

ECONOMIC COMMENTARY

Will the Dollar's Decline Help Ohio Manufacturers?

by Amy Durrell,
Philip Israilevich,
and K.J. Kowalewski

A sharp drop in the value of the dollar since February 1985 has created hopes that there will be an increase in net exports that will fuel economic gains both in Ohio and the nation.

The decline in the dollar has come at a time of sluggish growth in the national economy, which has been in a period of recovery since November 1982. This period featured record employment increases in the U.S. between 1983 and mid-1984. Ohio's growth throughout the recovery, however, has been below the national average, leaving industries in the state particularly anxious for an economic stimulant. Many hope that the decline in the dollar may be that stimulant.

However, are the rosy expectations produced by the dollar's decline warranted for Ohio and its major producers? In this *Economic Commentary*, we examine this question and find that both Ohio and U.S. producers of manufactured goods are, in general, only moderately sensitive to exchange-rate fluctuations.

The responsiveness of individual states to the dollar's decline, however, will vary due to the mix of industries prominent in each area. Ohio's largest manufacturing employers are heavily involved in international trade and, therefore, are generally more sensitive to dollar fluctuations than the average U.S. manufacturer. This indicates that the appreciation of the dollar may have been a factor depressing growth earlier, and that the recent drop in the exchange rate could encourage future gains among the state's large manufacturers.

However, further examination of Ohio's competitiveness suggests that the state may not be in a position to fully benefit from the falling exchange rate. High wages and low productivity make Ohio firms less likely to benefit from the recent depreciation of the dollar than firms elsewhere in the nation.

The Ohio Economic Climate

While the United States has made rapid employment increases since hitting a low point in 1982, Ohio has lagged behind, making more moderate gains. Manufacturing and nonmanufacturing employment increases in Ohio have primarily offset large declines that occurred between 1980 and 1982, and have left the state with virtually the same number of people employed now as in 1980. Over the same period, U.S. employment has risen more than 9 percent.

In large part, the slow growth in Ohio's employment level is due to sharp declines in manufacturing employment. As chart 1 shows, while manufacturing employment in both Ohio and the U.S. has been falling, Ohio employment has fallen faster than the national average since 1979. In the periods in which U.S. manufacturing employment has increased, Ohio's has risen more slowly. The state's manufacturing employment remains 15 percent below its 1980 high, while United States manufacturing employment has fallen by only half that amount in the same period.

The decline in Ohio manufacturing employment is partly due to the state's industry mix. Ohio continues to have a

Chart 1 Trade-Weighted Dollar and Manufacturing Employment

Index = January, 1976



SOURCE: Board of Governors of the Federal Reserve System; U.S. Department of Labor Statistics; Ohio Bureau of Employment Services, Employment and Earnings.

large concentration of durable goods manufacturers, including several industries which have faced serious economic difficulties throughout the nation in recent years. In 1983, 50 percent of Ohio manufacturing employment was concentrated in only four sectors—primary and fabricated metals, transportation equipment, and nonelectrical machinery.¹ Weaknesses in these industries have been a primary factor restricting growth in Ohio. For example, Ohio's steel and primary metals employment is currently only half of its 1973 level.

Philip Israilevich and K.J. Kowalewski are economists at the Federal Reserve Bank of Cleveland. Amy Durrell is a former research assistant at the bank. The authors would like to thank Mark Sniderman and Peter Skaperdas for their helpful comments and suggestions.

The views stated herein are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

1. Nonelectrical machinery includes the manufacture of metalworking, farm, and industrial machinery.

The causes of the decline are complex and beyond the scope of this paper. One possible factor to be considered, however, is substantial foreign competition, both in the import and export market. Several industries, particularly transportation and steel, have often been cited as being hard-hit by foreign competition.

Another factor contributing to the state's decline in manufacturing employment is that Ohio is among the top three exporting states, based on the value of shipments of manufactured products. Ohio's major employers are also major exporters. While, on the average, U.S. industries exported 11.3 percent of their total shipments in 1983, Ohio's four largest employing industries exported between 11.6 percent and 20.2 percent of their manufactured products. In addition, employers in smaller industries are also large exporters. Ohio's instrument and chemicals industries, for example, both exported nearly 19 percent of their total shipments in 1983.² When exports dropped due to high exchange rates, manufacturing employment also dropped.

In sum, the Ohio economy has been less robust than that of the nation as a whole in recent years because much of the benefit of the national recovery bypassed the state. The importance of international trade to major Ohio industries indicates that the benefits of the dollar depreciation could be a factor to bring Ohio's growth closer to the U.S. average.

