"Summary of article by George J. Borjas and Valerie A. Ramey: The Relationship Between Wage Inequality and International Trade" in Frontier Issues in Economic Thought, Volume 5: The Political Economy of Inequality. Island Press: Washington DC, 2000. pp. 313-316

Social Science Library: Frontier Thinking in Sustainable Development and Human Well-being

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Wage inequality in the U.S., by virtually any measure, began an unprecedented rise in the late 1970s. The change is primarily due to the deterioration of the real wages of less educated and experienced workers, not to gains by those at higher levels. Many explanations for increasing wage inequality have been proposed, including the shift away from manufacturing toward service industries, the effects of international trade or immigration, the decline in unionization and the fall in the real value of the minimum wage, and a decline in the level of skills supplied by the American educational system. The residual inequality that cannot be accounted for by these factors is often attributed to "skill-biased technological change."

This article presents a version of the argument that trade is a major cause of wage inequality. It demonstrates empirically that the trend in wage inequality parallels the U.S. trade deficit in durable goods, and suggests that in theoretical terms, import competition would be expected to have a particularly strong effect on wages in concentrated industries, such as those found in many branches of durable manufacturing. Finally, it shows that evidence on wage trends in selected industries lends additional support to the theory.

Trends in Trade and Inequality

The empirical analysis of wage inequality is based on annual Current Population Survey data for 1963 to 1988, for samples of adult men who worked full-time year-round, and were not self-employed or unpaid. In each year, average wages were estimated for each of four groups - high school dropouts, high school graduates, those with some college, and college graduates. Inequality is then measured by the wage ratios between groups, e.g. the ratio of average wages for college graduates vs. high school graduates, or college graduates vs, high school dropouts. Both of these measures display similar patterns, rising slightly in the 1960s, remaining roughly constant for most of the 1970s, and then rising rapidly in the 1980s.

The goal of this section of the article is to identify trade-related data series that move in parallel with the measures of inequality. Because the analysis involves time series with nonzero trends, there is a danger of being misled by spurious correlations between actually unrelated series. Recent developments in econometrics, involving the analysis of "cointegration," address this problem; the article contains an accessible summary of these developments and references to more detailed texts.

For readers who are not interested in pursuing the cointegration problem, the authors' argument can be seen in a series of three graphs. The graphs compare the college graduate-high school dropout wage ratio to the U.S. trade deficit in services, nondurable goods, and durable goods (as a percentage of GDP). The wage premium for education has essentially no relationship to trade in services, and only a weak or inconsistent relationship to trade in nondurables. In contrast, there is a close relationship between the wage premium and the net imports of durable goods.

Statistical analysis confirms and elaborates the impression created by these graphs. Only the relationship of the wage premium to trade in durable goods passes the test of cointegration (i.e., avoids the problem of spurious time series correlations). Separate examination of durables exports and imports shows that the increase in inequality caused by imports is greater than the decrease in inequality due to the same amount of exports.

Changes in durables imports and exports precede and appear to cause (in technical jargon, "Granger-cause") changes in the wage premium; the reverse relationship does not hold. Finally, the relationship between trade in durables and the wage premium was similar before and after 1980. That is, the relationship estimated on the basis of data for 1963-1979, if applied to the actual trade figures for the 1980s, predicts the pattern of inequality in the 1980s quite accurately.

A Model of Wages and Employment Rents

The differential effect of trade in durables on wage inequality is difficult to explain in terms of standard trade theory. Durable goods industries use skilled labor more intensively than other goods-producing industries, so one might expect that import competition in durables should weaken the relative position of more highly skilled workers. Yet in fact, the exact opposite occurs.

Why does an increase in net imports of durable goods weaken the relative position of low-skilled workers? Two distinguishing characteristics of durable goods industries are relevant to this question. First, industries producing durables tend to be more concentrated than other industries. Second, workers in more concentrated industries tend to earn higher wages, for any given level of skills. This is in part because more concentrated industries are more likely to be unionized, but there is an effect independent of unions as well. There is an industry rent in concentrated industries, a portion of which is received by workers.

These facts provide the basis for a plausible explanation of the statistical results discussed above. Most workers in manufacturing are either high school dropouts or graduates. Those in more concentrated industries, where there are higher rents, earn higher wage premiums relative to the average for their skill levels. When foreign firms enter the market, they capture a portion of the industry rents and reduce the wage premium formerly enjoyed by American manufacturing workers. The reduction occurs both because import competition leads to wage reductions for those who remain in the industry, and because it drives some workers into other, lower-paid industries. Foreign competition in low-wage industries, in comparison, matters less for overall inequality trends, because the workers there have less to lose. A mathematical model in the article offers a rigorous demonstration of these arguments.

Trends in Labor Compensation in Key Industries

The theoretical model discussed in the previous section implies that when import competition affects durable goods industries, their wage bill, or total employee compensation, should decline - at least as a percentage of aggregate employee compensation in the economy as a whole. If this model correctly describes the mechanism by which import competition causes wage inequality, then the trend in employee compensation in durable manufacturing should parallel the measures of inequality, such as the college-high school dropout wage premium. At first glance, this relationship does not hold. The wage bill in durable manufacturing parallels the college-high school dropout wage premium only very approximately; the two series fail the cointegration test for a meaningful relationship.

In reality, however, only a few durable goods industries account for most of the volume of trade. Three industries -- motor vehicles and parts, capital goods (largely nonelectric machinery), and primary metals -- account for a significant fraction of all durable imports and exports. Metal mining, though not part of manufacturing, is similarly affected by trade in durables because so much of the demand for its output comes from the same three industries. The trend in employee compensation in the four industries, three manufacturing sectors plus metal mining, is quite similar to the trend in the college-high school dropout wage premium. The cointegration test confirms the existence of a meaningful relationship in this case; the same is true, somewhat more weakly, when using the four industries and the college-high school graduate premium.

These final statistical tests suggest that import competition in just four industries could be responsible for trends in the educational wage premiums. It may be hard to believe that such a small set of industries could have such a tremendous impact; however, the industries involved are not small ones. The trade deficit in motor vehicles and parts alone amounts to one percent of GDP, and the automobile industry is one with substantial rents. A large part of the trade deficit, then, represents oligopoly rents shifted to foreign producers. Moreover, there may be important spill-over effects, through both income effects and upstream linkages from the affected industries, that magnify the effect on wage inequality.