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TRADE, JOBS, AND WAGES

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ABSTRACT

There is a broad consensus among US opinion leaders that our economic problem is largely one of failures of international competition -- that trade deficits have eroded our manufacturing base, that inability to sell on world markets has been a major drag on economic growth, and that imports from low-wage countries have caused a widening of income inequality. This paper summarizes recent evidence on these issues, and shows that while there may be a grain of truth to each complaint, in each case the effect is quantitatively minor. The arithmetic of "competitiveness" just doesn't work.

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The real wage of the average American worker more than doubled between the end of World War II and the early 1970s. Since then, however, the picture has been much less satisfactory. The real compensation of the average worker in 1991 was only 6 percent higher than it had been in 1973. Furthermore, only highly educated workers have seen their compensation rise; the real wages of blue-collar workers have actually fallen in most years since 1973.

Why have earnings stagnated? A broad consensus of opinion among business and political leaders attributes flat or declining wages in large part to the failure of the United States to compete effectively in an increasingly integrated world economy. A typical version of the story runs something like this: Foreign competition has led to an erosion of the US manufacturing base, and with it a loss of the high-paying jobs that a strong manufacturing sector provides. More broadly, the nation's real income has lagged because of the inability of many US firms to sell on world markets. And because imports increasingly come from Third World countries with their huge reserves of unskilled labor, the heaviest burden of this foreign competition has fallen on less educated American workers.

Many people find this story, or something like it, extremely persuasive. It links American's undeniable economic difficulties to the obvious fact that American firms increasingly sell in a global market. In effect, America is seen (in the words of President Clinton) as being "like a big corporation in the world economy"; and like many big corporations, it has stumbled in the face of new competitive challenges.

But is the story true? Have US workers suffered primarily

because of the pressures of international competition?

The answer is that they have not. A growing body of evidence contradicts the popular view that international competition is central to US economic problems. In fact, international factors have played surprisingly little role in the country's economic difficulties. The manufacturing sector has become a smaller part of the economy, but international trade is not the main cause of that shrinkage. The growth of real income has slowed almost entirely for domestic reasons. And -- contrary to what even most professional economists have believed -- recent work indicates that growing international trade has played a minor role even in the declining real wages of less-educated US workers.

In this article we summarize this evidence. We cover three topics: the role of international trade in the "deindustrialization" of the US economy, the effects of international competition on the growth of US real income, and the effects of growing trade on the distribution of income among American workers.

TRADE AND THE MANUFACTURING SECTOR

The fraction of US workers employed in manufacturing has been declining steadily since 1950, closely paralleled by a decline in the share of US output accounted for by value added in manufacturing (Figure 1). Before 1970, international trade was of minor importance to the US economy, and those who worried about this trend generally blamed it on "automation", that is, on rapid productivity growth in manufacturing. Since then, however, it has become more common to blame deindustrialization on rising imports. In 1970 value added in the manufacturing sector accounted for 25.0 percent of Gross Domestic Product (GDP) and 27.3 percent of employment; by 1990 it had fallen to 18.4 percent of GDP and 17.4 percent of employment. Over the same period, imports rose from 11.4 to 38.2 percent of manufacturing value-added.

The fact that imports grew while industry shrank does not in itself, however, demonstrate that international competition was responsible for the decline in the relative importance of manufacturing. Manufacturing exports also rose dramatically over the period, from 12.6 percent of value-added in 1970 to 31.0 percent in 1990. Thus while many manufacturing firms may have reduced their payrolls in the face of import competition, many others added workers to produce for expanding export markets.

To assess the overall impact of growing international trade on the size of the manufacturing sector, we need to estimate the net effect of this simultaneous growth of exports and imports. A simple

framework for doing this is the following: First, divide the total expenditure of US residents on all manufactured goods into expenditure on U.S.-produced goods and spending on imports:

US expenditure on all manufactures = Expenditure on domestic goods

+ Expenditure on imports

Next notice that total sales of manufactured goods (excluding sales of manufacturing firms to each other) are the sum of domestic sales and exports:

Sales of manufactures = US expenditure on domestic goods + Exports

It follows that the total sales of domestic manufactures are equal to domestic spending plus the trade balance:

Sales of manufactures = US expenditure on all manufactures

+ Exports – Imports

If we take domestic spending on manufactures as given, then, the net effect of international trade on sales of domestically produced manufactures is simply measured by the trade balance in manufactures.[1]

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[1]There are actually two technical issues that arise here. First, our statement of the issue neglects imports of manufactures used as inputs by domestic manufacturers; adding this in would complicate the exposition but lead to the same end equation. Second, it is possible that increased trade will affect the overall

As Figure 2 shows, the US ran substantial deficits in manufacturing trade during the 1980s. In 1970 US manufactured exports exceeded manufactured imports, although the surplus was only 0.2 percent of GDP. The strong dollar of the mid-1980s plunged the US manufacturing sector into large deficits, peaking in 1986 at 3.1 percent of GDP. By 1990 the deficit was back down to 1.3 percent of GDP, but this still represented a substantial decline from 1970.

One can immediately see, however, that the trade deficit cannot have been the main factor in the declining share of manufacturing in the economy. The share of manufacturing in GDP fell 6.6 percentage points between 1970 and 1990, while the trade balance in manufactures deteriorated by only 1.6 percentage points of GDP.

Moreover, looking at the raw value of the trade deficit in manufactures, which measures the effect of trade on manufacturing sales, overstates the effect of trade on value-added -- wages and profits actually earned in the manufacturing sector. (Both GDP and the manufacturing component of GDP measure value-added, not gross sales). The reason is that a substantial fraction of a dollar of manufacturing sales is not paid to labor or capital within that sector but is instead used to purchase inputs from the service sector. For example, the largest single contractor to General

level of domestic spending on manufactured goods; but if anything the increased availability of imports should increase this spending, reinforcing our conclusion that trade has played little role in the decline in US manufacturing employment.

