestic demand as foreign demand. This point is part of the domestic view of U.S. manufacturing output fluctuations, which emphasizes the sensitivity of manufacturing to cyclical movements in U.S. real income and the importance of supply changes in altering the exchange rate.[2]

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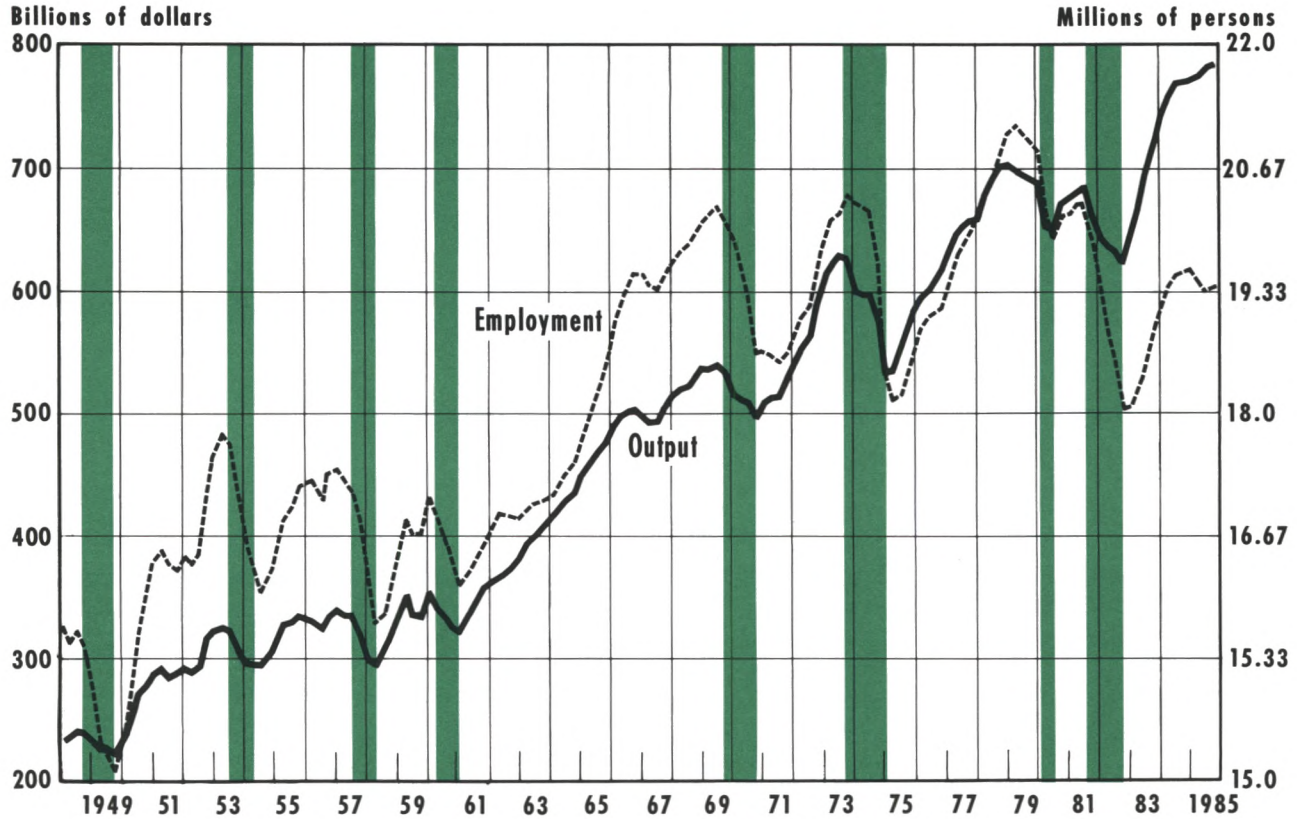
[1]The international explanation applies to all goods and services, though manufacturing is typically singled out because such goods constitute a relatively large share of U.S. exports and imports. Since 1980, the international hypothesis has become increasingly popular, and in recent years it has been presented in virtually every national magazine and newspaper. Lawrence (1984) is an advocate of this view. This is somewhat surprising, since he also emphasizes the importance of the cyclical view of manufacturing developments in the 1970s and links the decline in the dollar in the 70s to the relative weakness of U.S. manufacturing productivity. Solomon (1985) and Fieleke (1985) also discuss the international view and provide evidence that is at odds with it.

[2]Norton (1986) agrees with Lawrence that, in the 1970s, adverse movements in U.S. manufacturing output and employment were the result of domestic "cyclical effects," while, in this decade, they have been the result of short-run trade effects associated with macroeconomic policies that presumably raised the value of the dollar. But Norton also notes two influential studies that dismiss the "overvalued dollar" view and argues that such a view is too simple and ignores the fact that a "depreciating dollar is a sign of decline" (p. 16).

Chart 1

U.S. Manufacturing Output and Employment



This article suggests that manufacturing output in the United States has not been systematically weakened during the period of dollar appreciation. Instead, it has been stronger than gains in domestic income alone can explain. On the demand side, domestic cyclical movements in real income provide the best explanation for manufacturing growth in the first half of this decade because they account for both the slow and the boom periods that, on net, have left manufacturing output above its 1948–80 average share of the nation's output. The article also suggests that economic policy has had supply-side effects on U.S. manufacturing that not only improved the international competitive position of the United States, but also raised the value of the dollar.

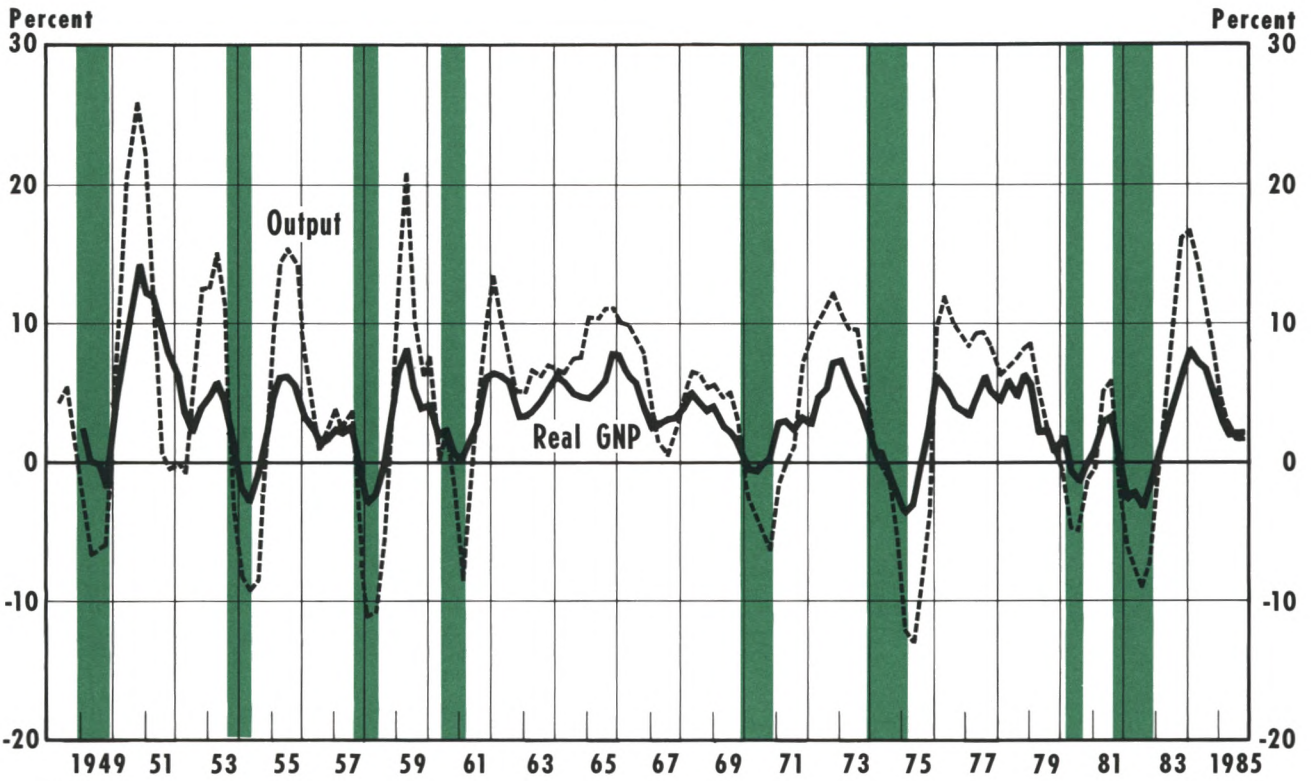
RECENT MANUFACTURING SECTOR DEVELOPMENTS

Manufacturing output in the United States has been volatile since 1980. Chart 1 shows output and employment in the manufacturing sector. Output is gross domestic product originating in manufacturing (1982 prices) or real value-added in that sector. From 1947 to 1979, manufacturing output grew at a 3.6 percent rate, but employment rose much more slowly, averaging a 0.9 percent rate of growth over the period. Since then, there have been periods of declining output (I/1980 to III/1980 and III/1981 to IV/1982), relatively slow growth (III/1984 to IV/1985) and rapid advance (IV/1982 to III/1984). In the recent period of slow growth, manufacturing output expanded at only a 1.5 percent rate, while employment fell by 131,600 persons, a 0.5 percent rate of decline.

The periods of declining, relatively slow, and fast growth of manufacturing in the 1980s closely follow cyclical movements in domestic real income. As chart 2 shows, during the shaded recession periods, real income (GNP) declines, but manufacturing output

Chart 2

Growth Rates of Manufacturing Output and Real GNP



NOTE: 4-quarter percent change.

falls even more; during periods when real GNP grows relatively rapidly, manufacturing output growth tends to be stronger.

