U.S. Wage Trends in the 1980s: The Role of International Factors

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United States wage performance has been disquieting. Between 1979 and 1993, real hourly compensation rose by just 5.5 percent. This poor average wage performance has been associated with a dramatic increase in the dispersion of earnings: both in the returns to general characteristics such as education, experience, and occupation and in earnings across workers with similar educational, experience, and occupational characteristics.[1] In this paper I will consider briefly the evidence on the role that U.S. international performance has played in these outcomes.

AVERAGE WAGES

Three internationally related explanations have been advanced to account for the poor average growth in U.S. wages over the 1980s. These can be described as deindus-

trialization, relative decline, and factor-price equalization. But the evidence supports none of these explanations. Instead, poor average compensation reflects the sluggish rise in U.S. labor productivity, which results from poor productivity performance outside the manufacturing sector.

DEINDUSTRIALIZATION

The deindustrialization hypothesis suggests that the U.S. trade deficit in manufactured goods has eroded the supply of highly paid manufacturing jobs. But the job content of the U.S. manufacturing trade deficit that emerged over the 1980s is simply too small to allow the explanation for slow average wage growth to be the loss of high-paying manufacturing jobs due to trade. In 1991, the trade deficit was equal to about 5 percent of value-added in manufacturing. Average hourly earnings in manufacturing were 8.2 percent higher than those in the private sector generally. (Average weekly earnings were 29 percent higher.) Since manufacturing accounted for 17 percent of total employ-

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ment, shifting an additional (.05 * 17) 0.85 percent of employment to manufacturing would have raised average hourly and weekly wages by 0.07 and 0.25 percent, respectively—an amount scarcely large enough to explain the poor wage performance of the 1980s.

DECLINE

Nor is there support for the decline hypothesis. Stafford and Johnson suggest that an erosion of the rents from U.S. technological leadership explains the slow growth in U.S. wages over this period. But such an erosion in the international buying power of U.S. wages (and profits) should be associated with a decline in the terms of trade. However, while there is evidence of such a decline in the 1970s, over the 1980s, the broadest measure of the terms of trade—using the GDP deflators for exports and imports of goods and services—shows an improvement of 5.2 percent, while the fixed-weight price measures show an increase of 1.5 percent.

FACTOR PRICE EQUALIZATION

Finally, the claim of factor price equalization for all U.S. wages put forward by Leamer (1991) also does not stand scrutiny. U.S. compensation per worker actually increased in line with output per worker. When nominal compensation is deflated by a production price index (in this case the business sector GNP deflator) rather than by the consumer price index, this "production wage" closely tracks the growth in output per worker from 1979 to 1991. If the factor price equalization between wages and capital was occurring, real product wages would be growing more slowly than productivity.[2]

The evidence instead indicates that had American workers chosen to consume the products they produced, their real compensation would have increased by about 10 percent over the 1980s—about as much as output per worker in the business sector. However, as elaborated in Lawrence and Slaughter (1993), real wage growth lagged behind productivity growth for two main reasons: (a) much of the productivity growth occurred in industries producing capital goods such as computers, which workers do not generally buy, and (b) the relative price of housing

(which workers consume but do not produce) rose. International trade played no role in this poor average wage growth.

INCREASING DISPERSION

Other analysts have suggested that trade (or globalization) helps explain the growing inequality in U.S. wages. In particular, they point to the correlation between rising wage inequality and the growing U.S. trade deficit (Murphy and Welch 1992; Borjas and Ramey 1993). Many argue that trade with developing countries is putting downward pressure on the relative wages of unskilled workers.

QUANTITIES

Studies that have tried to quantify the relationships more precisely, however, have generally concluded that the impact of trade is small. In particular, Borjas, Freeman, and Katz (1992, p.237) estimate the quantities of educated and uneducated labor embodied in U.S. manufactured goods exports and imports. They conclude that trade flows explain at most 15 percent (that is, 1.9 percentage points) of the 12.4 percent increase between 1980 and 1988 in the earnings differential between college-educated workers and their high-school-educated counterparts. Since the trade deficit has declined considerably since 1988, a similar estimate today would yield smaller effects.