Motors is not a parts supplier but Blue Cross/Blue Shield. So to estimate the impact of the trade balance on manufacturing value-added we need to scale it down by a factor reflecting this "leakage" to the service sector. We have used Commerce Department data to estimate the leakage at 40 percent. That is, each dollar of trade deficit reduces value-added in US manufacturing by only $.60.

We then estimated what the trend in US manufacturing output would have been if, instead of moving from trade surplus to trade deficit, the manufacturing sector had maintained balanced trade from 1970 to 1990. To do this we estimated what the manufacturing share would have been in each year if trade had been balanced. In 1990, for example, the actual share of manufacturing in GDP was 18.4 percent, with a trade deficit of 1.3 percent of GDP. With balanced trade the manufacturing sector would have been 1.3 X 0.6 = 0.78 percentage points of GDP larger than it was, implying a share of 19.2 percent of GDP.

Figure 3 compares this series of hypothetical manufactured shares with the actual trend. If trade in manufactured goods had been balanced from 1970 to 1990, the downward trend in the size of the manufacturing sector would not have been as steep as it actually was. But most of the deindustrialization would still have taken place. From 1970 to 1990, manufacturing declined from 25 to 18.4 percent of GDP; with balanced trade, the decline would have been from 24.9 to 19.2, about 86 percent as large.

International trade, then, explains only a small part of the decline in the relative importance of manufacturing to the US

economy. But then what does explain that decline?

The proximate answer is that the composition of domestic spending has shifted away from manufactured goods. In 1970, 46 percent of domestic expenditure in the United States was on goods (domestic or imported), 54 percent on services and construction. By 1991 the shares were 40.7 and 59.3 percent respectively. It is hardly surprising, given this shift, that manufacturing has become a less important part of the economy.

But why are US residents spending a smaller fraction of their incomes on goods than they did 20 years ago? The shift, it turns out, is not because consumption of goods has failed to rise; it is because the prices of goods have fallen relative to those of services. One way of seeing this is to note, as Figure 4 does, that the share of goods in expenditure measured at constant prices (in this case, 1987 dollars) has not declined. That is, the physical ratio of goods to services purchased has not declined; all that has happened is that goods have become relatively cheaper. (Between 1960 and 1990 the price of goods relative to services fell 29.3 percent).

But why have goods become cheaper? Primarily because productivity growth in manufacturing has been much faster than in services (Figure 5), and this productivity growth has been passed on in lower consumer prices.

This last point suggests that the conventional wisdom has things almost exactly backward. The declining share of US employment in industry is often ascribed to a lack of manufacturing

competitiveness, due to inadequate productivity growth. In fact, however, the shrinkage of that sector is largely due to its relatively _fast_ productivity growth as compared with services. Or to put it another way, the old-fashioned concern about loss of manufacturing jobs because of automation is closer to the truth than the current preoccupation with loss of manufacturing jobs because of foreign competition. (Or to put it differently, deindustrialization is primarily due to the slow growth of productivity in the service sector).

To the limited extent that the US manufacturing sector _has_ contracted in the face of foreign competition, can this explain the failure of real earnings to rise? A simple calculation shows that it is at most a tiny factor. In 1990, the trade deficit in manufacturing was $73 billion, corresponding to approximately 700,000 manufacturing jobs. In that year, the average manufacturing worker earned about $5,000 more than the average nonmanufacturing worker. Thus the loss of "good jobs" in manufacturing due to international competition could be said to have corresponded to a loss of $3.5 billion in wages that year. That may sound like a large number, but US national income in the same year was $5.5 _trillion_. That is, the wage loss from deindustrialization in the face of foreign competition was less than 1/15 of one percent of national income.

INTERNATIONAL COMPETITION AND REAL INCOMES

While much of the concern about US competitiveness has focussed on the relative shrinkage of the manufacturing sector, there is also a broader sense that US real incomes have been eroded by our failure to compete effectively on world markets.

Most discussions of US competitiveness are marked by considerable confusion, because "competitiveness" is not a well-defined term. It is always useful to compare the performance of different countries: if, for example, US productivity growth lags that of other advanced nations, this may indicate that we could or should be doing better. Such comparisons need not mean, however, that the economic consequences of poor US productivity growth are any worse because other countries are doing better -- which is what most people have in mind when they speak of a competitive problem. To sort out these issues, it is helpful to perform a simple three-part thought experiment.

First, imagine a world in which all countries are increasing their productivity -- their output per worker -- by 3 percent annually. Most people have little difficulty in agreeing that in this case real earnings per worker would rise by 3 percent everywhere.

Next, suppose that productivity growth around the world were to fall to 1 percent annually. Again, most people would agree that earnings growth would fall to 1 percent in all countries.

Finally, suppose that productivity growth in the United States falls from 3 to 1 percent, but that it continues at 3 percent elsewhere. And suppose that, as in the previous case, earnings

growth in the US falls from 3 to 1 percent.

In this case the US has a problem; but it is surely misleading to think of it as a competitive problem. After all, the slowdown in earnings growth is exactly the same as it would have been if everyone else had experienced the same difficulties; the fact that other countries are doing better than we are may hurt our pride, but it does not hurt our standard of living.

It would only make sense to talk of a competitive problem to the extent that our earnings growth falls by more than the decline in our productivity growth -- say, if US earnings were to stagnate or even decline with 1 percent productivity growth -- and if this additional decline were due to the fact that other countries are performing better than we are.

There is nothing inherently unlikely about such a competitive drag on real income. Indeed, there is a well-understood channel through which foreign competition can reduce a country's real income. If increased foreign competition in export markets forces a decline in the prices of US exports relative to those of US imports -- a price decline that typically occurs via devaluation of the dollar -- then this so-called terms of trade effect pulls down US real earnings, holding them below the rate of productivity growth.