There are two principal explanations for the cyclical sensitivity of manufacturing output. The first, called the "permanent income" hypothesis, emphasizes that when real income is temporarily depressed, purchases of durable manufactured goods tend to be postponed; when real income is temporarily higher, most of the income gain is saved for future consumption, including saving in the form of durable goods acquisition.[3] The second explanation emphasizes the responsiveness of supply to price changes. Variations in demand, including those due to cyclical real income changes, have little effect on the prices of goods whose supply is very responsive to price. The supply of other goods is relatively less responsive to price variation, and these goods show greater price variability when real income fluctuates. The manufacturing sector is usually characterized as having relatively less flexible prices so that variations in demand affect output relatively more, and price relatively less, than in other sectors of the economy.[4]

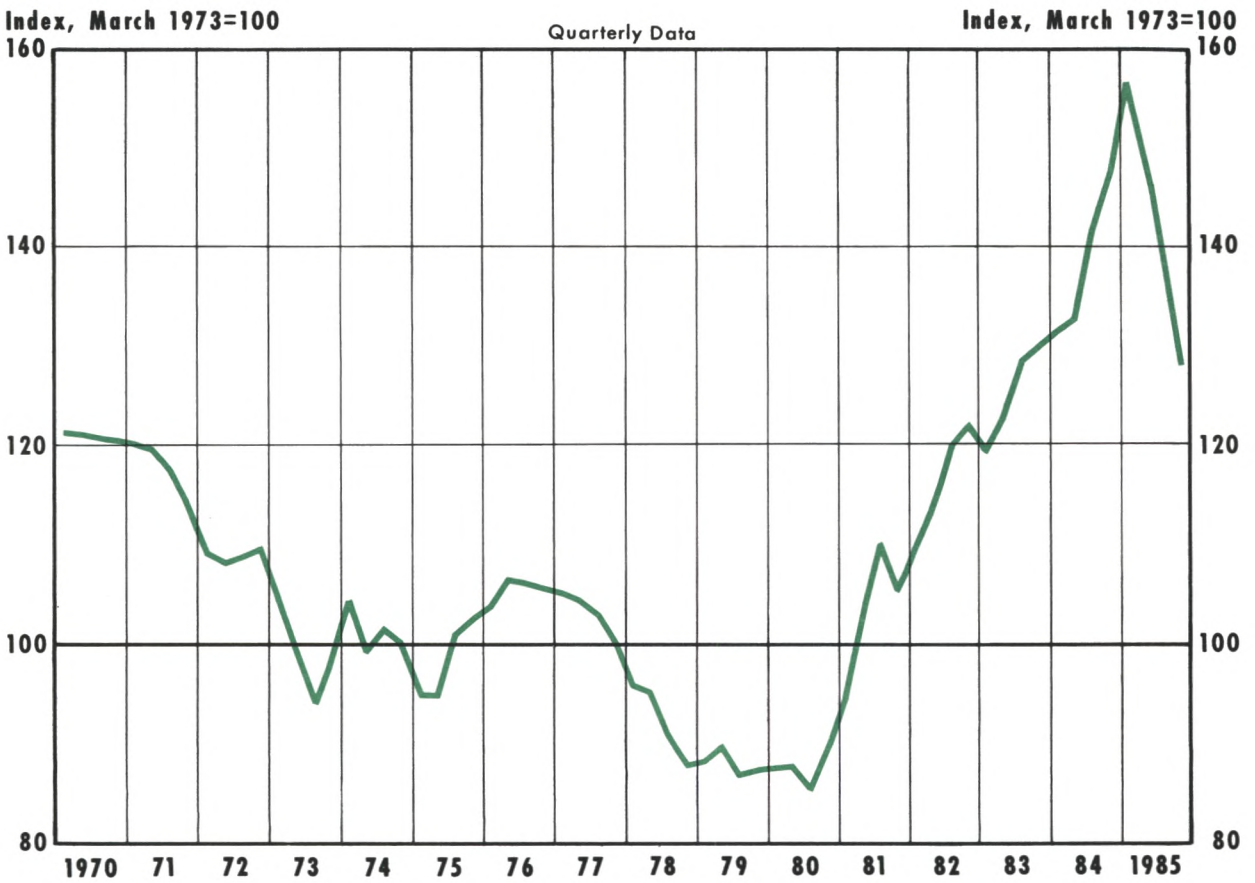
The experience of the 1980s appears to be consistent with the previous cyclical experience. The recent intervals of slow or negative growth appear to be due to cyclical movements in real income. But the cyclical volatility in chart 1 may be obscuring a general tendency for manufacturing output growth to have been depressed by the rise in the value of the dollar.

[3]See Milton Friedman (1957). The pioneering application of this concept to the demand for durable goods is developed by Harberger (1960) and the studies therein.

[4]Okun (1981) develops aggregate theories of price adjustment and cyclical behavior based on the distinction between what he called "flex-price" and "fixed-price" industries. The elasticity of supply in a competitive industry plays only a minor role in this work. Other factors, such as the objectives of firms and degrees of competitiveness, play more important roles in Okun's analysis.

Chart 3

The Nominal Trade-Weighted Exchange Rate



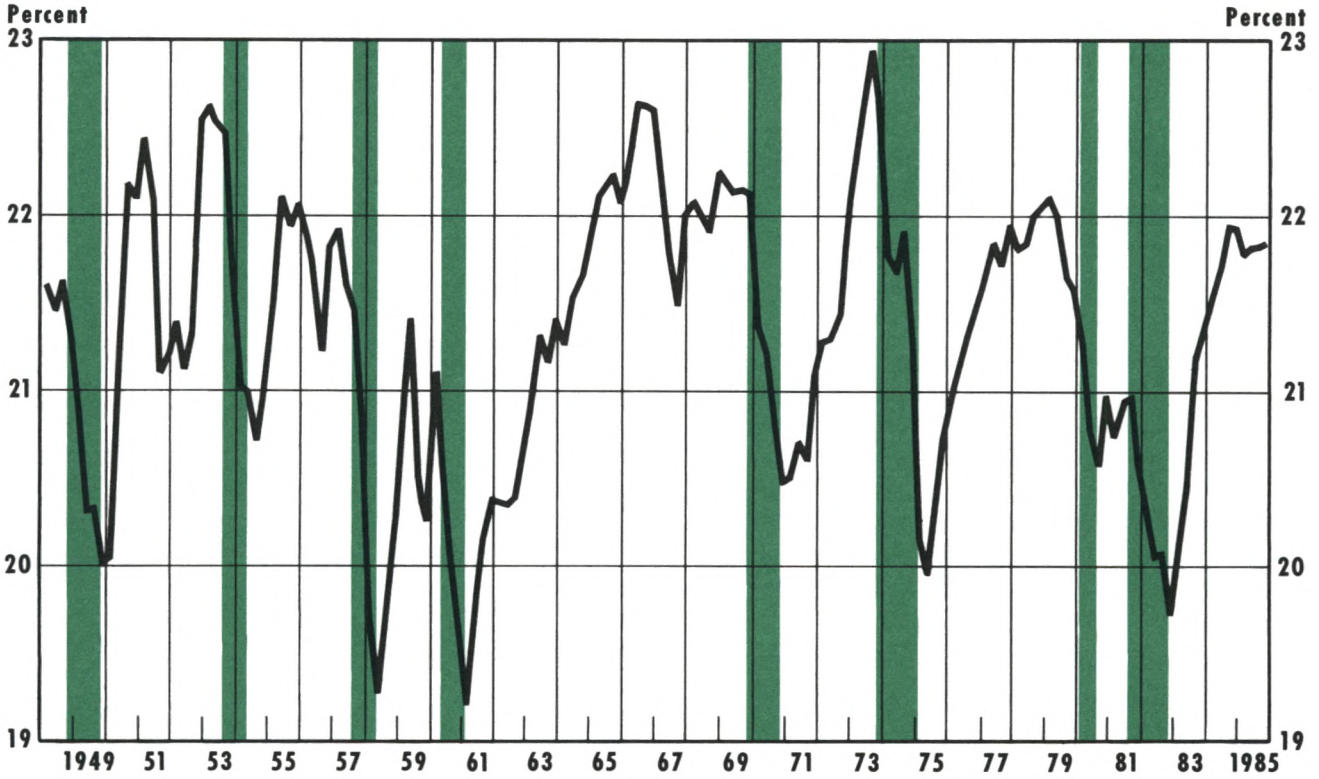
The Value of the Dollar Rose . . .

An appreciation in the value of the dollar is frequently blamed for recent weakness in the growth of U.S. manufacturing output. When the price of the dollar in units of foreign currency rises, the prices of U.S. goods measured in foreign currencies also increase, given the dollar prices of those goods. On the other hand, foreign currencies become cheaper, making the dollar prices of foreign goods lower. As a result, both foreigners and domestic residents buy fewer U.S. goods and more foreign goods. From the U.S. point of view, exports fall, while imports of foreign goods increase.

As chart 3 shows, the marked appreciation in the value of the dollar began in late 1980 and continued until the first quarter of 1985. Over the period, the exchange rate rose fairly steadily at a 14.4 percent annual rate. Over the remaining three quarters of 1985, the value of the dollar fell at a 26 percent rate, reaching an end-of-year value near its early 1983 level. The earlier rise in the dollar's value has been held responsible for the dismal performance in manufacturing, and the same view suggests that the recent depreciation will lead to renewed strength.[5]

[5]In principle, the appropriate measure of the exchange value of the dollar is the "real" exchange rate, which takes into account changes in U.S. and foreign prices. For example, the real exchange rate rose at a 13.2 percent rate over the period III/1980 to I/1985. The difference between the growth rates of the nominal and real exchange rate reflects an average annual rate of price increase abroad that was about 1.1 percent per year higher than in the United States. For empirical purposes, there is little difference between the two series. From I/1970 to III/1985, a regression of the growth in the real exchange rate on a constant and the growth rate of the nominal exchange rate, with significant autocorrelation correction, accounts for 97 percent of the variation in the real exchange rate. Of course, the coefficient on the nominal exchange rate is not significantly different from one.

Chart 4
U.S. Manufacturing Output as a Percent of Real GNP



. . . But U.S. Manufacturing Output Has Not Been Uniformly Slow Since 1980

While manufacturing output growth has had periods of weakness in the 1980s, it has not been uniformly slow. From III/1980 to I/1985, the period of strong appreciation, manufacturing output rose at a 4 percent rate. Such growth is hardly weak compared with the earlier record for such growth. More important, to the extent that the dollar appreciation explains the 1984–85 weakness in manufacturing, the effect was mysteriously late.

