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DOES FOREIGN TRADE BENEFIT THE

AMERICAN WORKING POOR?

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ABSTRACT

In accounting for secular trends in income inequality, most research has centered on supply side explanations. In this paper we look instead at the demand side and particularly at one component of aggregate demand, foreign trade. Changes in product demand affect the distribution of labor earnings by changing the derived demand for different skill classes of labor. Our attention will be focused on one skill class, the unskilled, many who make up the so-called working poor. Three questions will be analyzed: 1) What is the unskilled labor intensity of American exports relative to other components of final demand? 2) what is the unskilled labor intensity of American exports relative to American imports? and 3) has the changing composition of American exports and imports worked to the benefit or detriment of the American working poor?

DOES FOREIGN TRADE BENEFIT THE AMERICAN WORKING POOR?

1. Demand Mix and Income Inequality

In accounting for secular trends in income inequality most research has centered on supply side explanations such as changes in the distribution of human capital or demographically induced labor supply changes. Focusing instead on the demand side of the market, one possible alternative explanation for inequality trends can be found in the changing composition of final demands. The production of individual commodities within the final demand vector are intensive in the use of different factors of production. Some goods, e.g., autos, are intensive in the use of physical capital while others, e.g., apparel, are intensive in the use of labor. Factor intensities in production also vary with respect to different types of labor. Analogous with the use of physical capital, some commodities use relatively more human capital, i.e., skilled labor, while others are intensive in the use of unskilled labor. The 'pre-fisc' distribution of labor earnings is determined by the number of workers in each type of skill group, their respective wage rate, and number of hours worked. Changes in the composition of final demands work to change the distribution of labor earnings by altering the derived demands for, and,

therefore, the number employed, hours worked, or the wage rates for different skill classes. If the secular shift in the composition of final demands is biased in favor of those commodities intensive in the use of skilled labor, we might plausibly expect to find rising rates of return being paid to skilled labor associated with increasing inequality as the incomes of the unskilled lag behind.

2. Foreign Trade and the Working Poor

The link between changing demand mix and secular trends in income inequality was recently examined in a paper by Williamson.[1] He attempted to identify several sources of change in the composition of domestic final demand and how, in turn, this would affect the share of income going to unskilled labor. Exports were excluded from the final demand vector, however, partly because they represent a relatively small per cent of total domestic production. In 1963, for instance, total exports were 5.5 per cent of G.N.P.[2] As he argued, a very dramatic shift in the composition of exports would be required to have an even perceptible influence on the derived demand for labor and thereby the distribution of labor earnings.

While foreign trade and exports in particular may not bulk large enough to affect the overall distribution of

income, they may have a significant impact on certain
geographic areas, industries and/or subgroups of the labor
force. Export related employment is not evenly distributed
across the economy. Of the 116 industries examined by
Eldridge and Saunders in a recent study, the nine
industries with the greatest number of export related jobs
accounted for nearly 40 per cent of all export employment
in 1970.[3] The leading two industries, crops and other
agricultural products and wholesale trade, accounted for
19 per cent of total export related employment. The
impact of these industries is heightened by their
relatively labor intensive nature. A different way to
highlight the selective impact of export related employment
is to compare the ratio of export related jobs to total
employment in various industries. In 50 of these 116
detailed industries, less than 5 per cent of industry
employment was related to merchandise exports in 1970.
However, in 30 industries this ratio fell in the 10-to-20
per cent range and the ratio of export related to total
employment exceeded 20 per cent in six industries.

The analysis in this paper will extend the work of
Eldridge and Saunders in several directions. First, they
did not distinguish between different types of labor
required by exports. Are exports intensive in the use of
any one kind of labor, unskilled or skilled labor for
instance? Secondly, they did not compute estimates of

the labor displaced by imports. As with exports, do
imports work to the disadvantage of any one particular
group of the work force? The particular subgroup of the
labor force focused on in this paper is the unskilled,
many who make up the so-called 'working poor'. About $1\frac{1}{2}$
million family heads who worked full time throughout 1968
did not receive an income large enough to put them above
the poverty line.[4] A nearly equal number of family heads
also engaged in some although not full time work and yet
remained below the poverty line. As with export related
employment, the working poor are not evenly distributed
across the industrial sectors of the economy. They are
instead concentrated in certain low wage areas such as
agriculture, retail sales, and certain non-durable consumer
goods industries, e.g., textiles and apparel. One method
to increase the incomes of the working poor would be to
increase the demand for the products they produce. As
shown by Eldridge and Saunders, export related employment
grew over 30 per cent between 1963 and 1972, compared
to 19 per cent for total private employment. If it
happened that those goods and services which are a large
part of U.S. exports were also intensive in the use of
unskilled labor, foreign trade could be a significant
factor in reducing the number of working poor. The
opposite situation is also possible, however. It may
well be that American exports favor skilled labor while

American imports are unskilled labor intensive. Then, as the volume of imports continues to grow, they would serve to displace domestic demand for unskilled American labor in favor of the foreign unskilled. In this case foreign trade would only make the reduction of poverty more difficult to achieve.