Furthermore, over the past 20 years the United States has indeed experienced a deterioration in its terms of trade. As Figure 6 shows, the ratio of US export prices to import prices fell more than 20 percent from 1970 to 1990, implying that the US had to

export 20 percent more to pay for any given quantity of imports in 1990 than it did in 1970.

This sounds like a serious blow to US real income. To keep a sense of perspective, however, one must realize that only a fraction of US incomes are spent on imports, and correspondingly only a fraction of US resources are devoted to producing exports. In spite of the growing importance of international trade imports were only 11.3 percent and exports only 10.0 percent of GDP in 1990. The impact of worsened terms of trade on national real income was correspondingly only a fraction of the percentage decline in the terms of trade themselves.

The overall impact of the terms of trade on real income can be calculated using a measure known as "command GNP". Real GNP, the conventional measure of economic performance, measures the output of the economy valued at the prices of some base year, say 1987. Command GNP is a similar measure in which the value of exports is deflated, not by the export price index, but by the import price index. That is, command GNP measures the quantity of goods and services the US economy can afford to pay for out of current income (the amount it can "command") as opposed to the volume of goods and services it produces. Adverse trends in the terms of trade should show up as a lag of command GNP behind actual GNP.

Figure 7 compares rates of growth of actual and command GNP per worker over two periods: 1959-1973, a period of sustained real wage growth, and 1973-1990, a period of stagnant real wages. It is in fact the case that command GNP grew faster than output in the

first period, slower than output in the second. But in both cases the differences were small. The great bulk of the decline in the growth rate of command GNP is explained by the decline in the rate of growth of real GNP per worker -- that is, by the purely domestic impact of the decline in productivity growth. Any additional effects that could be ascribed to competitive problems played a very minor role.

TRADE AND THE DISTRIBUTION OF INCOME

Economists have generally been quite sympathetic to the argument that increased integration of global markets has pushed down the real wages of less-educated US workers. After all, there is a familiar concept in the theory of international trade known as "factor price equalization". Factor price equalization asserts that when a country in which highly skilled labor is abundant (and thus where the premium for skill is small) trades with a country where skilled workers are scarce and unskilled workers abundant, the wage rates tend to converge: the wages of skilled workers rise in the rich country and fall in the poor one, while the wages of unskilled workers do the reverse. Given the rapid growth of exports from populous poor countries such as China and Indonesia, it seems reasonable to suppose that factor price equalization is a major source of the growing gap in earnings between skilled and unskilled workers in the United States.

Surprisingly, however, this does not seem to be the case. The

evidence suggests that increased wage inequality, like the decline of manufacturing and the slowdown in real income growth, is overwhelmingly driven by domestic causes.

To understand this evidence, it is necessary to understand the logic of factor price equalization, first explained in a classic 1942 paper by Wolfgang Stolper and Paul Samuelson.

Suppose that a country in which skilled labor is relatively abundant begins trading with another country in which it is relatively scarce. The skill-abundant country will export skill-intensive goods and import labor-intensive products, and as a result will shift its production toward skill-intensive sectors and away from labor-intensive sectors.

But such a shift in the industry mix toward skill-intensive products raises the demand for skilled workers while reducing it for unskilled workers. This will lead to a rising real wage for skilled workers, a declining real wage for unskilled. The rising wage differential, in turn, will lead firms in all industries to reduce the ratio of skilled to unskilled workers in their employment. When the dust has settled, the wage differential must rise just enough to offset the effects on labor demand of the change in industry mix.

Figure 8 illustrates the logic, for the case of a two-sector economy. Point E represents the economy's overall supply of skilled and unskilled workers; the vectors OX and XE represent initial employment in the skill-intensive and labor-intensive sectors. The slope of each vector is equal to the ratio of skilled to unskilled

labor employed in that sector. As a result of increased trade, the skill-intensive sector now employs OX' -- more of both kinds of workers, but with a lower proportion of skilled workers. The other sector employs X'E -- less of both kinds of labor, but also with a lower proportion of skilled workers than before. The change in industry mix as a result of international trade is just offset by the shift away from skilled workers because of the rise in their relative wage, so that total employment of both types of labor remains unchanged.

According to the theory of factor-price equalization, then, a rising relative wage for skilled workers leads all industries to employ a lower ratio of skilled to unskilled workers; this is necessary in order to allow the economy to shift its industry mix toward skill-intensive sectors. Or to put it differently, the skilled workers needed to expand the skill-intensive sector are made available because industries economize on their use when their relative wage rises; and conversely the shift in the industry mix ratifies the change in relative wages.

This analysis carries two clear empirical implications: if growing international trade is the main force driving increased wage inequality, then we should see the ratio of skilled to unskilled employment declining in all industries, and a substantial shift in the mix of employment toward skill-intensive industries.

In fact, the data look nothing like this prediction. Figure 9 compares the change in the ratio of white-collar to blue-collar wages with the change in relative employment for US manufacturing

sectors between 1979 and 1989, a period during which the real compensation of white-collar workers rose while that of blue-collar workers fell. If factor price equalization were the driving force behind the growing gap, most observations should lie in the northwest quadrant -- that is, the skilled-unskilled ratio in each industry should have fallen. Instead, nearly all of the observations lie in the northeast quadrant: in spite of the rise in the relative wages of white-collar employees, nearly all industries were employing more of them.

Figure 10 shows that the mix effects that should have accompanied factor-price equalization were also absent. Skill-intensive industries showed no tendency to grow faster than industries with high blue-collar employment. Thus the rising demand for skilled workers was overwhelmingly due to changes in demand within industries rather than a shift of the economy's industrial mix in response to trade.

The evidence in Figures 9 and 10 suggests that the decline in blue-collar wages must be attributed, not to international trade that changes the country's industrial mix, but to other factors that have reduced the relative demand for less-skilled workers throughout the economy. Technological change, especially the growing use of computers, is a likely candidate; but in any case international trade cannot have played the dominant role.