Import and Export Sensitivity to the Dollar

The dollar fell nearly 30 percent in the year following February 1985, and has continued to decline. Such a drop has two trade-related effects on domestic industries. U.S. firms lower their foreign-currency-denominated prices, stimulating an increase in the quantity of goods demanded abroad. In addition, foreign firms supplying imports to the U.S. economy raise import prices. The price increase will lead to a drop in the quantity of imports demanded, allowing domestic suppliers to replace foreign producers. The impact of the two changes coincide, stimulating increases in domestic production. But how large an in-

crease can be expected? To address this issue, we considered two different approaches, one based on a macroeconomic model of Data Resources Inc. (DRI) and the other on a study conducted by the Congressional Budget Office (CBO).

According to the simulation with the DRI model, a 1 percent decline in each quarter over a three-year period beginning in the second quarter of 1986 brought the following changes in the economy. Exports rose 0.07 percent and imports fell 0.02 percent per quarter, on average. Based on the average change over the three years, the DRI model predicts that a 1 percent decline in the dollar would lead to a 0.06 percent increase in total manufacturing output.

The Congressional Budget Office estimated the elasticity of U.S. manufacturing industries with respect to the real dollar exchange rate for the 1973 to 1985 period.³ This study isolated the effect of the dollar from factors that influence manufacturing growth, such as cyclical changes, relative price changes, and the level of maturity of an industry.

The estimates from the CBO study suggested that a 1 percent increase (decrease) in the dollar led to an 0.08 percent to 0.09 percent decrease (increase) in U.S. manufacturing output. Such a small response in the U.S. economy to a change in the dollar is similar to the DRI simulation results for the period following the second quarter of 1986.

Although these figures represent only a small change, when considered over a period such as the year following February 1985, the effect is more substantial. The CBO and DRI models indicate that a 30 percent drop in the dollar over that period would be expected to generate an increase in U.S. manufacturing output by 1.8 percent to 2.6 percent. Over the last 20 years, the average annual rate of change of the industrial production index was 3.3 percent, and the change has varied between a 10 percent decline and a 12.5 percent gain. Relative to this historical pattern, the strong dollar depreciation could, in principle, have a notable effect on manufacturing growth.

Ohio's Responsiveness to the Dollar Exchange

The CBO study determined the national response of different manufacturing sectors to exchange rate movements. The response of individual state economies to fluctuations of the dollar would differ due to the variety of industries in the region. Ohio's industry mix is considerably different from the U.S. average, therefore the sensitivity of Ohio manufacturers to the foreign-exchange value of the dollar should be determined on the basis of specifics.

The state's sensitivity to the dollar's exchange rate can be estimated by examining elasticities for specific industries. These elasticities are presented in the CBO study. According to their values, industry sensitivities are ranked as high, medium, or low. Ohio's largest employers—primary metals, transportation equipment, fabricated metals, and nonelectrical machinery—lie predominately in the high or medium response range. The rank of elasticities derived by the CBO study appear to be consistent with the elasticity ranking from the DRI model.

To estimate Ohio manufacturers' responsiveness to exchange-rate movements, the CBO study's estimates of each industry's elasticity was assumed to approximate the elasticity of the corresponding industry in Ohio. This procedure implies that all states are equally competitive in specific industries. Each industry elasticity was weighted by the corresponding share of value added in total manufacturing separately for the U.S. and Ohio (see table 1).⁴

In both years, Ohio manufacturing was found to be somewhat more sensitive to exchange-rate movements than the nation as a whole. Under the assumptions used in the CBO study, the 1982 elasticities indicate that, everything else being equal, a 30 percent decline in the dollar would lead to a 2.6 percent production increase nationally and to a 3.1 percent increase in Ohio. These gains—if realized—would be substantial, especially in comparison to recent manufacturing growth in Ohio.⁵

Relative to the period of estimation of the CBO study, the latest dollar depreciation is very sharp and short. As a result, the response of foreign suppliers

2. See *1983 Annual Survey of Manufactures: Origin of Exports of Manufactured Products*, U.S. Department of Commerce, Bureau of the Census.

3. For details, see Eliot Schwartz, "The Dollar in Foreign Exchange and U.S. Industrial Production," *Staff Working Paper*, The Congress of the United States, Congressional Budget Office, December 1985.

4. *Census of Manufactures Volume III: Geographic Area Statistics*, "Part I and IV: General Summary, Alabama-Montana," U.S. Department of Commerce, Bureau of the Census.