3. The Unskilled Labor Intensity of Exports

What is the unskilled labor intensity of American exports relative to the other major components of final demand? In his earlier paper, Williamson has already calculated the unskilled labor intensity of consumption, investment, and government expenditures. We use the data presented in that paper to do the same calculation for exports.[5] What is desired is a ranking of industries by their relative use of unskilled labor. The unskilled labor intensity for a given industry is measured as the unskilled wage costs per dollar of output. Specifically, the unskilled wages content of total costs (per unit of output) can be measured by

$$(1) \quad \Theta_j = \frac{W_j L_j}{C_j} \quad ,$$

where L_j is the reported annual man-hours in industry j, C_j is their total costs (including intermediate inputs) and W_j is the unskilled wage. To actually calculate

the Θ_j use was made of the static input-output model.
For the 78 sectors listed by the Department of Commerce
in their 1963 input-output table, the direct and indirect
unskilled labor intensities were calculated. These are
reproduced as Table 1. Each item can be interpreted as
the payments impact on the working poor from a \$1
final demand expenditure on output of industry j. Call
this payments impact

$$(2) \qquad \overset{\curvearrowright}{\Theta}_j = \ell \hat{w} Q y_j,$$

where y_j is the final demand for j, Q is the Leontief
inverse matrix for 1963, ℓ is a vector of 1963 labor
coefficients, each element of which denotes the number
of persons engaged per dollar of the jth output, and $\hat{w}$
is the vector of 1963 unskilled wages, taken to equal
the annual earnings of farm laborers, assumed constant
across all j.[6]

To focus more clearly on the impact on the unskilled
of changes in the composition of demand, it is necessary
to aggregate the 79 sectors in Table 1 into more
meaningful final demand categories. This is done in
Table 2. Domestic production for 1963 is broken down
into consumption, investment, government and export
expenditures, denoted as $\overset{\curvearrowright}{\Theta}{}^f$. Exports are further broken
down into 8 subcategories. First, looking at the four
major components of final demand, exports are the least

Table 1. Payments Impact on Unskilled Labor, Direct and
Indirect, of $1 Purchase of Output from Industry j, 1963

Industry	$\overset{\sim}{\theta}_j$
1. Livestock	.2908
2. Crops	.2928
3. Forestry and Fishing	.2355
4. Agric. Services	.3022
5. Iron Mining	.1129
6. Nonferrous Mining	.1370
7. Coal Mining	.1934
8. Petroleum Mining	.1456
9. Stone and Clay Mining	.1689
10. Chemical Mining	.1549
11. New Construction	.2115
12. Maintenance Const.	.2193
13. Ord. and Accessories	.1742
14. Food	.2266
15. Tobacco	.1613
16. Textile Mills	.2353
17. Misc. Textiles	.1921
18. Apparel	.2858
19. Fabr. Textiles	.2576
20. Wood and Products	.2364
21. Wooden Containers	.2395
22. House Furniture	.2294
23. Office Furniture	.2238
24. Paper and Products	.1643
25. Paper Containers	.1782
26. Printing and Publishing	.1952
27. Basic Chemicals	.1442
28. Synthetics	.1458
29. Drugs and Soaps	.1605
30. Paints	.1535
31. Petrol Refining	.1262
32. Rubber Products	.1798
33. Leather Tanning	.2331
34. Shoes	.2592
35. Glass and Products	.1826
36. Stone and Clay	.1817
37. Iron and Steel	.1485
38. Nonferrous Metals	.1259
39. Metal Containers	.1739
40. Heating	.1769
41. Stampings Etc.	.1769
42. Hardware Etc.	.1760
43. Engines and Turbines	.1725
44. Farm Machinery	.1661
45. Constr. Equip.	.1717

Table 1 (cont.)