It is possible to reach the same conclusion by another route. Recent work by Lawrence Katz and others has calculated the skilled and unskilled labor "embodied" in US trade -- that is, the labor

inputs that were used to produce exports, and that would have been used to produce our imports if they had been made domestically. If the increase in US exports had embodied considerably more skilled and less unskilled labor than the increase in imports, this would have reduced the relative demand for less-educated workers. (This embodiment approach is not quite equivalent to the Stolper-Samuelson approach described above, but may be viewed as a close approximation). In fact, however, the net embodied labor flows are very small; if trade had been the only force pushing down less-skilled wages, it would have been massively outweighed by the rising education level of the work force. Recently Katz has concluded that growing internationalization can explain only a small fraction, certainly less than 10 percent, of the increase in the skilled-unskilled differential between 1979 and 1990.

How can these negative results be reconciled with the dramatic rise in manufactured exports from Third World countries? First, while the surging exports of some Third World countries have attracted a great deal of attention, the bulk of US trade continues to be with other advanced countries, which are similar to the US in skill levels and wage rates. In 1990 the average US trading partner, weighted by total bilateral trade, had a manufacturing wage rate that was 88 percent of the US level. Second, trade is still only a fraction of US output. In particular, imports from low-wage countries, defined as countries with wage rates less than half the US level, were only 2.8 percent of GDP.

Finally, while the US is increasingly trading with newly

industrializing countries in the Third World, this growing low-wage competition has been offset by the fact that our traditional trading partners have been converging on the US in wage rates and skill levels. In 1960 Japan was a low-wage country, and imports from Japan exerted competitive pressure on labor-intensive industries like textiles; today Japan is a high-wage country, and the burden of its competition falls largely on skill-intensive industries like semiconductors. Indeed, imports from low-wage countries -- using the same criterion as before, namely countries paying less than half the US wage -- were almost as large in 1960 as in 1990, 2 percent of GDP, because Japan and most of Europe fell into that category.

It must be said that the evidence that international competition has not been the villain in widening wage inequality is more complex and indirect than the evidence on deindustrialization and the terms of trade. Moreover, while factor price equalization does not appear to have been important so far, it could conceivably play a more important role in the future, as more Third World countries enter the world market. Nonetheless, here as before the popular view is contradicted by the available evidence.

CONCLUDING POINTS

The widespread view that the stagnation of US incomes since 1973 is largely due to the pressures of international competition does not hold up in the face of the facts. The common belief that

imports are responsible for deindustrialization is flatly rejected by the data; worsening terms of trade have had only a small impact on real income; even the seemingly sensible idea that low-wage US workers have suffered primarily from foreign competition appears inconsistent with the evidence.

Let us be clear about what we are saying. Some of those who have raised the alarm about US competitiveness seem to believe that there are only two possible positions: either you think that the US has a competitive problem, or you think that the American economy is performing well. We agree that the US economy is doing badly, but we find that the pressures of international competition explain very little of that poor performance. The sources of US economic difficulties are overwhelmingly domestic, and those difficulties would be much the same even if world markets had not become more integrated.

The relevant data are not subtle or difficult to interpret. The evidence that international trade has had little net impact on the size of the manufacturing sector, in particular, is blatantly obvious. The prevalence of contrary views among opinion leaders who believe themselves well informed says something disturbing about the quality of economic discussion in this country.

It is important to get these things right. Improving American economic performance is an extremely difficult task. It will be an impossible one if we start from the misconceived notion that our problem is essentially one of international competitiveness.

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FURTHER READINGS

L. Katz, "Understanding recent changes in the wage structure", <u>NBER Reporter</u>, Winter 1992/3.

P. Krugman, "Myths and realities of U.S. competitiveness", <u>Science</u>, November 1991.

R. Lawrence and M. Slaughter, "Trade and U.S. wages: giant sucking sound or small hiccup?", <u>Brooking Papers on Economic Activity: Microeconomics 1993</u>.

W. Stolper and P.A. Samuelson, "Protection and real wages", <u>Quarterly Journal of Economics</u>, 1942.

Figure 1: The share of the US labor force employed in manfacturing, and the share of US output accounted for by value added in manufacturing, have both been falling steadily since 1950. Before 1970, when international trade was relatively unimportant, it was common to ascribe this trend to automation; since 1970 it has generally been blamed on declining competitiveness.

Figure 2: Substantial trade deficits in manufactured goods emerged in the 1980s. The shift into deficit was, however, much smaller than the decline in the relative size of the manufacturing sector.

Figure 3: MOST of the decline in the share of manufacturing in output would have taken place even if manufacturing trade had remained in balance since 1970.

Figure 4: The share of goods in domestic expenditure has fallen steadily since 1960. This is entirely due to a decline in the prices of goods relative to those of services; the share of goods in expenditure measured in constant dollars has been stable.

Figure 5: The falling relative prices of goods are largely due to more rapid productivity growth in manufactures than in services.

Figure 6: The US terms of trade -- the price we receive for our exports relative to the price we pay for our imports -- have fallen considerably since the late 1960s.