As chart 4 shows, the share of manufactured output in real GNP since 1948 is strongly cyclical.[6] From 1980 to 1982, when real income growth declined, this share fell sharply. From 1982 to 1984, when real income grew rapidly, it rose. The recent slow growth in manufacturing output, which appears to be concentrated in 1984–85 and earlier in 1980–82, is not surprising in light of the relatively slow growth in real GNP over the same periods. Moreover, the share of manufacturing output in real GNP has remained steady recently and does not appear low relative to the previous experience.[7]

HAS MANUFACTURING OUTPUT BEEN DEPRESSED IN THE 1980S BY THE STRENGTH OF THE DOLLAR?

The casual evidence above indicates that the answer to this question is no. The question can also be

[6]Jonas (1986) discusses the unchanged share of manufacturing output in real GNP but argues that a declining share of nominal spending on manufactured products is more relevant. He cites a Congressional Budget Office view that supports this. But, of course, the declining share of nominal spending reflects the difference in these two measures, the continuing historical decline in the price of U.S. manufactured products relative to output prices generally. The latter is correctly regarded to be a sign of the strength of the growth of productivity and output in this sector.

[7]From I/1948 to III/1980, the average level of the share of manufacturing output in real GNP was 21.4 percent, while the average level of the Federal Reserve index of capacity utilization, a measure of the cycle, was 82.8 percent. Over the period III/1984 to IV/1985, the utilization rate was somewhat lower, averaging 80.6 percent, but the share of manufacturing output was higher, averaging 21.9 percent.

addressed by comparing manufacturing output growth in the 1980s with that from 1976 to 1980 when the dollar was falling. From III/1980 to I/1985, manufacturing output grew at a 4.0 percent rate; this was the 18-quarter period over which the exchange rate of the dollar rose by 83 percent. Over the preceding 17 quarters (II/1976 to III/1980), the exchange rate fell by about 20 percent, but manufacturing output grew at only a 2.0 percent rate. The growth of manufacturing output was stronger during the recent period of dollar appreciation than it had been over the previous period of dollar depreciation. If there is a relationship between changes in the value of the dollar and in manufacturing output, it appears to be a positive one, not the negative one cited by recent analyses.

A more rigorous test should take into account the strongly cyclical behavior of manufacturing output growth. After all, in the earlier period, the capacity utilization rate was little changed at 77.0 percent (II/1976) and 77.1 percent (III/1980), while in the more recent period it rose slightly to 80.5 percent (I/1985). Such a cyclical improvement could be expected to raise manufacturing output growth in the recent period relative to the earlier period.

To assess the exchange rate hypothesis, the relationship between manufacturing output growth and real GNP was first established for the period from III/1947 to III/1980. This relationship is:

$$(1)\quad 400\Delta\ln XM_t = \underset{(-5.60)}{-4.128} + \underset{(13.40)}{1.745}\,(400\Delta\ln X_t) + \underset{(3.72)}{0.485}\,(400\Delta\ln X_{t-1}),$$

$$SE = 6.37 \qquad \bar{R}^2 = 0.66 \qquad DW = 1.92$$

where XM_t is manufacturing output and X_t is real GNP in quarter t; growth rates are measured as 400 times the difference in the logarithm of the output series, which provides continuously compounded growth rates.[8] The standard error (SE), $\bar{R}^2$ and Durbin-Watson (DW) statistics are also given; t-statistics are in parentheses.

Table 1

Actual and Predicted Manufacturing Output Growth

	Actual	Predicted	Error
IV/1980	13.7%	4.8%	8.9%
I/1981	3.1	11.7	−8.6
II	2.7	−2.8	5.4
III	2.6	−1.7	4.3
IV	−14.6	−13.1	−1.5
I/1982	−9.9	−17.5	7.6
II	−4.8	−5.0	0.2
III	−2.4	−9.1	6.7
IV	−6.5	−4.6	−1.9
I/1983	12.2	3.0	9.2
II	14.6	12.7	1.9
III	18.9	7.3	11.6
IV	9.9	11.3	−1.4
I/1984	14.9	18.5	−3.7
II	7.6	9.8	−2.2
III	7.1	1.8	5.3
IV	0.0	−2.1	2.1
I/1985	1.0	2.5	−1.5
II	2.0	−0.5	2.5
III	3.0	1.6	1.4
IV	1.3	−1.4	2.7
Mean	3.6	1.6	2.0

Root-Mean-Squared-Error: 5.02

NOTE: Results are based on the III/1947-III/1980 relationship in equation 1 in the text. Entries do not add due to rounding.

Equation 1 has two fundamental properties. First, when real GNP growth equals its average growth rate of 3.4 percent, virtually the same growth rate of manufacturing output is observed; from 1947–80, the share of manufacturing output has shown no trend (chart 4). Second, manufacturing output growth is strongly cyclical, with each 1 percent faster or slower growth in real income associated with over twice (2.23) as large a deviation in the growth rate of manufacturing output.

When the equation is used to simulate the growth rate of manufacturing output in 1980–85, the predicted values are those shown in table 1. The root-mean-squared error is a measure of the range of forecast error; it is smaller than the standard error of the equation over the earlier period. The mean error over the period is positive, indicating that, on average, the growth of manufacturing output was *stronger* over the

[8] A search of the lagged relationship between XM and X up to four past quarters was conducted. Only one past value is significant for real GNP. Virtually the same results are obtained using quarterly industrial production growth on the left-hand-side of equations 1 and 2. The fact that XM is a component of X cannot influence the results here. To verify this, the results in this section were examined using compounded annual rates of change and decomposing real income growth into the lagged share of manufacturing output in real GNP times the growth rate of manufacturing output and a corresponding product for nonmanufacturing output. This allows the removal of the current period's manufacturing output growth from the right-hand-side of equation 1. The hypothesis that the effect of weighted past growth in manufacturing or nonmanufacturing output is the same could not be rejected and none of the results reported here were affected.

past five years than the prior cyclical relationship would predict. Over the recent period of weak manufacturing growth, III/1984–IV/1985, when it averaged only a 1.5 percent rate, the predicted growth rate based on real GNP growth alone was about zero. Thus, even over this period, manufacturing output was relatively strong.[9]

To test the exchange rate hypothesis, the growth rate of the exchange value of the dollar ($400\Delta\ln EX_t$) was added to the equation.[10] The exchange rate hypothesis indicates that, given GNP growth, an appreciation of the dollar should weaken manufacturing output growth; the coefficient should be negative.[11]

When the full period from III/1947 to IV/1985 is used, the results are significantly counter to the exchange rate hypothesis. The estimate is:

$$(2)\quad 400\Delta\ln XM = \underset{(-3.95)}{-2.95} + \underset{(10.95)}{1.52}\,(400\Delta\ln X_t) + \underset{(4.22)}{0.59}\,(400\Delta\ln X_{t-1}) + \underset{(2.00)}{0.095}\,(400\,\Delta\ln EX_{t-3}).$$

$$SE = 5.04 \qquad \bar{R}^2 = .71 \qquad DW = 2.12$$

Only the exchange rate three quarters earlier exhibits any significant relationship with manufacturing output, so other lags have been omitted. Equation 2 indicates that there is a positive, not a negative, relationship between the exchange value of the dollar and manufacturing output.[12] Thus, the strength of the exchange rate over the past five years has been associated with a significant boost in manufacturing output growth.[13] Apparently, the appreciation of the dollar has been associated with economic developments that were expected to raise U.S. productivity. While equation 2 refutes the exchange rate hypothesis, the positive relationship between the exchange rate and manufacturing output warrants more explanation.

WHY IS FASTER GROWTH IN U.S. MANUFACTURING OUTPUT ASSOCIATED WITH DOLLAR APPRECIATION?

The exchange rate hypothesis is based on the link between the exchange rate and relative demands for products. But, over the past five years, the exchange rate has moved opposite to that expected based on demand conditions in goods markets alone.

The exchange rate, like any price, is determined by supply and demand. Focusing initially only on the use of the dollar to facilitate international goods transactions, the demand for a flow of dollars in international exchange depends on the dollar value of foreign demand for U.S. goods. Given other factors that influence this demand, the quantity demanded varies inversely with the value of the dollar. When the foreign currency price of the dollar rises, U.S. goods become more expensive to foreigners and they reduce their purchases; thus, the quantity of dollars demanded to pay for our exports falls.

Similarly, a rise in the exchange value of the dollar reduces the dollar prices of goods imported from abroad. This prompts residents to buy more foreign goods or increase imports. Thus, the quantity of dollars supplied to pay for increased U.S. imports would rise with the exchange rate.[14] Equilibrium occurs

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[9]Solomon (1985) and Lawrence have noted the strength of U.S. industrial production growth in the early 1980s, based on the annual relationship of such growth to the growth rate of real GNP from 1951 to 1981.

[10]A search of up to four lags of the exchange rate movement was conducted. The same test was done using the real exchange rate, but the results are nearly identical since movements in the nominal and real exchange rate have been about the same.

[11]It is conceivable that a rise in the exchange rate has its dominant impact on real income, and that manufacturing adjusts in line with equation 1. But such a result is at odds with the notion that exchange rate movements have a disproportionate effect on manufacturing, beyond those associated with any induced cyclical movements in U.S. real income. This possibility is also at odds with the paucity of evidence supporting the hypothesis that exchange rate movements affect real GNP. The ambiguity of the evidence on this issue has been noted by Anderson (1985). A simple test of the hypothesis is to regress the growth rate of real GNP on current and past changes in the exchange rate and a constant over the period when the exchange rate changes, I/1967–IV/1985. There are no significant exchange rate effects in such an investigation for up to four lagged values of exchange rate movements, even when they are entered separately or in groups of up to five terms.

[12]The positive relationship between U.S. manufacturing output and the exchange rate is not a recent development. For the 1947–80 period, the estimate in equation 2 is virtually the same as that shown for the longer period, and the exchange rate coefficient and lag structure is the same and similarly significant. Tests of whether the coefficients in equations 1 or 2 changed after exchange rates began to move more freely in I/1973 indicated that there were no such changes. Of course, other factors, such as protectionist changes in U.S. trade policy like voluntary export restraint agreements on Japanese autos, may have contributed to the recent strength of U.S. manufacturing, but in the aggregate data, this is not apparent.