Industry	$\hat{\theta}_J$
46. Materials Hand. Equip	.1737
47. Metalworking Equip.	.1717
48. Special Ind. Equip.	.1674
49. General Ind. Equip.	.1719
50. Mach. Shop Prod.	.1732
51. Office Mach.	.1750
52. Service Ind. Mach.	.1769
53. Elect. Apparatus	.1840
54. Appliances	.1843
55. Light and Wiring Equip.	.1814
56. Communications Equip.	.1899
57. Electronic Components	.1873
58. Batteries Etc.	.1798
59. Motor Vehicles and Equip.	.1417
60. Aircraft and Parts	.1743
61. Trains and Ships	.1725
62. Instruments Etc.	.1718
63. Photo. Apparatus	.1617
64. Misc. Manufactures	.2036
65. Transportation	.1810
66. Communications	.1407
67. Radio and TV Broadcasting	.1715
68. Utilities	.1405
69. Trade	.2429
70. Finance and Ins.	.1114
71. Real Estate	.1104
72. Hotels and Pers. Serv.	.3289
73. Business Services	.2012
74. Auto Repair	.2591
75. Amusements	.2613
76. Medical and Education	.2580
77. Fed. Gov.	.2339
78. State and Loc. Gov.	.2423

Source: See Appendix and text for discussion of methods and sources.

Table 2: Payments Impact on Unskilled Labor, Direct and Indirect, of $1 Expenditures of Final Demand, 1963.

Final Demand Category	γ_θ^f
1a. Consumption	.1965
1b. Consumption (Excluding Services)	.2001
2a. Investment	.1980
2b. Investment (Including Med. and Ed.)	.2170
3. Total Government	.2395
4. Exports	.1922
4.1 Agriculture, Forestry, and Fishing	.2915
4.2 Mining	.1681
4.3 Manufacturing	.1725
4.4 Transportation, Communication	.1798
4.5 Wholesale, Retail Trade	.2429
4.6 Finance, Real Estate	.1104
4.7 Services	.2399
4.8 Government Enterprises	.2339

Source: The underlying $\tilde{\theta}_\gamma$ are taken from Table 1. Items 1a.-3 are from Williamson.(1976). The final demand weights used to aggregate up to these export expenditure categories are from Input-Output Structure of the U.S. Economy: 1963, Table 1, p.35, reprinted in November 1969 Survey of Current Business.

unskilled labor intensive, although the variation is
relatively small. Within exports, however, the variation
in unskilled labor intensity is considerably greater,
the unskilled labor intensity of the agriculture,
forestry, and fishing sector is in fact close to three
times that of the finance and real estate sector. As
Williamson has noted with components of domestic demand,
variation in unskilled labor intensity is apparently
much greater within the export sector than between
exports and other final demand categories. It would
appear, at the aggregate level anyway, that the export
component of final demand is, if anything, moderately
biased against unskilled labor compared to the other
components of final demand. There are clearly some
sectors in American export trade that are intensive in
the use of unskilled labor. The results in Table 2
would indicate, however, that those industries character-
ized by high ratios of export related jobs to total
employment are <u>not</u> the same as those industries intensive
in the use of the working poor.

4. <u>Exports, Imports, and the Leontief Paradox</u>

Whether the American working poor benefit from
foreign trade depends on the additional unskilled labor
demanded for export production versus the unskilled

labor displaced by imported goods. Another way to ask
this question is, what is the unskilled labor intensity of
American exports versus American imports? The question
of factor proportions in foreign trade has received an
extensive treatment in trade theory. The Hecksher-Ohlin
theorem states that a country's exports use intensively
the country's relatively abundant factors while its
imports are intensive in its relatively scarce factors.
According to a textbook interpretation of the Hecksher-
Ohlin theorem, the U.S. should export relatively capital
intensive goods because its abundant supply of capital
gives it a comparative advantage in such products, and
by the same reasoning, U.S. imports should be relatively
labor intensive.[7]

This question of factor proportions in foreign
trade has been subject to considerable empirical
investigation. In a pathbreaking article, Leontief,
using his 1947 input-output table, found just the opposite
results as predicted from the Heckscher-Ohlin model.[8]
His calculations found U.S. exports required a lower
capital-labor ratio in their production than did U.S.
imports. A number of studies have since followed
seeking to 'explain' the paradox, focusing on such things
as the capital requirements of natural resource products
or the research and development content of commodities.
One line of research that has been extensively followed

centers on the notion of human capital. It has been argued that the human capital embodied in U.S. workers should be considered along with the physical capital stock. Several studies have shown that indeed U.S. exports are more skill intensive and education intensive than the U.S. imports.[9] Thus while the simple capital-labor version of the Heckscher-Ohlin theorem has been shown to be inadequate, by allowing for a third factor, human capital, the consensus seems to be that the Heckscher-Ohlin factor proportions theory of trade remains largely valid. A clear implication of the "revised" Heckscher Ohlin theorem is, then, that American imports should be more unskilled labor intensive than American exports.