U.S. imports from developing countries did increase rapidly over the decade, but again what needs to be borne in mind is the magnitude. In 1990, for example, these imports amounted to $115.8 billion, or 2.1 percent of U.S. GNP, versus 1.2 percent in 1981. It is hard to see how a change of this magnitude—less than 1 percent of GNP—could have a large impact on the overall labor market.[3] Jeffery Sachs and Howard Shatz (1994) estimate that trade with developing countries reduced U.S. manufacturing employment by 5.7 percent between 1978 and 1990—a number that is just over 1 percent of aggregate U.S. employment. They find that such trade induced a 6.2 percent decline in production worker employment in manufacturing and a 4.3 decline in nonproduction workers, suggesting little impact on the economy-wide relative demand for these two occupational categories.[4]

PRICES

There is a problem in using ex post trade flows to make these calculations. Such flows do not necessarily capture the effect of price pressures that operate through trade.[5] If international competition forced U.S. workers to lower their wages, for example, domestic firms might be able to prevent imports from rising. By examining only trade flows, as these calculations do, we would conclude that trade had no impact on wages. In principle, therefore, even if trade flows are small, changes in traded goods prices could have large effects on the prices (and thus factor returns) of domestically produced substitutes. As Bhagwati (1991) has emphasized, relative price changes are the critical intervening variable in the chain of causation from trade to factor prices.

If trade lowered the relative wages of unskilled workers, according to the Stolper-Samuelson theorem, we would expect to see a decline in the relative price of goods that are produced using unskilled labor relatively intensively. In Lawrence and Slaughter (1993), however, my coauthor and I find that over the 1980s, the relative import and export prices of unskilled-labor-intensive goods actually increased slightly.

As might have been anticipated given its surprising conclusions, our work has been attacked. Sachs and Shatz (1994) raise questions about our use of the price data. In particular, they argue that computer prices should not be included in the sample. When they drop computers, they obtain a negative but statistically insignificant relationship between import price changes and skill intensity and they note that the size of the effect is small. Similarly, if computer price changes are omitted, the ratio of manufacturing producer prices weighted by production worker employment to prices weighted by nonproduction workers falls slightly instead of rising slightly. While we would agree that computer prices are difficult to measure, we are not convinced that this sector should be given no weight at all in the explanation. Even accepting their evidence indicates only a small relative decline in the prices of unskilled-labor-intensive products.[6]

Moreover, in Lawrence (1994) I report similar investigations of the price behavior of both German and Japanese imports and producer prices. These data tell the same story: when price changes over the decade of the 1980s are regressed against the ratio of unskilled to skilled employment, they indicate a positive rather than negative relationship (which is statistically significant in the case of wholesale prices but not import prices). Similarly, when industry wholesale and import prices for both countries are weighted by production worker shares, they show larger increases (or smaller declines) than when weighted by nonproduction workers. These results are robust to including or dropping computer prices from the samples.

In Lawrence and Slaughter we also noted that if trade was the operative factor, we would expect to see a contraction in labor-intensive industries, but we would also expect to see the remaining sectors taking advantage of this labor by using unskilled labor relatively more intensively. In fact, throughout U.S. manufacturing, there has been a pervasive upward shift in the ratio of skilled to unskilled labor.[7] Our conclusion, therefore, is that the simple Stolper-Samuelson process due to trade does not provide an adequate account of the growing wage inequality. Instead, we interpret the evidence as consistent with a bias in manufacturing technology toward the more intensive use of skilled labor. Our conclusion is supported by Berman, Bound, and Griliches (1992) and Bound and Johnson (1992), who find that trade played basically no role in America's wage changes in the 1980s and ascribe these changes to technological change and changes in unmeasured labor quality.