Figure 7: Command GNP measures the purchasing power of US output. Before 1973, improving US terms of trade meant that command GNP rose faster than output per worker; after 1973, declining terms of trade were a drag on real income. Most of the slowdown in growth of command GNP, however, was due to slower domestic productivity growth, not foreign competition.
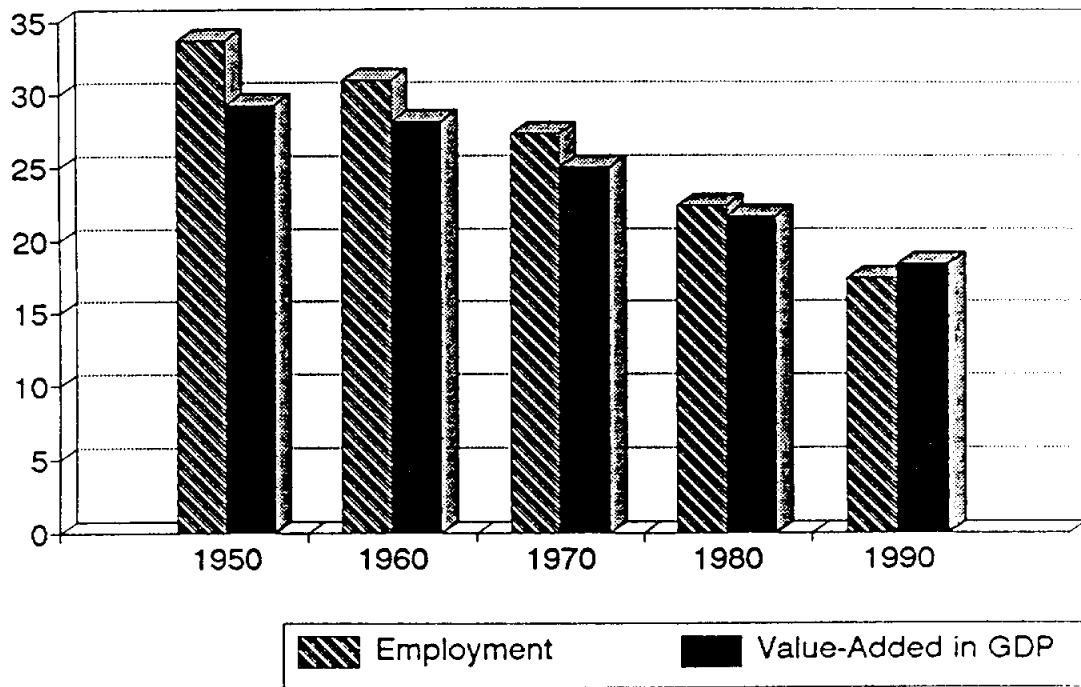
Figure 8: INTERNATIONAL TRADE can shift the mix of employment toward skill-intensive industries. To accommodate this shift, the relative wage of skilled workers must rise, leading all industries to reduce the share of skilled workers in their labor forces. In this two-sector illustration, the industry mix has shifted toward the skill-intensive sector, but the overall ratio of skilled to unskilled employment is unchanged, because the ratio of skilled to unskilled workers has fallen in both industries.

Figure 9: The actual data show that nearly all US industries have increased the share of skilled workers in their work force, even though such workers have become relatively more expensive. This shows that the increased demand for skilled labor is the result of economy-wide technology changes, rather than a change in the industrial mix.

Figure 10: Skill-intensive sectors have shown no tendency to grow more rapidly than overall employment, refuting the idea that growing international trade has shifted the industry mix toward skill-intensive production.
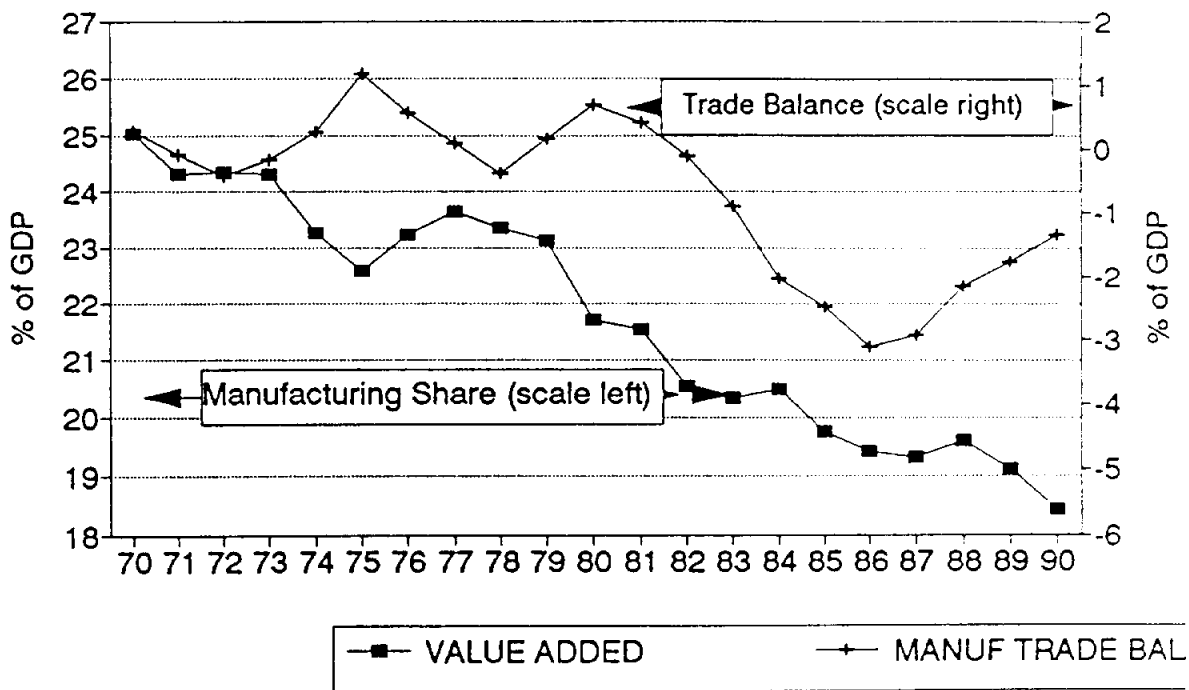
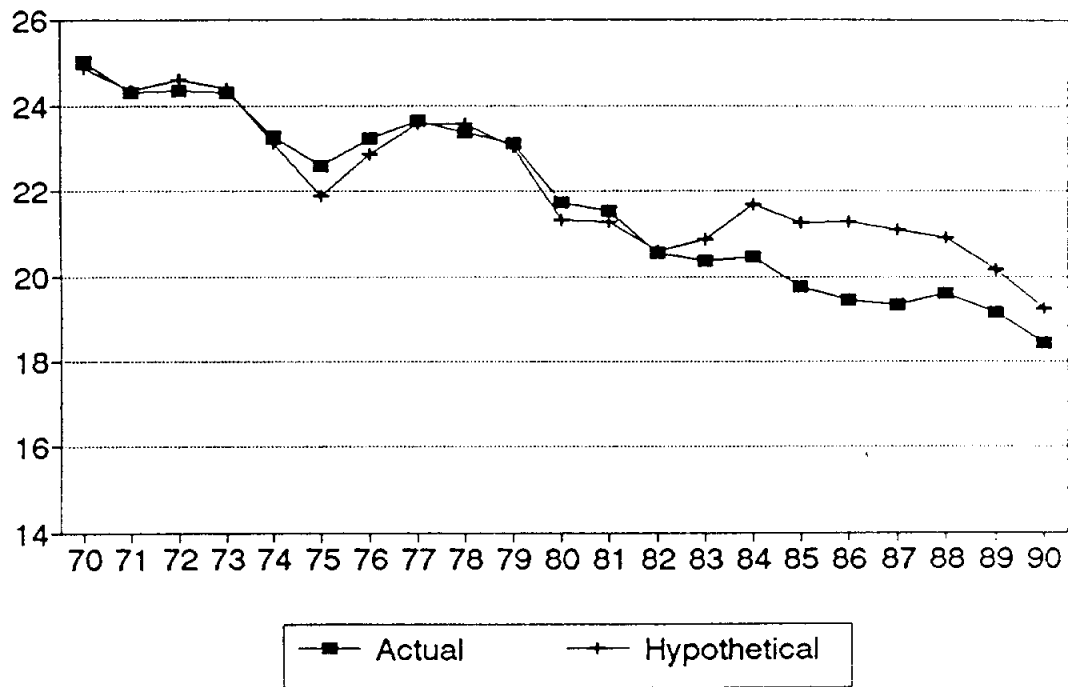# MANUFACTURING SHARE:
Employment and Value-added