[13]An in-sample experiment using equation 1 shows the other side of this relationship. Most of the previous decline in the trade-weighted value of the dollar occurred from II/1976 to III/1978. During this period, U.S. real income experienced a strong cyclical recovery, rising at a continuous rate of 4.9 percent. Using equation 1, the predicted growth rate in manufacturing output is 11 percent, but such growth was only 6.9 percent over the period.

[14]This requires that the increased volume of purchases more than offsets the decline in the dollar price of imported foreign goods.

Table 2
The Shrinking Share of International Transactions in U.S. Economic Activity

	1980		III/1984–II/1985	
	Billions of dollars	Percent of U.S. GNP	Billions of dollars	Percent of U.S. GNP
Net foreign investment in the United States	$ −28.0	−1.0%	$ 77.0	2.0%
Foreign investment	58.1	2.1	76.5	2.0
U.S. investment abroad	86.1	3.2	−0.5	0.0

where the supply and demand for dollars in the foreign exchange market are equal at some level of the exchange rate.

The dollar rises in value only if the demand for dollars rises or the supply of dollars falls. But these shifts correspond to a rise in exports or a fall in U.S. imports. Since 1980, however, real exports generally have fallen while real imports have risen. Thus, movements in relative demands for U.S. goods appear to have little to do with exchange rate developments since 1980.

The Strength of the Dollar Has Been Associated with a Reduction in U.S. Investment Abroad . . .

The demand for U.S. and foreign goods and corresponding demand and supply of dollars in foreign exchange markets are inadequate explanations of recent developments. More than goods and services are traded among nations. U.S. residents also acquire real and financial assets abroad, supplying dollars in international exchange; likewise, foreigners acquire U.S. real and financial assets, demanding dollars in international exchange markets to facilitate the exchange.

When there is a shift in the demand and/or supply of dollars due to such investment flows, the exchange rate can also change. Thus, a rise in the value of the dollar in international exchange can occur either because of an increase in foreign investment in the United States or because of a reduction in U.S. investment abroad. Most analyses of foreign exchange developments emphasize the former.[15] The latter, however, has been the dominant force in the 1980s.[16]

Table 2 shows the swing from net U.S. investment abroad to a net capital inflow. But this swing was not due to growth in foreign investment in the United States.[17] Instead, the pace of U.S. investment abroad slowed to a halt (a *negative* $0.5 billion). The rise in the dollar from 1980 to 1985 primarily was associated with a decline in the U.S. supply of dollars in international exchange for foreign assets.[18]

. . . That Was Due to Changes in Investment Incentives . . .

Two major international factors were the proximate causes of these foreign exchange market developments and the relative strength of U.S. manufacturing. First, the 1981 tax act substantially improved the rate of return on investment in the United States. This set in motion a major reallocation in the world capital stock toward U.S. production and away from foreign production. Economic capacity began rising in the

[15]For example, see Morgan Guaranty Trust Company (1985): "It is generally accepted that the rise in the dollar in recent years was primarily the result of an unusually large demand for dollars from foreigners wishing to buy dollar-denominated assets."

[16]Net foreign investment in the United States generally rose throughout the period III/1980 to II/1985, but during the first two years, both U.S investment abroad and foreign investment in the United States increased, especially in 1982.

[17]While foreign investment in the United States did not keep pace with the growth in U.S. GNP, it did represent a major increase in such outlays viewed from the foreign perspective. Recall that each dollar of such investment had a foreign currency cost that was about 70 percent more in the year ending in II/1985 than it did in 1980. Viewed from the foreign currency perspective, even an unchanged dollar investment level would have been impressive.

[18]The other component of the supply of dollars in international exchange — U.S. import spending — also fell relative to U.S. GNP over the period. In 1980, imports equaled 11.7 percent of GNP; this declined to 11.4 percent of GNP in the year ending in II/1985.

Table 3

The Annual Growth Rates of Real GNP Across Countries

	1980–84	1976–80	Change
United States	2.7%	3.2%	−0.5%
Canada	1.7	2.4	−0.7
Japan	3.8	5.0	−1.2
Belgium	0.5	1.9	−1.4
Denmark*	2.0	1.5	0.5
France*	1.1	2.8	−1.7
Germany	0.8	2.8	−2.0
Italy*	0.4	3.3	−2.9
Netherlands	0.0	3.3	−3.3
Norway*	2.2	4.4	−2.2
Sweden*	1.5	1.2	0.3
United Kingdom*	1.3	1.2	0.1

*Real gross domestic product where indicated

United States relative to that in the rest of the world.[19] Second, in addition to the reduction of output growth abroad due to a relative capacity loss, cyclical forces contributed to a loss in output and income growth abroad.[20] As a result, foreign demand and consumption of goods exported and imported by the United States fell relative to U.S. domestic demand, depressing world prices of traded goods.

. . . And Increased Production in the United States Relative to Foreign Competitors

Table 3 shows the growth rates of real GNP in 12 countries during the period of dollar depreciation, 1976–80, and during 1980–84, when the dollar appreciated. In the earlier period, U.S. real GNP growth was exceeded in Japan, Norway, Italy and the Netherlands. Over the later period, all of the countries except Japan showed slower growth than the United States. More important, the growth rate slowed in 1980–84 relatively more than in the United States in every country but the United Kingdom, Denmark and Sweden, where real output growth was sluggish in both periods.

Unemployment developments show the same relatively poor performance in other countries. The area encompassing the European members of the Organization for Economic Cooperation and Development (26 countries) showed an increase in unemployment from 6.1 percent of the labor force in 1980 to 10.7 percent in 1984. Over the earlier period, unemployment rose less, up from 5.4 percent in 1976. In Canada, the unemployment rate rose from 7.1 percent in 1976 to 7.4 percent in 1980, then to 11.3 percent in 1984. In Japan, the unemployment rate was the same in 1980 as in 1976, at 2 percent of the labor force, then rose to 2.7 percent in 1984. In contrast, the unemployment rate in the United States fell from 7.6 percent in 1976 to 7.0 percent in 1980. From 1980 to 1984, the rate rose 0.5 percentage points, a smaller increase than in the 26 countries of OECD-Europe, Canada or Japan.[21]

U.S. Manufacturing Output Has Not Been Shifted to Foreign Countries

Another way to see whether foreign exchange developments have weakened U.S. manufacturing is to examine trends in manufacturing in other countries from 1976 to 1980, when the exchange value of the dollar generally fell, and from 1980 to 1984, when it rose.[22] According to the exchange rate argument, if U.S. production was weakened by the rise in the exchange rate, foreign nations would be expected to have had stronger manufacturing output growth due to their falling exchange rate.

As table 4 shows, the growth rate of U.S. manufacturing output from 1980 to 1984 was second only to that

[19]The decline in the cost of capital relative to that abroad was not the only factor accounting for differential capacity growth. See below. There is considerable disagreement among analysts concerning the effects of taxes on the cost of capital and investment. Many argue that 1982 tax changes repealed the 1981 investment incentives. Bosworth (1985) and Slemrod (1986) present the view that investment was not boosted by tax law changes. Meyer (1984) argues that the net cost of capital was lowered on average. He also notes areas where it was raised. Two of the strongest areas of investment, business automobiles and commercial and industrial buildings, are areas where Meyer shows the largest reduction in the net cost of capital. Also, see Tatom (1985).

[20]The monetary approach to the balance of payments emphasizes relative money stock and real income growth. See Kemp (1975), for example. He shows that, in the monetary approach, an appreciation of the exchange rate occurs when domestic money stock growth slows, or when domestic real income growth accelerates relative to that in the rest of the world.

[21]The dominance of the improvement in the relative growth of the U.S. economy in accounting for the rise in the value in the dollar is reinforced by the fact that between 1976–80 and 1980–85, the growth rate of M1 accelerated in the United States, but slowed in all the other countries shown in table 3. Such monetary trends would be expected to lower the value of the dollar against these other currencies.

[22]The latest year for which the data used is available for all the countries examined is 1984. The data on manufacturing in table 4 and table 5 below are Bureau of Labor Statistics measures described by Dean, Boissevain, and Thomas (1986).

Table 4

Annual Growth Rates of Manufacturing Output and the Effective Exchange Rate

	Manufacturing Output Growth			Effective Exchange Rate		
	1980–84	1976–80	Change	1980–84	1976–80	Change
United States	3.4%	2.6%	0.8%	9.5%	−2.8%	12.3%
Canada	0.6	2.4	−1.8	1.5	−5.5	7.0
Japan	7.4	7.0	0.4	5.5	5.0	0.5
Belgium	1.3	1.9	−0.6	−6.0	3.0	−9.0
Denmark	1.8	3.1	−1.3	−5.7	−0.9	−4.8
France	0.7	2.6	−1.9	−8.6	−0.3	−8.3
Germany	0.2	2.1	−1.9	−1.0	5.3	−6.3
Italy	−0.5	4.2	−4.7	−8.2	−5.0	−3.2
Netherlands	1.0	1.9	−0.9	−1.3	4.0	−5.3
Norway	0.0	0.0	0.0	−3.9	−0.5	−3.4
Sweden	2.0	−0.5	2.5	−7.7	−2.1	−5.6
United Kingdom	0.2	−1.7	1.9	−4.9	2.9	−7.8

in Japan. Moreover, such growth rose by more than in any nation shown except Sweden and the United Kingdom.[23] If the trends in each country in table 4 are influenced by exchange developments, then each country's exchange rate index against all other currencies would be important.[24] From 1980 to 1984, the effective exchange rate of each country's currency in table 4 fell, and fell faster than from 1976 to 1980, except in the United States, Canada and Japan. In Japan and Canada, like the United States, the currency appreciated in 1980–84 relative to its change in 1976–80.

Only Canada, Sweden and the United Kingdom show a negative relationship between changes in the value of the country's currency and the growth rate of its manufacturing sector. The evidence is not intended to show that an appreciating currency is always associated with relatively strong manufacturing growth, since such a conclusion is as questionable as the contrary view. But this has been the case for nine of 12 countries in the 1980s, and there is little evidence that U.S. manufacturing output was weakened or that it lost out to foreign competitors.