5. Other factors may have even larger effects. For example, the CBO study found that a 1 percent change in the rate of growth of potential GNP stimulates industrial production growth in

Table 1 Elasticity of Industrial Production with Respect to Change in the Trade-Weighted Dollar

Estimates based on industry elasticities calculated by the CBO

	U.S.	Ohio
1977	-0.085	-0.093
1982	-0.086	-0.102

SOURCE: Congressional Budget Office.

to the dollar's depreciation could make the historically-based elasticity estimate misleading if the dollar's decline does not affect prices much or for a long time. If foreigners raise the dollar price of their products that are imported by the U.S. to reflect the fall in the dollar, they must accept a decrease in the quantity of goods sold. Alternatively, foreign suppliers may be willing to accept the same dollar-denominated price and reduced profit margins to maintain their market shares. If the latter path is chosen, U.S. production will be less elastic than it otherwise would be.

The refusal of foreigners to accept decreases in the quantity of goods sold may be more prominent in this period of depreciation. Over the period 1983 to mid-1985, while the dollar rose almost 17 percent, import prices were not rising. Little of the benefit of dollar appreciation was passed on to domestic consumers, leaving foreign suppliers with wide profit margins. Such large margins could make it easier for foreigners to absorb the costs of decline in the dollar, decreasing the elasticity of domestic production. However, in the same period, import prices did decline relative to the price of domestically produced goods, weakening this proposition.⁶

In short, based on the CBO elasticities, our study concludes that output in Ohio should be slightly more responsive to the exchange rate than U.S. production as a whole. However, foreign suppliers have so far been unwilling to give up their market shares, thus preventing all domestic producers from benefiting as much from the depreciation as the CBO study indicates they normally would.

the range of 1 percent to 3 percent in the U.S. The impact of cyclical changes was only slightly smaller.

6. See Charles Pigott and Vincent Reinhart, "The Strong Dollar and U.S. Inflation," *Quarterly Review*, vol. 10, no. 3 (Autumn 1985), Federal Reserve Bank of New York, pp. 23-29.

Table 2 Wages and Productivity

Based on production workers only

	Wages			Productivity		
	Traded: Ohio	U.S.	Difference	Nontraded: Ohio	U.S.	Difference
1977	\$7.32	\$6.48	\$.84	\$59.81	\$61.61	-\$1.80
1982	10.90	9.73	1.17	97.40	98.81	-1.41

Wages represent average hourly wages for production workers. Productivity is shipments per hour for production workers.

SOURCE: U.S. Census of Manufactures.

Exchange Rate Movements and Relative Competitiveness of Ohio Manufacturers

The dollar's depreciation could stimulate both higher production levels and increases in employment, but the gains may not be distributed evenly across regions. Relative wages and productivity may make a region more or less competitive than other areas in the U.S. that produce comparable products. In this section, Ohio competitiveness is analyzed in relation to the dollar exchange movement.

Ohio production workers' hourly wages, according to the *Census of Manufactures*, were above the national average in both 1977 and 1982. (See table 2). Although the Census provides data for only those two years, another source of data confirms that Ohio manufacturing wages have been higher than the U.S. average from the 1970's up to the present.⁷

These data on wages may be misleading because they are neither adjusted for the characteristics of employees, nor for their industry of employment. However, a recent study by Medoff (1985) also found that Ohio employers pay a "wage premium." He defined a quality-adjusted wage rate based on the *Current Population Survey*. He observed even more drastic discrepancies between wage rates in Ohio and the U.S. The Ohio quality-adjusted wage rate in the

manufacturing sector in 1973 was 7.3 percent higher than in the U.S. as a whole and, in 1979, was 5.9 percent higher. In the most recent period, 1983-1984, an Ohio worker earned 8.3 percent higher pay than a similar worker in the U.S.⁸

In addition to Ohio's above-average wages, the *Census of Manufactures* showed Ohio's productivity rates to be below average. This makes the state a more expensive place for production than the U.S. average. Such a position could lead buyers to use Ohio industries as a last-choice supplier.

The effect of wages and productivity during periods of dollar depreciation and appreciation can be better determined by dividing industries into two categories. Those industries with little or no exposure to international trade are called "nontraded" and those involved in a significant amount of international trade are called "traded."⁹

Although both traded and nontraded industries in Ohio had above-average wages and below-average productivity, the difference in both was largest for traded industries. The noncompetitiveness of Ohio's traded industries would make Ohio both among the last to gain the benefits of a lower dollar, and among the first to bear the costs of depreciation. This condition clearly threatens Ohio's position as a major exporting state.