| | Employment | Value-Added in GDP |

ch2

MANUFACTURING SHARE IN GDP:
VALUE ADDED & TRADE BALANCE

Trade Balance (scale right)

Manufacturing Share (scale left)

% of GDP

% of GDP

70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

■ VALUE ADDED   + MANUF TRADE BAL

ch3 MANUFACTURING SHARE OF GDP
(Actual and Hypothetical)

Legend: Actual ─■─   Hypothetical ─+─

4

SHARE OF GOODS IN US SPENDING
(Current and Constant Dollars)
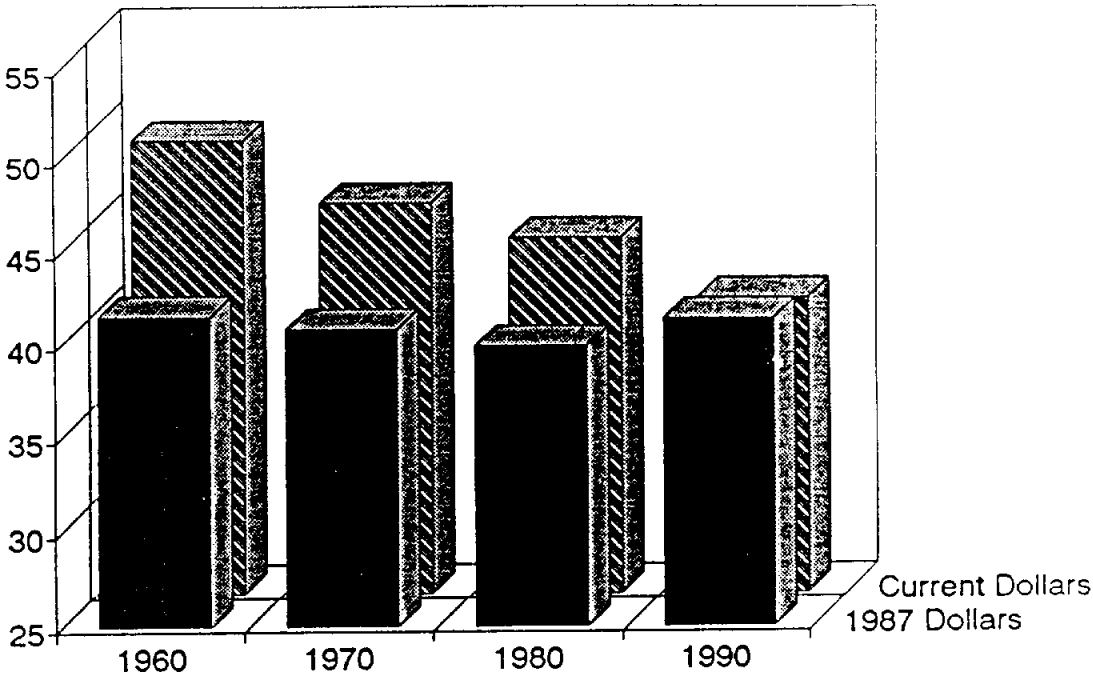
cht5

OUTPUT PER HOUR
(1987 DOLLARS)