Some Comparative Measures of Factor Costs, Productivity and Employment

A key part of the international explanation of manufacturing output growth in the United States is that the competitive position of this sector worsened due to foreign competition and the strength of the dollar. A look at the data on factor costs and productivity, however, does not reveal a deterioration in U.S. competitiveness.

Capital Costs. The improved expected real cash flow available to business following the 1981 tax act led to an increase in domestic investment demand.[25] Of course, relatively stronger investment increases financing demands, raising the real rate of return on financial instruments including stocks, bonds and short-term debt. But foreign producers did not gain from accelerated cost recovery, lower corporate income tax rates or the extension of the investment tax credit in the United States. Instead, they simply had to adjust to the higher real rates of return required on financial instruments and real assets in the world capital market. Thus, the international competitiveness of U.S. industry generally improved.

[23]It might be objected that the countries examined in the table are not representative of the areas where trade and production have shifted. In the first half of 1985, however, Europe, Canada and Japan accounted for 63.1 of U.S. imports and 59.8 percent of U.S. exports, up from 50.4 percent and 56.4 percent, respectively, in 1980. The rise in the shares more than offset a decline in these countries' importance in U.S. trade from 1975 to 1980. Another indicator is that world exports (including or excluding the United States) declined from 1980 to 1984, following nearly 20 percent annual growth in the earlier period.

[24]The effective exchange rate is a weighted average of the value of a country's currency relative to other currencies. It is constructed by the International Monetary Fund and described in more detail in their *International Monetary Statistics Yearbook* (1985), pp. 6–7.

[25]The strength of U.S. domestic saving and investment is discussed in Tatom (1985).

Table 5
Growth Rates of Manufacturing Unit Labor Cost, Productivity and Real Wages

	Unit labor cost growth			Productivity growth		
	1980–84	1976–80	Change	1980–84	1976–80	Change
United States	2.3%	8.3%	−6.0%	4.0%	1.1%	2.9%
Canada	6.2	8.2	−2.0	2.3	1.4	0.9
Japan	−0.8	0.6	−1.4	5.5	6.8	−1.3
Belgium	1.8	3.7	−1.9	5.7	5.9	−0.2
Denmark	6.5	6.5	0.0	1.3	3.9	−2.6
France	8.0	8.9	−0.9	5.0	4.2	0.8
Germany	1.7	5.1	−3.4	3.6	2.9	0.7
Italy	13.5	12.6	0.9	3.6	4.3	−0.7
Netherlands	0.3	3.1	−2.8	5.2	4.4	0.8
Norway	6.9	7.0	−0.1	2.7	2.3	0.4
Sweden	4.9	7.1	−2.2	4.1	2.6	1.5
United Kingdom	3.5	16.4	−12.9	5.7	0.1	5.6

	Real wage growth			Manufacturing employment growth		
	1980–84	1976–80	Change	1980–84	1976–80	Change
United States	0.3%	0.2%	0.5%	−1.0%	1.7%	−2.7%
Canada	0.3	0.7	−0.4	−1.4	1.1	−2.5
Japan	1.7	1.4	0.3	1.5	−0.3	1.8
Belgium	0.1	4.0	−3.9	−3.2	−3.3	0.1
Denmark	−0.8	0.0	−0.8	0.2	−0.5	0.7
France	2.6	2.5	0.1	−2.5	−1.1	−1.4
Germany	1.0	4.3	−3.3	−2.8	0.3	−2.5
Italy	2.2	0.3	1.9	−2.8	−0.1	−2.7
Netherlands	0.8	2.2	−1.4	−3.6	−1.8	−1.8
Norway	−0.1	1.2	−1.3	−2.8	−0.8	−2.0
Sweden	−0.5	−0.2	−0.3	−2.4	−1.5	−0.9
United Kingdom	1.8	2.1	−0.3	−5.6	−1.2	−4.4

Unit Labor Cost. Another key factor influencing comparative costs is the cost of labor per unit of output. Table 5 compares manufacturing unit labor cost across countries. In the first column, the rate of increase in unit labor cost is shown for the period of dollar appreciation from 1980 to 1984. The rate of increase in unit labor cost is not the slowest in the United States, though it is well below the rate in many of the countries shown.

In the second and third columns, the rate of increase in unit labor cost over the period of dollar depreciation, 1976–80, and the differences between the two periods are shown. In the 1976–80 period, the pace of unit labor cost increase in the United States was among the highest shown. There is a wide gap between the slowing in the United States and that in the other 10 countries shown. Thus, trends in unit labor cost suggest that the competitiveness of U.S. manufacturing improved over the recent four years.

Productivity. A major factor accounting for the improvement in unit labor cost is a relative improvement in productivity growth in manufacturing. While U.S. manufacturing productivity growth from 1980 to 1984 was about average compared with the other countries, it improved sharply from the 1976–80 period, when it was much lower than in 10 of the other 11 countries shown in table 5.

Real Wages. Table 5 also indicates real wage developments over the two periods.[26] Real wage movements reflect changes in supply and demand. Thus, a rise in real wages can occur due to either a increase in the

[26]Real wage growth in each country is measured by the rate of increase in hourly compensation in manufacturing deflated by the consumer price index in each country. Similar results are found deflating by the price indexes for manufacturing or industrial prices published by the IMF.

demand for labor or a rise in the supply price of labor, or some combination thereof. In the former case, employment tends to rise, while in the latter case employment tends to fall. Thus, evidence on real wages alone does not indicate whether demand, supply or both are changing.

The implication of the international explanation, however, is that, by shifting the demand for manufacturing output away from the United States toward foreign competitors, the demand for labor abroad would rise and that in the United States would fall. As a result, real wages in the United States would tend to decline relative to those in other countries. Real wage growth in the United States was higher in 1980–84 than it was in the earlier period, however. This improvement was larger in the United States than in all the other countries except Italy. Indeed, in eight of the other nations real wage growth fell between the two periods.

Employment. The growth of manufacturing employment in the 12 countries is shown at the end of table 5. It, too, is at odds with the view that manufacturing output and employment are being redistributed away from the United States. While the table indicates that U.S. manufacturing employment declined from 1980 to 1984, the decline compares favorably to developments in the other 11 countries. Only Japan and Denmark showed an increase in employment over the 1980–84 period.[27]

The decline in employment growth in the United States over the two periods is among the largest in the table. As table 4 indicates, however, this decline was not due to reduced output growth. Instead, the decline reflects the relatively strong pace of productivity growth in manufacturing over the recent period.

The use of annual rates of growth does not fully illuminate the dramatic differences that have occurred in manufacturing employment across the countries. Over the full period in table 5, only Japan and the United States showed growth in manufacturing employment, but it was up less than 5 percent in each case (2.7 and 4.9 percent, respectively) after eight years. In Canada and Denmark, such employment fell about 1 percent over the eight years. In France, Germany, Italy, Norway and Sweden, the reduction was about 9 to 15 percent. In the Netherlands, Belgium and the United Kingdom such employment fell by 20 to 24 percent. If there is a redistribution of employment going on, it appears to be strongly in favor of the United States and Japan.

Energy. Finally, energy prices are another cost of production that has moved down in the United States compared with such prices abroad. In the United States, energy prices have declined relative to the prices of business output. This is in sharp contrast to developments abroad. Since oil is a major source of energy around the world and other sources of energy compete with it, a look at the real price of oil in various countries is sufficient. Table 6 shows the 1980–84 change in the real cost of oil to domestic and foreign producers.[28] While this price fell at a 5.2 percent rate from 1980 to 1984 in the United States, it generally rose abroad. Only Japan shows a decline like that in the United States. In Italy and Norway, such prices were nearly unchanged, but in the other eight countries shown, the price of oil rose sharply relative to prices of goods and services generally.

Thus, it is difficult to argue that the international competitiveness of U.S. industry has been hurt by the rise in the value of the dollar from 1980–85. For capital and energy resources, it appears that factor prices have not risen relative to output prices in the United States, especially when compared with the experience of foreign competitors. For labor, it does not appear that real wages in the United States have been depressed relative to those abroad. The positive relationship between the growth of U.S. manufacturing output and the rise in the exchange value of the dollar apparently reflects improved competitiveness of U.S. manufacturing.

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[27]Fieleke (1985) has shown that there is no correlation between the growth of import penetration in various U.S. industries and their employment growth over the 1980–84 period. McKenzie and Smith (1986) find that textile imports in the early 1980s and in the period 1960–84 had no significant negative effect on employment in the U.S. textile and apparel industries. They do find some evidence that apparel imports have affected employment in the apparel industry. They find that the dominant factor influencing employment in these industries has been relatively rapid productivity growth in both industries.

[28]The dollar price of imported oil in the United States is representative of the world price since oil is priced in dollars around the world and, except for differences in taxes and transportation costs, the U.S. price is representative of the price for firms in other nations. The local currency price of oil is assumed to be the average cost of imported oil in the United States (dollars per barrel) multiplied by the exchange rate between the local currency and the dollar (foreign currency/dollar). For Canada, the industry selling price for petroleum and coal products is used instead of the price of imported oil. The industry selling price for petroleum refineries shows the same annual rate of increase. Canada, like the U.S. in 1980, had significant regulations on domestic oil and energy prices, so that the imported price of oil is not representative of local costs. In the U.S. case, the average cost of oil to domestic refiners is used to measure the dollar price of oil. These local prices of oil are deflated by the consumer price index for each country to examine movements in the real cost of oil in the various countries.

Table 6

Percentage Change in the Real Price of Oil: 1980 to 1984

	Percentage change	Average annual rate
United States	−19.1%	−5.2%
Canada	26.8	6.1
Japan	−20.1	−5.5
Belgium	25.6	5.9
Denmark	12.0	2.9
France	17.8	4.2
Germany	12.5	3.0
Italy	−0.6	−0.1
Netherlands	14.5	3.4
Norway	−3.5	−0.9
Sweden	16.3	3.8
United Kingdom	11.2	2.7

CONCLUSION

Manufacturing output in the United States does not appear to have been adversely affected by exchange rate developments since 1980. Except for the cyclical decline associated with the 1980 and 1981–82 recessions, manufacturing output has maintained its share in real GNP and has shown fairly rapid growth. Indeed, the evidence indicates that, during the 1980s, such output has grown 2.0 percentage points faster than the 1948–80 relationship of such output to real income would predict. Of course, since manufacturing production rose while exports fell and imports rose, U.S. purchases of such goods rose rapidly. In effect, U.S. consumption was raised not only due to increased production, but also by purchasing U.S. products that formerly were exported and foreign products that formerly were purchased abroad.