Mishel and Bernstein (1994) question whether the shift toward the relatively more intensive use of skilled labor in the 1980s is any greater than it was in earlier decades. In fact, the shift toward the more intensive use of nonproduction labor in the 1980s was both larger and more pervasive than in the 1970s and 1960s. As I elaborate in Lawrence (1994), the average decrease in the ratio of production to nonproduction workers across three-digit industries was 18.47 percent in the 1980s, compared with 6.9 and 7.23 percent in the 1960s and 1970s, respectively. Of course an increase in the manufacturing average could reflect a change in either the mix of industries or the ratio within industries. Both factors were at work. However,

69.7 percent of the shift occurred within industries. Since this shift occurred even though relative wages of nonproduction workers actually increased, it is strongly suggestive of a skilled-labor-using technological shift that was concentrated in the skill-intensive sector of manufacturing.

EVIDENCE FROM U.S. MULTINATIONALS
Additional support for these conclusions can be found in an examination of U.S. multinational data (Table 1) (Lawrence 1994). It is widely perceived in the United States that many of the jobs formerly in these firms have moved abroad. Drawn by low labor costs and low labor standards, multinational corporations are seen as having relocated their production toward low-wage countries. In particular, the jobs of blue-collar workers are viewed as vulnerable to this development. Such international outsourcing could, in principle, provide an alternative explanation of the widespread decline in *both* relative blue-collar wages and the ratio of blue- to white-collar workers employed in U.S. manufacturing.

If outsourcing is important, the decline in blue-collar intensity in the United States should be associated with an increase in blue-collar intensity abroad. In addition, as viewed through the eyes of the Stolper-Samuelson paradigm, if developing countries lower their trade barriers and increase their specialization in unskilled-labor-intensive products, the relative wages of production workers should rise in developing countries, while in developed countries they should fall. On the other hand, if global changes in technology are dominant, we should see *parallel* increases in the ratio of blue- to white-collar employment in the United States and in the rest of the world and similar movements in wages.

The ratio of production to nonproduction workers employed in U.S. manufacturing operations worldwide has fallen precipitously. Indeed, the declines are of similar magnitude in U.S. manufacturing parents (-15.7 percent) and in their affiliates in developing countries (-13.6 percent). The declines have been particularly large in Europe (-24.2 percent) and in Australia, South Africa, and New Zealand (-19.1 percent). In addition, the relative wages of production workers have fallen worldwide—in U.S. subsidiaries

in both the developed and the developing economies. The picture that emerges supports the notion of a common shift in technology rather than the notion of expanding trade. *Worldwide* (in both developed and developing countries), we see a rise in the relative employment of nonproduction workers despite the increase in their relative wage.[8]

TECHNOLOGICAL CHANGE
Mishel and Bernstein question whether this change in skill intensity should be described as technological change. They find an absence of evidence indicating an association with investment and other hard measures of technical change such as research and development, capital accumulation, and computerization, and they stress the importance of distinguishing developments in manufacturing from those in the rest of the economy.

Both the points they make are important. First, if this evidence is correct, those arguing for a major role for technology must apply a broader interpretation that includes new labor-management relations and work organization. Second, the divergent productivity performance between the manufacturing and services sectors in the United States is a major structural feature of the U.S. economy in the 1980s. Historically, relative productivity growth was faster in goods than in services. But this difference widened in the 1980s, when almost all the improvement in total factor productivity in the business sector was confined to manufacturing (Gullickson 1988). If the demand for manufacturing goods is inelastic, relatively rapid increases in manufacturing productivity will reduce the demand for manufactured goods workers. With no bias in this change, since production workers are relatively intensively employed in manufacturing, this will reduce the demand for production workers. In combination with a shift within manufacturing toward production-worker-saving technical change concentrated in nonproduction worker sectors, the impact on relative wages could be considerable.

There remains the issue of whether technological change itself has been affected by trade. It is noteworthy that while U.S. productivity growth in manufacturing recovered in the 1980s, it did not exceed the pace it had

achieved before 1973. This could reflect a spur from international competition offsetting a more general slowdown, or it could simply reflect a return to previous performance. More generally, however, the links between trade pressures and productivity growth have not been adequately explored.