MANUFACTURING
NON MANUFACTURING

1979=100

135
130
125
120
115
110
105
100
95

77   78   79   80   81   82   83   84   85   86   87   88   89   90   91
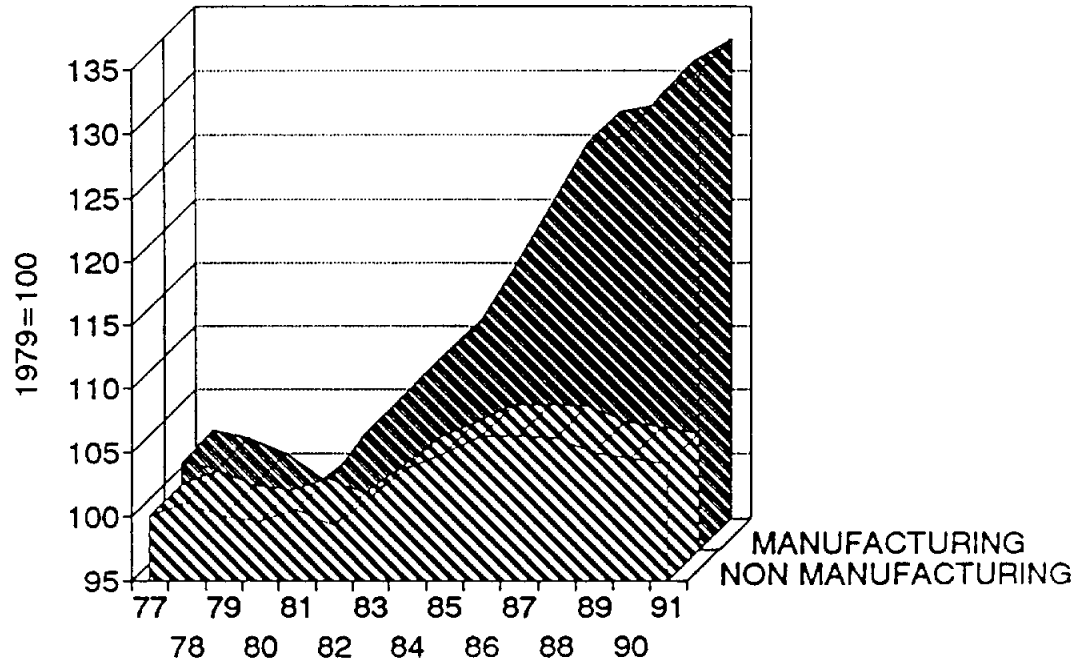
US TERMS OF TRADE
(Fixed Weight,1979=100)

cht6
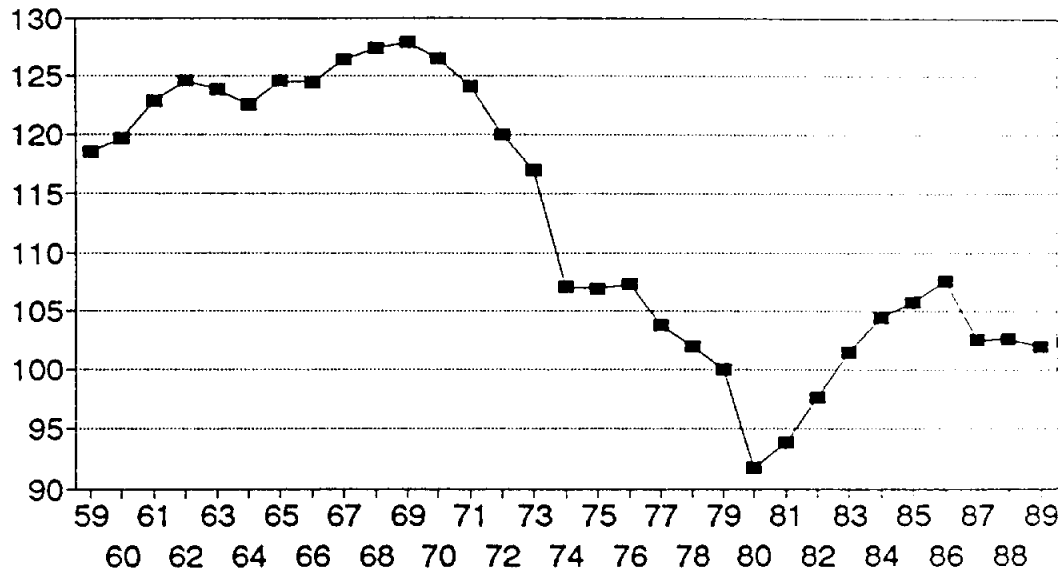
Terms of Trade

GNP & COMMAND GNP
AV. ANNUAL GROWTH PER HOUR

GNP/HOUR	COMMANDGNP/HOUR

Skilled workers

Total supply
of skilled
workers

E
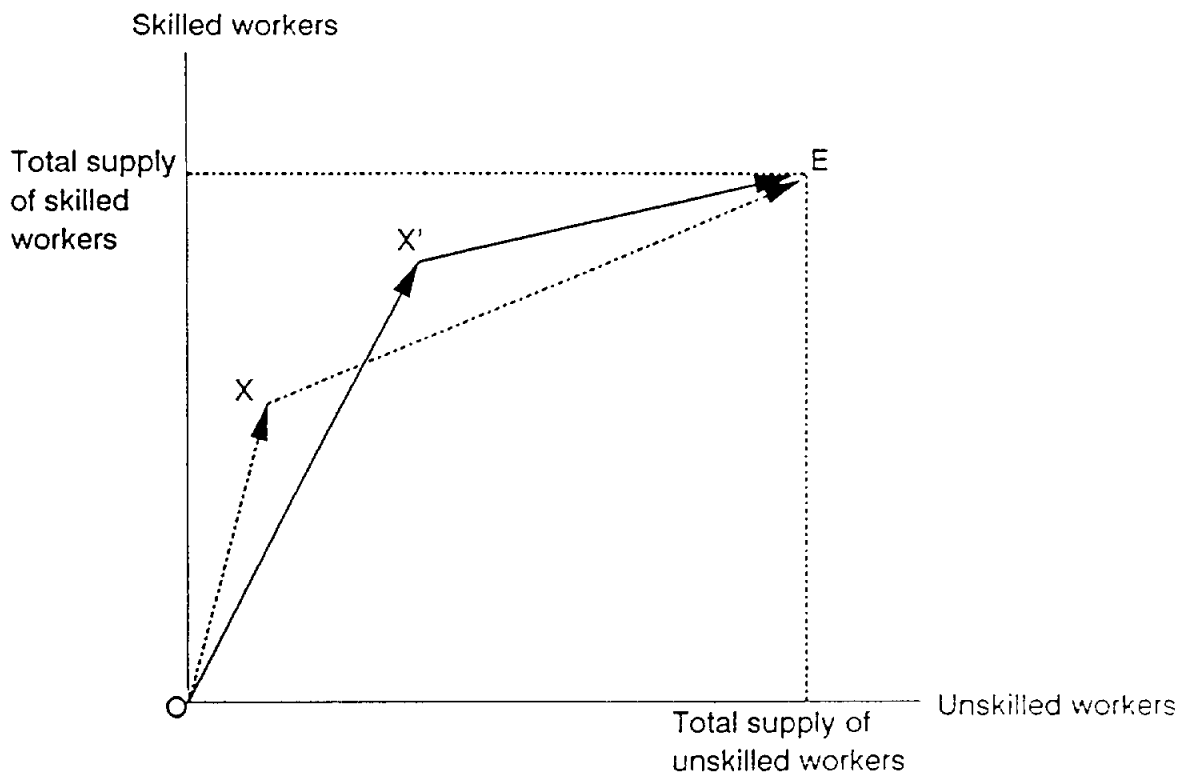
X'