No doubt the rise in the value of the dollar restrained the growth of demand for U.S.-manufactured products. But the appreciation of the dollar in part simply offset improvements in the relative cost advantages of U.S. producers over foreign competitors. In industries in which these cost advantages were unusually strong or weak, the gains in production and employment were relatively stronger or weaker than the data for the whole manufacturing sector indicate. Thus, there are likely to be industries in which the rise in the exchange value of the dollar has exerted strong negative influences on production, prices and employment that were not offset by relative cost improvements.[29]

Manufacturing output growth abroad has not shown the expected gains that would occur if the exchange rate alone were reallocating world demand and production of such goods. During the period of dollar appreciation, production growth slowed sharply in most other countries. These developments reflect a redistribution of capital and output toward the United States and away from other countries. The evidence suggests that this redistribution and the appreciation of the dollar reflect the relative cost improvements in U.S. production.

The irony, then, is that the new-found conventional wisdom, which holds that the rise in the dollar has weakened the competitive position of U.S. manufacturing, not only appears to be incorrect, but it reverses the dominant positive relationship and it obscures the recent strength of U.S. manufacturing. Adjusted for normal cyclical movements in the United States, manufacturing output has been relatively *strong* in the 1980s; this is in large part related to the improvements in the competitiveness and real rate of return in U.S. manufacturing and, hence, the appreciation in the value of the dollar in the early 1980s. Nonetheless, the international explanation has led to calls for protectionist and monetary and fiscal actions to drive the exchange value of the dollar down. Such actions are likely to retard the otherwise improving competitiveness of U.S. manufacturing.

At least in the United States, exchange rate movements over the eight years from 1976 to 1984 appear to reflect policy-induced and other changes in U.S. international competitiveness. Thus, economic policies that promote low inflation and faster or more stable growth appear to be relatively more important for U.S. manufacturing than the exchange rate consequences of economic policy or other exchange rate developments.

[29]Output growth rates in the 10 industries in manufacturing industrial production indicate that three — transportation equipment (especially motor vehicles and parts), lumber and products, and printing and publishing — showed faster than average growth in 1980–84 *and* their growth rate was higher than it had been in 1976–80. The only sector where growth in 1980–84 was below average *and* slower than in 1976–80 was fabricated metal products. Other industries (primary metals, apparel and products, chemicals and products, foods, electrical, and non-electrical machinery) showed mixed results on these criteria. For example, the two machinery industries showed the largest declines in 1980–84 from growth in the earlier period, but their growth exceeded the average for all 10 industries over the recent period.

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The Cost of Checkable Deposits in the United States

Kenneth C. Carraro and Daniel L. Thornton

FINANCIAL innovations and deregulation of the 1980s have changed significantly the types and composition of checkable deposit accounts offered by depository institutions. Both banks and thrift institutions now offer checking accounts that generate explicit interest returns as well as the more traditional ones that do not pay interest. These accounts, however, impose some implicit and explicit costs on their holders. This article reviews the costs and benefits associated with holding various forms of money, specifically the costs of holding various types of checking accounts. The results of recent surveys are used to illustrate the differing costs of these accounts.

THE COSTS AND BENEFITS OF HOLDING MONEY

A primary function of money is to serve as a "medium of exchange," that is, to facilitate the exchange of goods or services.[1] Most individuals receive their income, purchase the goods and services they desire and dispatch their debts with money.[2] Indeed, economic life would be significantly more complicated if money did not exist. Individuals would receive their income in the form of a bundle of goods and services that likely would differ from the one they would like to consume. They would be forced to use time and energy exchanging unwanted goods and services.[3] Because the use of money facilitates such exchanges, thereby reducing the cost of exchange, it can be thought of as providing benefits to its holder.[4] These are the so-called "non-pecuniary" benefits of holding money. In addition, if money is held in a form, like NOW accounts, on which interest is paid there may be some pecuniary benefits.

Since there are costs associated with holding money, an individual must balance the benefits of holding money against these costs.[5] This problem is complicated because there are several types of money — cash (coin and currency), traveler's checks and checkable deposits — that have differing advantages for different types of transactions. For example, traveler's checks generally are more useful than checking

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[1]We are silent on the exact nature of these services and their origin. For a discussion of these and other issues, see Brunner and Meltzer (1971), Alchian (1977) and White (1984).

[2]Of course, exchanges can be made "in kind" (barter). In fact, it is often argued that high marginal tax rates provide an incentive to avoid taxes by engaging directly in barter. Indeed, there has been an increasing awareness of this as, until recently, inflation had pushed a larger percentage of the population into higher marginal tax brackets. (1985 marked the first year that tax brackets were indexed for inflation.) Moreover, because currency transactions are less easily traced than transactions carried out by check, currency has a decided advantage over checks for those who wish to avoid taxes.

[3]Historically, the precise nature of these costs has been the subject of much discussion; see Brunner and Meltzer (1971), and Alchian (1977).

[4]This is a convenient and, for our purposes, useful characterization. Also, this idea forms the basis for some empirical definitions of money, e.g., Barnett's (1980) Divisia monetary aggregates. It is not, however, the only, nor perhaps even the preferred, basis for the existence of money . A significant number of economists argue that there are no direct benefits to holding money. Instead, they argue that the benefits of holding money are indirect; money essentially enables an individual to obtain a higher (more preferred) stream of consumption than could be obtained without its use. See Brunner and Meltzer (1971) and their cited references.

[5]Specifically, individuals will add to their money balances until the marginal cost of holding the next dollar exceeds the marginal benefit of holding it.

accounts when traveling out-of-state or abroad.[6]

Different forms of money also have different costs associated with holding them. Furthermore, the financial innovations and deregulation in the 1980s have resulted in different types of checking accounts with different costs. Individuals must trade off these costs and benefits in deciding how much and what types of money to hold.

Implicit Costs of Holding Money

The costs associated with holding money can be divided into two broad categories: implicit and explicit. The implicit costs, called *opportunity costs*, primarily are the income lost by holding money rather than assets that pay a higher interest rate.[7] To illustrate, assume that you hold an average daily balance of $500 per month in cash or non-interest-bearing demand deposits and that your next-best alternative is to deposit these funds into a savings account paying 5.5 percent per year.[8] On average, the annual opportunity cost of holding $500 in demand deposits or cash is $27.50 ($500 × .055).

The opportunity cost varies with the size of the average daily balance held and the interest return on available alternatives. For example, if the same $500 had been held in a NOW account paying 5.25 percent, the opportunity cost would be only $1.25 ($500 × [.0550 − .0525]) per year. Had the alternative, instead, been a money market asset paying an interest rate of 8 percent, the opportunity cost would be higher: $40 ($500 × .08) for demand deposits and cash and $13.75 ($500 × [.08 − .0525]) for NOW accounts.[9] Thus, individuals have an incentive to economize on their money holdings when the interest return on one form of money is less than the rate paid on their next-best, non-money alternative and to choose the particular form of money that minimizes the cost, given their desire to make various transactions.

Depository institutions frequently specify that customers be charged an additional fee if their checking account balance falls below some specified level. These *minimum balance requirements* are most often imposed on checking accounts that pay explicit interest.[10] All other things the same, the daily average balance held in an account increases by the difference between the minimum balance requirement and the minimum balance that would have been held if no requirement were imposed; the opportunity costs increase similarly. For example, suppose that an individual holds a daily average balance of $500 but, because of the timing of his deposits and expenditures, the account balance never goes below $50. If the depositing institution imposes a minimum balance requirement of $200 and nothing else changes, the daily average balance would increase by $150 from $500 to $650.[11] Thus, minimum balance requirements increase the opportunity cost of holding these accounts to the extent that the required minimum balance exceeds what would have been held otherwise. Continuing with the previous example, the imposition of a $200 minimum balance requirement on the demand deposit account increases the opportunity costs (if the alternative is a 5.5 percent savings account) from

[6]Likewise, cash is generally more advantageous for small, everyday transactions, while checks are more useful for paying large bills, especially those involving out-of-city or out-of-state transactions. It is interesting to note that a significant portion of the population holds no checking accounts, but relies on money orders and the like to handle transactions for which cash is inconvenient. See Canner and Kurtz (1985).

[7]Costs will be associated with the lost use of funds if depository institutions require holding periods on checks drawn on out-of-city or out-of-state depository institutions.

[8]This rate was the legal maximum for commercial banks from January 1984 to January 1986.

[9]Consequently, if rates on these alternatives vary directly with money market interest rates, while the rates paid on checking accounts do not, the amount held in these forms can be expected to vary inversely with market interest rates.

[10]These requirements are imposed to cover the costs of servicing these accounts. Because funds may be drawn from these accounts at any time, depository institutions must maintain liquid assets to meet these deposit withdrawals. In general, their liquid assets earn a lower interest return than other portions of their asset portfolio such as loans. Consequently, depository institutions also face an interest opportunity cost for holding such liquid assets. Moreover, on a per dollar of deposit basis, explicit costs such as accounting, clerical services and wire transfers tend to be higher for accounts with more activity than for nontransaction accounts. In addition, there are explicit interest payments on interest-paying checking accounts.

The average daily level of these deposits constitutes a pool of funds that a depository institution can lend. The interest income from these loans is a major source of income for these institutions. Because minimum balance requirements increase the average daily funds available to a depository institution, they increase the institution's net revenue, all other things the same.

In addition, because these minimum balances are perpetually on deposit, there are no transactions and, hence, none of the usual clerical, wire transfer and related costs associated with them.

[11]In particular, this assumes that the individual does not alter his income and expenditure pattern. If the "cost" of doing so is less than the cost of holding larger average balances, however, the individual will respond by economizing on such deposits. As a result, the average balance will increase by less than the difference between the required and pre-required minimum balance.