Because the elasticities estimated by the CBO study represents an average

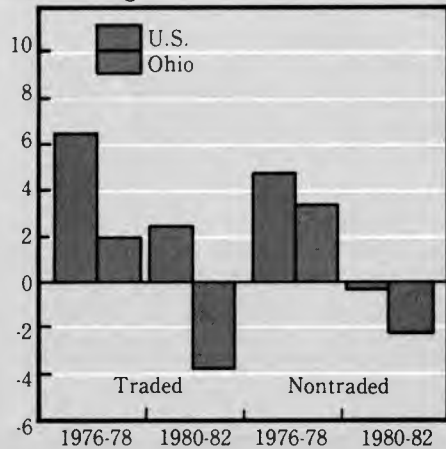
7. Ohio Bureau of Employment Services, Employment and Earnings.

8. See James L. Medoff, "Labor Market Conditions in Ohio versus the Rest of the United States: 1973-84," *Economic Review*, Quarter I, 1986, Federal Reserve Bank of Cleveland, pp. 24-30.

9. Industries were chosen by first selecting those with national shipments of more than \$1 billion, then selecting the significant employers in Ohio. Industries with imports or exports that equal 5 percent or more of domestic shipments are "traded" industries; the remainder are "non-traded" industries.

Chart 2 Net Employment Changes of Existing Firms

Percent change



SOURCE: Data compiled by Brookings Institute.

response for all states to changes in the dollar, application of these elasticities to the current period of depreciation may be misleading. If Ohio is an expensive supplier due to high wages and low productivity then, in times of a rising dollar, Ohio manufacturing may decline faster than the calculated elasticity indicates. On the other hand, when the dollar falls, Ohio manufacturing will gain less than the elasticity indicates. Ohio's above-average wages and below-average productivity thus makes the state less likely to attract new firms and to expand existing manufacturing facilities.

An examination of the expansion and

contraction of employment in existing firms substantiates this argument. The data used were prepared by the Brookings Institution for two periods, 1976-1978 and 1980-1982.¹⁰ The results are recorded in chart 2.

In the economic expansion of 1976-1978 the United States economy and the Ohio economy both increased their manufacturing employment. Ohio's performance was considerably weaker in the traded industries, however, as existing firms grew only 2 percent compared to 6.5 percent of the comparable U.S. growth. The depreciation of the dollar between 1976 and 1979 should have contributed more to Ohio's growth than to that of the U.S, according to industry elasticities. Therefore, the lackluster performance in Ohio indicates a less-competitive position among the traded industries.

Similarly, during the economic decline of 1980-1982, employment in Ohio's existing trading firms declined 4 percent, while their U.S. counterpart grew over 2 percent. Since this period coincides with the dollar appreciation, it is not clear what portion of Ohio's relatively poor performance in traded industries' employment is due to the recession and what portion is due to the dollar appreciation. Similar behavior by the nontraded sector, however, is observed, but the difference between Ohio and the nation as a whole is smaller. One plausible conclusion is that Ohio's traded industries are more sensitive to dollar appreciation than are traded industries in the country as a whole.

10. Because only metropolitan area data were available, both the United States and Ohio represent the sum of their urban areas.

Based on the analysis of existing firms, Ohio manufacturers relative to the U.S. as a whole are losing employment faster in recessions and gaining it slower during expansions. Traded industries are particularly sluggish, perhaps due to the high wages and low productivity that make Ohio firms less competitive than corresponding national firms.

Conclusion

Ohio's mix of industries suggest that the state is slightly more responsive to exchange-rate fluctuations than the U.S. average, assuming that Ohio is equally competitive with the typical U.S. producer. We have seen that during the past decade employment in Ohio has been weaker than in the U.S. and that the weakness is most pronounced among traded industries. This may be due to low productivity and to high wage rates in Ohio. Since large changes in the dollar should eventually stimulate output and employment among the nation's traded industries, Ohio's uncompetitiveness may prevent the region from fully enjoying the benefits of dollar depreciation.

All this suggests to industrialists and state officials that benefit of the dollar depreciation is filtered through the competition in the U.S. market. Since Ohio manufacturing firms appear to have a competitive disadvantage, one should not expect Ohio to benefit fully from the declining dollar.

Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101

BULK RATE
U.S. Postage Paid
Cleveland, OH
Permit No. 385