U.S. MULTINATIONALS

| | Employment Figures (000s) | | | | | | | | | Employment Ratios | | | Compensation Ratios | | |
| | Total | | | Production Workers | | | Nonproduction Workers | | | Production Worker Employment/ Nonproduction Worker Employment | | | Production Worker Compensation/ Nonproduction Worker Compensation | | |
	1977	1989	Percent Change	1977	1989	Percent Change	1977	1989	Percent Change	1977	1989	Percent Change	1977	1989	Percent Change
THE UNITED STATES[a]															
Total[b]	67,344	90,644	34.6	55,179	73,474	33.2	12,165	17,170	41.1	4.54	4.28	-5.7	-[c]	-[c]	-6.8
Manufacturing	19,682	19,426	-1.3	14,135	13,257	-6.2	5,547	6,169	11.2	2.55	2.15	-15.7	N.A.	N.A.	-
MULTINATIONALS[d]															
Total	18,885	18.765	-0.6	N.A.	N.A.	-	N.A.	N.A.	-	N.A.	N.A.	-	N.A.	N.A.	-
Manufacturing	11,775	10,127	-14.0	7,257	N.A.	-	4,518	N.A.	-	1.61	N.A.	-	0.78	N.A.	-
FOREIGN AFFILIATES[e]															
Majority-owned manufacturing affiliates in:															
Developed countries	2,754	2,167	-21.3	1,695	1,196	-29.5	1,059	971	-8.3	1.60	1.23	-23.1	0.75	0.66	-10.8
Canada	562	455	-19.2	358	274	-23.5	204	181	-11.5	1.76	1.52	-13.6	0.86	0.81	-5.2
Europe	1,951	1,509	-22.6	1,202	828	-31.1	749	681	-9.1	1.60	1.22	-24.2	0.70	0.63	-10.0
Japan	40	75	86.6	14	23	62.0	26	52	99.7	0.53	0.43	-18.9	0.75	0.69	-8.5
Australia/New Zealand/ S. Africa	201	129	-35.8	122	71	-41.3	80	58	-27.4	1.53	1.23	-19.1	0.78	0.68	-12.5
Developing countries	1,019	1,079	5.9	675	679	0.6	344	400	16.4	1.96	1.70	-13.6	0.47	0.41	-12.8
Total	3,773	3,247	-14.0	2,371	1,875	-20.9	1,403	1,371	-2.2	1,69	1.37	-19.1	0.68	0.59	-14.2
Majority-owned manufacturing affiliates in:															
Food & kindred products	377	308	-18.5	248	184	-25.9	129	124	-4.2	1.93	1.49	-22.7	0.57	0.62	9.8
Textile products & apparel	102	82	-19.5	80	59	-27.2	21	23	9.3	3.78	2.52	-33.3	0.47	0.59	23.7
Chemicals & allied products	464	475	2.2	233	227	-2.5	231	247	6.9	1.01	0.92	-8.8	0.71	0.64	-9.1
Primary & fabricated metals	229	179	-21.9	158	117	-26.1	71	62	-12.5	2.23	1.88	-15.6	0.80	0.73	-9.4
Machinery, except electrical	523	508	-2.9	270	254	-6.0	253	254	0.4	1.07	1.00	-6.4	0.61	0.59	-3.9
Electric & electronic equipment	629	455	-27.7	422	288	-31.8	207	167	-19.3	2.03	1.72	-15.5	0.56	0.54	-4.3
Transportation equipment	740	597	-19.4	507	365	-28.0	233	231	-0.9	2.17	1.58	-27.3	0.97	0.61	-37.2
Other manufacturing	709	645	-9.0	452	382	-15.5	257	263	2.3	1.76	1.45	-17.4	0.75	0.59	-21.0
Total	3,773	3,247	-14.0	2,371	1,875	-20.9	1,403	1,371	-2.2	1.69	1.37	-19.1	0.68	0.59	-14.2

[a] Labor force totals according to the U.S. Department of Labor, *Employment, Hours, and Earnings, United States, 1909-90,* vol. 1.