$27.50 to $35.75.[12]

Depository institutions, however, usually reduce or waive their fees to depositors who meet minimum balance requirements. By holding a sufficiently large balance to avoid monthly fees, the cost of these accounts may be lower than other accounts not offering such fee-reducing balance levels.[13]

The opportunity costs associated with holding these deposits also varies with the method used to calculate the interest paid on deposits. The most commonly used methods are: daily compounded interest, simple interest paid on monthly (or statement period) average balances and interest paid on monthly (or statement period) *minimum* balances.

Finally, it should be noted that there is an implicit cost to holding money balances during periods of inflation. (During deflation there is a benefit.) Because some forms of money bear interest, while others do not, the attractiveness of various forms of money changes with the expected rate of inflation. Given the existing cost structures for these accounts, this is true even if, as was the case for NOW accounts prior to January 1986, there is a legal maximum interest rate on these deposits that does not increase with inflation.

Explicit Costs of Checkable Deposits

In addition to the implicit costs of holding checkable deposits, there are explicit costs if money is held in specific types of checkable deposits.[14] These costs fall into three categories: flat service fees (usually monthly), per-check service fees and check-printing fees. Flat service fees are charged directly on each account and are independent of the number of checks written. Per-check fees are based solely on the number of checks written. Of course, depository institutions may impose a combination of such fees. Indeed, there is a wide variety of such plans, often offered by the same depository institution. For example, the flat fee per account may vary with the monthly average (or minimum) balance in the account; the flat fee is usually lower, the larger the checking account balance held. Likewise, depository institutions may vary the per-check fee with the average (or minimum) balance held. Finally, some institutions provide checks free of charge to depositors; others charge for them.

Given both the range of accounts available and the variation in the charges on these accounts, it can be quite difficult for an individual to choose the account with the lowest net cost. Unfortunately, this article cannot provide specific advice on such choices; the next section, however, presents recent U.S. survey information to illustrate these costs for representative depositors.

THE COSTS OF HOLDING CHECKABLE DEPOSITS: AN ILLUSTRATION

This section illustrates the costs of holding four forms of checkable accounts. Since costs vary according to numerous characteristics, including the average balance, three representative depositors having low, medium and high monthly average balances are used.

A balance of $500 is used as the baseline balance for the "middle" individual; two other representative individuals are assumed to have balances of $300 and $1,000, respectively.[15] The *minimum* balances held by

[12]It should be noted, however, that checkable deposits have a reserve requirement (currently 12 percent of the account balance) that must be held in a non-interest-bearing form. Because this "reserve tax" is higher for checkable deposits than for savings deposits, depository institutions have an incentive not to impose too high a minimum balance requirement. If funds are simply switched from savings accounts with lower or no reserve tax to checkable deposits, the total net revenue for the institution could decline. Competition among institutions is another constraint on raising minimum balance requirements. It is possible that an increased balance requirement at one institution would cause its total deposits to decline, as its customers shift deposits to other institutions.

[13]The interest rate on alternative assets would have to be high for it not to pay to meet the minimum balance requirement necessary to waive all fees. For example, using numbers from the survey data reported below, assume annual service fees of $74.76 on a NOW account bearing 5.25 percent. Assume that an individual normally holds a minimum balance of $100, but that the institution requires a minimum balance of $1,047 to waive all service fees. The interest rate that the individual would have to earn on alternative assets to make it worthwhile not to hold the minimum balance would have to be greater than 13.14 percent.

[14]Because checkable deposits may have costs that do not exist for cash, the costs of holding cash may be lower than the costs of interest-paying demand deposits. While this is true, it should be remembered that such deposits may offer more services and greater security than cash.

[15]The 1983 Survey of Consumer Finances (Avery and Elliehausen, forthcoming) found that the median balance in the primary checking account for families was $500, the median balance for families with incomes in the lowest 10 percent of those sampled was $300, while the median balance for families with incomes in the highest 10 percent was $1,000. The median account balance data from the Survey of Consumer Finances differs sharply from average balance data compiled by the ABA on a national basis. The ABA average account balance for tiered checking accounts in 1984 ranged from $1,000 to $1,700 depending on bank size. The average NOW account balance ranged from $4,500 to $6,600 for the ABA survey. The reason for the difference between the ABA data and the Survey of Consumer Finances is the use of average vs. median account balances. Data using averages have the disadvantage of being skewed by extremely large or small accounts. The use of median data avoids this problem by selecting the middle data point in a series so that half the values are less than the median while the other half exceed the median.

these three individuals are assumed to be one-fourth of their average monthly balances. These balance characteristics plus data on the number of checks written per account are presented in table 1.[16]

The characteristics of the four checkable accounts are shown in table 2. These characteristics are derived from survey data collected by Sheshunoff and Company, Inc. (see the appendix for a description of the data). The first three accounts — no-frills, basic, and tiered demand deposits — pay no explicit interest, while the fourth, a NOW account, is assumed to pay 5.25 percent interest.

No-frills checking accounts are designed to provide low-cost checking to depositors whose monthly balances are low and who write relatively few checks. Basic demand deposit accounts have a flat monthly fee that is waived when the account balance exceeds some average or minimum level. Tiered demand deposit accounts have monthly fees that are calculated on the account's average or minimum balance. Typically, the higher the balance, the lower the monthly fee — up to a point at which, with sufficiently high balances, all fees are waived.

NOW accounts are checkable accounts that pay explicit interest. Until January 1, 1986, banks were legally restricted to paying a maximum interest rate of 5.25 percent on NOW accounts whose minimum monthly balance fell below $1,000.[17] As of January 1, 1986, all interest rate restrictions were removed from NOW accounts. Many NOW accounts, like tiered demand deposits, have fees that are levied according to the account's balance.

Table 2 presents data on a number of fee items. The monthly maintenance fee is the average of the maximum fee that the surveyed banks charged on these accounts. These fees are charged regardless of the minimum balance maintained for the no-frills accounts. For basic demand deposits, these fees were waived if the minimum balance in the account was at least $452. For both tiered demand deposits and NOW accounts, the maximum monthly fee was reduced from the amounts shown by holding balances in excess of $236 and $943, respectively, and waived for minimum balances of $491 and $1,047, respectively.

Table 1

Comparison of Checking Accounts by Representative Individuals

	Individual A	Individual B	Individual C
Average monthly balance	$300	$500	$1,000
Minimum monthly balance	$ 75	$125	$ 250
Checks per month	10	16	24

Cost Calculation

The costs for three representative individuals are calculated from the data shown in table 2. Details of these calculations are presented in the insert on the opposite page. The calculations assume that all banks impose these charges where relevant.

A number of qualifications are appropriate at this point. For example, while all banks are assumed to impose these fees, survey data indicate that 6.3 percent of all responding banks offered the basic demand deposit account without fees or minimum balance requirements. Furthermore, as noted, the maximum monthly fees may be reduced for some accounts by holding balances that are smaller than those that are indicated to waive all fees. Also, there is evidence from the American Bankers Association (ABA) survey and the 1983 Survey of Currency and Transactions Account Usage (see Avery and others, 1986) that many individuals hold deposit balances far in excess of those required to waive all fees. Indeed, 59 percent of the families responding to the 1983 Survey of Currency and Transactions Account Usage indicated that they usually do not pay a fee on the household's main checking account.[18] Consequently, these calculations

[16]These data are drawn from Avery and others (1986). This work, which is based on the Survey of Currency and Transaction Account Usage conducted in 1984, focuses on the household sector of the economy. The survey obtained 1,946 completed telephone interviews from a randomly selected sample of 2,500 families in the United States.

[17]For a discussion of the issues surrounding Regulation Q see Gilbert (1986).

[18]This is due primarily to holding account balances so large that interest earnings offset the account fees; however, this also represents responses from families who have selected non-fee accounts. The Sheshunoff data indicate that over 77 percent of the banks surveyed offered free checking accounts to senior citizens, 30 percent offered free checking to students and 19 percent used depositors' balances in savings accounts to offset checking account fees.

Table 2
Key Characteristics of Four Checkable Accounts

	No-Frills	Basic demand deposits	Tiered demand deposits	NOW account
Monthly maintenance fee	$1.48	$3.15	$5.45[1]	$6.23[1]
Highest balance to which maximum fee applies	NA	NA	$236	$943
Minimum balance needed to waive monthly fee	NA	$452	$491	$1,047
Number of free checks monthly	15	19	24	25
Per-check fee after limit	$0.23	$0.16	$0.16	$0.18

[1]These fees represent the maximum monthly fee that applies to balances below $236 in the case of tiered demand deposits and below $943 for NOW accounts. The Sheshunoff data provide only the maximum fee, while the ABA data provide the range of fees that applies to minimum account balances from $0 to the balance level required for fees to be waived. For minimum account balances that fall between $236 and $491 for tiered accounts and between $943 and $1,047 for NOW accounts, the fee is estimated using the ABA data to adjust the fee data from Sheshunoff.

SOURCE: Derived from Sheshunoff Survey Data.

are illustrative; they need not reflect any particular individual's explicit costs of holding various types of checking accounts.

Table 3 presents the calculated monthly explicit cost of the four transaction accounts. Although NOW accounts have the highest maximum monthly service charge, the earned interest income can make their monthly before-tax net cost quite low, especially for an individual with large minimum and/or average balances. Indeed, the monthly before-tax net cost would be *negative* if average balances were greater than $1,425, regardless of how low the minimum balance was. Since survey data indicate that the average balance in these accounts is in the $5,000–$6,000 range, it would not be surprising to find that many NOW account holders have negative monthly net costs.

Annual Comparison of the Four Accounts

Table 4 summarizes the results of table 3 on an annual basis. The cost of purchasing checks is included in the annual cost based on the average number of checks written from table 1. A 1984 study analyzing retail banking fees found the average charge for 200 checks to be $6.25.[19]

[19]Trans Data Corporation (1984). The ABA survey found the charge for 200 checks to vary from $5.18 to $6.51.

The Cost Calculation Formula

The following simple equation is first used to calculate the monthly before-tax costs. Tax implications are discussed in a later section. Then the net costs, which include the cost of buying checks, are compared on an annual basis for all four accounts.