X

O

Total supply of
unskilled workers

Unskilled workers
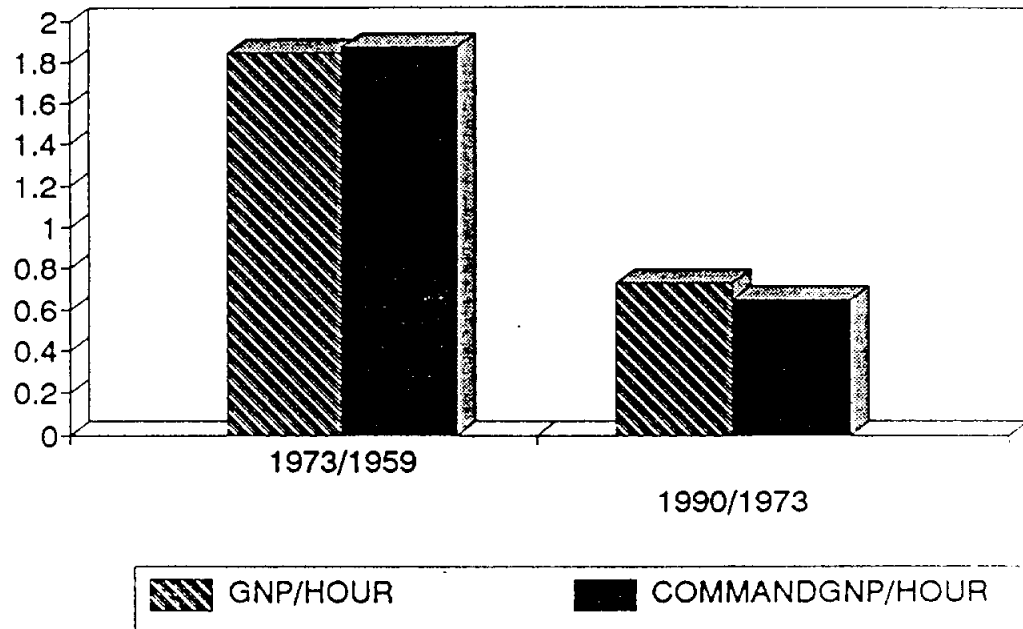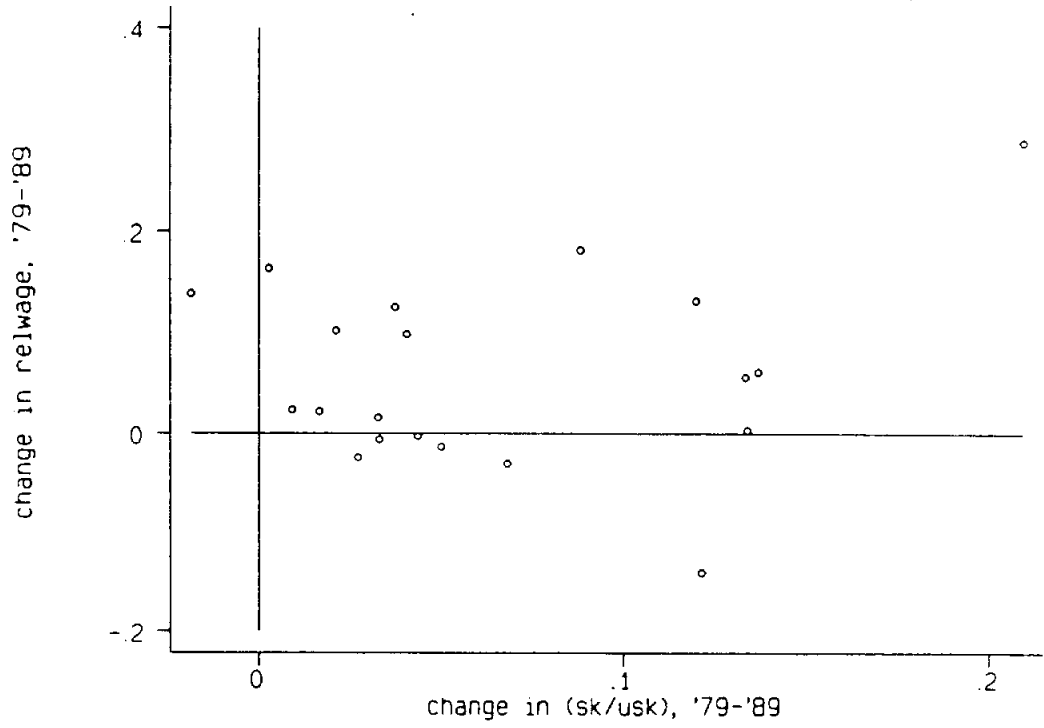
FIGURE 8

d(relative wages) vs. d(relative employment), 2-digit SIC

CHART 9

d(relative employment) vs. (sk/usk) in 1979, 2-digit SIC

CHART 10