[b] Figures for private nonfarm establishments. The total nonfarm figures are: 1977–82.471 million; 1989–108.413 million.

[c] The compensation ratio for total U.S. employment is a comparison of the white-collar/blue-collar cost indices in 1977 and 1989, as published by the Bureau of Labor Statistics.

[d] According to and based on U.S. Department of Commerce publications: *1977 U.S. Direct Investment Abroad*; *1989 U.S. Direct Investment Abroad.* Information is for nonbank U.S. parents of nonbank U.S. affiliates.

[e] Classified by industry of affiliate. According to the Department of Commerce publications referenced above.

SPECIFIC FACTORS

Wages will reflect the returns to both general and firm-and/or industry-specific human capital. Those invoking theoretical frameworks such as that of Hecksher-Ohlin implicitly have in mind explanations of changes in the returns to general human capital. To argue, as we have done, that there is little evidence in support of the Hecksher-Ohlin framework, therefore, should not be interpreted to mean that trade has had no impact on the returns to industry-specific capital. In fact, early work by Lawrence and Lawrence (1985) and later work by Revenga (1992) and Borjas and Ramey (1993) suggest that trade has had some impact on relative industry rents.[9] Thus, trade performance has an impact on specific returns and rents but the degree to which these effects are associated with more general attributes remains unclear.

CONCLUDING COMMENTS

Why U.S. productivity growth in services has risen so slowly since 1973 remains a great mystery. But taking this performance as given, there is no mystery in the slow growth in average U.S. compensation. A complete accounting of the growing dispersion in U.S. wage performance requires the integration of many different factors, and the size of the changes suggests that a variety of causes could be important. In this short note, however, I have concentrated on the role of international trade and investment. I conclude that trade has had some impact on relative industry wages but provides little explanation for the growing dispersion in the returns to general factors such as education, skill, and occupation. Certainly, support for those invoking the factor-price equalization theorem is very weak.

ENDNOTES

l. Bound and Johnson (1992) found that between 1979 and 1988, the ratio of the average wage of a college graduate to the average wage of a high school graduate rose by 15 percent. Steven Davis (1992) found that between 1979 and 1987, the ratio of weekly earnings of males in their forties to weekly earnings of males in their twenties rose by 25 percent. The employment cost index indicates that between December 1979 and December 1992, the growth of compensation and earnings of white-collar occupations exceeded that of blue-collar occupations by 7.9 and 10.9 percent, respectively. Katz and Murphy (1992) and John, Murphy, and Pierce (1993) emphasize the changes within industry-occupation cells.

2. In addition to arguing that trade has reduced average U.S. wage rates, Leamer (1991) argues that trade has lowered the relative wages of unskilled workers. This claim will be discussed below.

3. U.S. exports to developing countries have also grown rapidly. Over the 1980s, the U.S. trade deficit in manufactured goods trade with developing countries swung by $45.55 billion or 8/10 of a percent of GDP.

4. Adrian Wood (1994) has questioned the use of developed country input coefficients for imports from developing countries.

5. Deardorff and Staiger (1988) demonstrate the conditions under which this methodology is appropriate. It is necessary that both preferences and production technology are Cobb-Douglas.

6. Sachs and Shatz also claim on the basis of their regressions omitting the computer industry that there was a negative relationship between total factor productivity growth and skill intensity. They conclude "TFP growth was less on average in high-skilled than low-skilled industries" and argue that technological change was therefore causing wage differentials to narrow rather than widen. Again, the impact of the computer industry is important. In Lawrence and Slaughter, we found that, including computers, the gap between weighted averages of high-skilled and low-skilled productivity growth was positive, and thus concluded the impact was the opposite.

8. Davis (1992) similarly rejects the prediction that relative factor prices are converging internationally.

9. The international evidence is more mixed. Using an international sample, Martins (1993) finds import penetration reduces relative wages in competitive sectors such as textiles and clothing but actually increases relative wages in sectors with product differentiation. Wyploz (1994) obtains similarly complex results.

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