Monthly Net Cost = Interest Earned on Deposits
minus Monthly Maintenance Fee
minus Per-Check Fees,

can be restated as:

$$\text{Net Cost} = \frac{i(X)}{12} - M - p(N - L),$$

where:

- i = interest rate paid on deposits
- X = average monthly balance
- M = monthly fee, (a function of minimum monthly balances)
- p = per-check fee (applies only when $N > L$)
- N = number of checks written per month
- L = limit of free checks per month.

Table 3

Net Costs of Alternative Checking Accounts for Representative Individuals

	No-frills DD	Basic DD	Tiered DD	NOW account
Individual A				
Interest earned	0	0	0	$1.31
Monthly fee	$1.48	$3.15	$5.45	$6.23
Check fee	0	0	0	0
Monthly net cost	$1.48	$3.15	$5.45	$4.92
Individual B				
Interest earned	0	0	0	$2.19
Monthly fee	$1.48	$3.15	$5.45	$6.23
Check fee	$0.23	0	0	0
Monthly net cost	$1.71	$3.15	$5.45	$4.04
Individual C				
Interest earned	0	0	0	$4.38
Monthly fee	$1.48	$3.15	$5.18[1]	$6.23
Check fee	$2.07	$0.80	0	0
Monthly net cost	$3.55	$3.95	$5.18	$1.85

[1]Individual C has a minimum balance of $250 but the highest fee is assessed for balances up to $236. The monthly fee of $5.45 was reduced by 5 percent to $5.18. The 5 percent reduction is the average amount by which the monthly fee was reduced from its maximum according to ABA data.

Table 4

Annual Cost of Four Checkable Deposit Accounts for Representative Individuals (including the cost of checks)

	Individual A	Individual B	Individual C
No-frills account	$21.51*	$26.52*	$51.60
Basic demand deposit account	$41.55	$43.80	$56.40
Tiered demand deposit account	$69.15	$71.40	$71.16
NOW account[1]	$62.76	$54.51	$31.26*

[1]Due to rounding, NOW account interest income is slightly different using annual rather than monthly calculations.

* indicates the least-cost alternative.

Table 4 indicates that individuals A and B would opt for the no-frills account at annual costs of $21.51 and $26.52, respectively, while individual C would clearly prefer the NOW account at an annual cost of $31.26.[20]

While the data in table 4 do not necessarily represent the cost of various types of deposits for a given individual, there is a clear relationship between the average daily balance and the cost of various types of accounts. As a general rule, the higher the average daily balance, the more likely it is that NOW accounts will be the *least* costly form of checkable deposits. Indeed, for very large average and/or minimum balances, NOW accounts likely will be the most cost-effective checking account among all the alternatives. Likewise, no-frills demand deposits likely will be the least costly alternative for individuals who hold relatively small balances.[21] Similar results were arrived at using Eighth District data in place of national data (see opposite page). While our calculations do not illustrate a situation in which either basic or tiered demand deposits are preferred, there clearly are combinations of average and minimum balances and explicit fees for which these accounts will be the least costly alternative.

The Impact of Tax Considerations

It is also important to consider the tax liabilities arising from interest on deposits. Tax effects are important because interest income on bank deposits is taxed as ordinary income, without consideration of monthly service fees. For example, in one year, individual C earned $52.50 in interest on the NOW account and paid $83.76 in account fees for a net annual cost of $31.26. In that year, individual C would be taxed on the $52.56 of interest income rather than paying no taxes on the $31.26 of net expense. If this depositor were in the 30 percent marginal tax bracket, the account would result in an after-tax cost of $47.01, ($31.26 + .3 [$52.50]), instead of the before-tax cost of only $31.26. If this depositor were in the 50 percent tax bracket, the

[20]For example, the net annual cost of $31.26 for individual C includes $52.50 of interest earned ($1,000 × .0525) and $83.76 of fees. The fees include $74.76 of monthly maintenance fees (12 × $6.23) and $9.00 in charges for checks (24 × 12 × $6.25/200).

[21]Indeed, survey data indicate that the percentage of families holding only regular non-interest paying demand deposits declines substantially with family income, while the proportion with only NOW accounts increases. We would like to thank Robert Avery for providing us with these data.

The Cost of Checkable Deposits in the Eighth Federal Reserve District

This insert compares the fee structure on checkable accounts in the Eighth District with that of the nation. It also investigates whether the three representative individuals would have chosen different checkable accounts had they been located in the District. The Eighth Federal Reserve District includes all of Arkansas and parts of Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee. As of December 31, 1985, there were nearly 1,400 banks in the District. The primary data source for this article, Sheshunoff (1986), provides a state-by-state breakdown of most fees for some of the major checkable accounts. An Eighth District fee structure is constructed by combining data from all seven states that are part of the District. The number of observations for the District data ranged from 74 to 325.

In the cases in which regional data were not available, national data were substituted. Table A compares the national and District data where such comparisons are possible. It shows that the District data correspond closely with the national data. There are no consistent differences; however, the national fees are sometimes higher than District fees, while at other times the opposite is true.

Table B replicates table 4 of the main text. It provides the annual cost of the four checkable accounts using the District data. It indicates that, although the absolute costs in the District are different than the national costs, the selection of the lowest cost account for each of the three individuals is unchanged.

Eighth District data from the Quarterly Survey of Number of Selected Deposit Accounts and the Report of Transaction Accounts indicate an average NOW account balance of $6,554 in the first quarter of 1986. These District findings correspond closely to the ABA national survey results which indicate an average NOW account balance of $4,500 to $6,600 depending on the size of the bank.

Table A

U.S. and Eighth District Comparison

	No-Frills		Basic Demand Deposit		Tiered Demand Deposit		NOW Account	
	U.S.	District	U.S.	District	U.S.	District	U.S.	District
Monthly fee	$1.48	$1.46	$3.15	$3.37	$5.45	$5.21	$6.23	$6.29
Minimum balance for free checking	NA	NA	$452	$438	$491	$467	$1,047	$1,030
Free checks	15	NA	19	NA	24	21	25	24
Check fee	$0.23	NA	$0.16	$0.17	$0.16	$0.15	$0.18	$0.17

SOURCE: Sheshunoff (1986)

Table B

Annual Cost of Four Checkable Deposit Accounts in the Eighth District

	Individual A	Individual B	Individual C
No-frills account	$21.27	$27.60	$52.68
Basic demand deposit account	44.19	46.44	60.84
Tiered demand deposit account	66.27	68.52	77.64
NOW account	63.48	55.23	31.98

after-tax cost of the account would be $57.51 ($31.26 + .5 [$52.50]). In this case, the NOW account would no longer be the lowest-cost checking alternative for the high balance depositor. Instead, the no-frills account would be the least costly form. As a general rule, the higher the marginal tax rate, the higher the average and/or minimum balances required to make NOW accounts the least costly alternative.

SUMMARY

This article reviews the costs and benefits of holding money and outlines the calculations involved in determining the amount and type of money balances one would want to hold. In addition, the explicit costs of holding four types of checking accounts are calculated for three representative depositors. The purpose of this discussion is to provide a better understanding of the costs and benefits of holding money and to make it easier for consumers to compare annual costs on alternative checking accounts.

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APPENDIX
The Data Sources

The primary data source for the explicit costs of these checkable deposit accounts is the most recent annual survey published by Sheshunoff and Co., Inc., entitled "Pricing Bank Services and Loans 1986." Nationally, over 1,300 commercial banks responded to a detailed survey which asked banks to list the charges associated with the "checking account used by most of your customers" for each of many different accounts. For example, if a bank offers three distinct NOW accounts to depositors, its survey responses provide data only for the most widely used of the three.

The data requested include minimum balance requirements, service charges, per-check charges and a variety of other information related to the costs and returns of holding checkable deposits. The Sheshunoff data provide weighted average rather than median values. It is assumed that all charges and fees assessed are based on the minimum balance held because over 85 percent of respondent banks indicate they calculate these charges on the basis of minimum, rather than average, balances.

Another data source is the "1984 Retail Deposit Services Report" by the American Bankers Association (ABA). The ABA sampled 1,735 banks and published data from 377 respondents broken down by asset size of the banks and solicited account information similar to the Sheshunoff survey. In most cases, the Sheshunoff data are used in the analysis.

Sheshunoff and ABA Survey Comparison

	Sheshunoff	ABA
No-frills Accounts		
Monthly maintenance fee	$1.48	$1.25–$3.06
Number of free checks monthly	15	13–20
Per-check fee after limit	$0.23	N/A
Basic Demand Deposits		
Maximum monthly maintenance fee	$3.15	$3.14–$3.89
Minimum balance needed to waive monthly fee	$452	N/A
Number of free checks monthly	19	N/A
Per-check fee after limit	$0.16	$0.17–$0.25
Tiered Demand Deposits		
Maximum monthly maintenance fee	$5.45	$3.51–$4.31
Minimum balance needed to waive monthly fee	$491	$400–$500
Number of free checks monthly	24	10–27
Per-check fee after limit	$0.16	$0.12–$0.22
NOW Accounts		
Maximum monthly maintenance fee	$6.23	$4.77–$5.75
Minimum balance needed to waive monthly fee	$1,047	$1,000
Number of free checks monthly	25	15–40
Per-check fee after limit	$0.18	$0.10–$0.22

Comparison of Sheshunoff and ABA Survey Data

Both the Sheshunoff and ABA surveys collect data on the four checkable accounts analyzed in this article although slightly different terminology is used to describe some of the accounts. Both surveys refer to no-frills and NOW accounts but use different terms in reference to basic and tiered demand deposit accounts. The Sheshunoff survey uses the term "metered" checking account and the ABA uses "special" checking account to refer to the basic demand deposit account for which a fee is assessed without regard to the account's balance. Tiered demand deposit accounts, for which fees are assessed as a function of the account's balance, are called "3–2–1" accounts by the Sheshunoff study and "regular" checking by the ABA study.

While the account definitions and the manner of displaying survey results are not identical for the two studies, basic data comparisons can be made. Though Sheshunoff data are reported by the deposit size of the bank, an average for all banks is provided as well. The ABA data do not provide averages for all banks and, therefore, a *range* of fees and balance levels are presented in the following table. The ABA survey was completed in 1984, while the Sheshunoff study was done in 1985. The following comparisons in table A show that the two studies arrive at similar account fee structures.