The unskilled labor intensities of American exports and imports for 1963 are presented in Table 3, as well as a more detailed breakdown by end use of product. It should be noted Table 3 is calculated using only merchandise exports and imports; complete data on imports by industry of origin is not given in the 1963 input-output table nor is separate trade data available for the transportation, finance and service sectors. Table 3 therefore includes the Agriculture, Forestry and Fishing, the Mining, and the Manufacturing industries given in Table 2, comprising somewhat over 75 per cent of total exports. A further caveat should also be mentioned.

Table 3: Payments Impact on Unskilled Labor, Direct
and Indirect, of $1 Expenditures of Merchandise
Exports and Imports, 1963.

End Use	Exports	Imports
Total	.1931	.1944
Food, Feed, and Beverage	.2713	.2564
Industrial Supplies and Materials	.1690	.1590
Capital Goods	.1742	.1757
Consumers Goods	.1968	.2339
Automobiles and Accessories	.1433	.1471
Ordnance	.1742	.1742

Source: The underlying θ_j are taken from Table 1.
The classification of input-output industries
by end use was taken from U.S. Exports and
Imports: Classified by OBE End-Use Commodity
Categories 1923-1968, A Supplement to the
Survey of Current Business, Dept. of Commerce,
1970. All export and import data come from
U.S. Exports and Imports As Related to Output,
Dept. of Commerce, 1958, 1963, and 1971 issues.

In the calculations that follow we assume the 1963
American input-output relationships characterize the
production of both domestic and foreign goods. Our
conclusions as to the relative unskilled labor intensity
of exports and imports are obviously dependent on the
validity of that assumption.

For 1963, we find American imports were more
intensive in the use of unskilled labor, though the
difference is negligible. The reason for the small
difference in unskilled labor intensities can be seen by
looking at the breakdown of exports and imports by end
use. For two sectors--Food, Feed, and Beverages, and
Industrial Supplies and Materials--American exports were
in fact more unskilled labor intensive. These two
sectors of production are characterized by a relatively
high ratio of natural resource inputs to total factor
inputs. In a second paper, Leontief found that when
he excluded 19 natural resource industries from his
calculations, the capital intensity of exports exceeded
that of imports.[10] Baldwin, among others, has explained
this result on the basis of two related observations:
a) part of American imports consist of natural resource
commodities not easily produced in the U.S., and b) the
production of these natural resource commodities are
capital intensive.[11] Our results, therefore, appear to
support these earlier studies.

These results would lead to three conclusions:
1) for 1963, we find only weak empirical confirmation
for the predicted factor intensities of American exports
and imports that comes out of the Heckscher-Ohlin model;
2) for certain subsectors of American imports there
appears to be a strong natural resource--capital
complementarity; and 3) at least in 1963, foreign trade
had a slight tendency to work to the relative advantage
of American skilled labor and foreign unskilled labor,
but against American unskilled labor.

5. The Changing Composition of Trade

Several researchers have found that since the early
1950's, the changing composition of American exports
and imports has had the effect of changing the factor
intensities of trade in the direction predicted by the
Heckscher-Ohlin theorem. Mitchell, for instance,
concludes that by 1970 the Leontief Paradox had
disappeared.[12] As further evidence of the shift in
exports towards capital intensive goods and imports
towards labor intensive goods, he notes that, while in
the early 1960's organized labor actively lobbied for
the removal of trade restrictions, by the late 1960's
organized labor was promoting the Burke-Hartke trade
bill to place quotas on imports.

If the composition of foreign trade has been moving
in such a way as to bring about the predicted relative
factor intensities of exports and imports, we would
expect to find the unskilled labor content of imports
increasing over time relative to exports. In Table 4
are presented the unskilled labor intensities of
merchandise exports and imports for the years 1958, 1963,
and the latest year for which data is available, 1971.
Also presented in Table 4 are the relative shares of each
end use category in total exports or imports for the
years 1958 and 1971 and the real rate of growth of
expenditures for each subcategory over the 1958-71
period. Because differential rates of price change among
the input-output industries may distort the relative
weights used to aggregate up to the total export or
import unskilled labor coefficient, it was necessary to
deflate the export and import data. For most of the
input-output industries price deflators could be derived
from one or more components of the Wholesale Price Index.
For two of the mineral producing industries, unit value
indexes were constructed from the quantity and
expenditure data given in the foreign trade sources.
For two industries, components of the Consumer Price
Index were used. Deflating imports by domestic price
indexes obviously introduces some degree of bias. An
additional assumption underlying Table 4 is that the

Table 4:   Payments Impact on Unskilled Labor, Direct and
           Indirect of $1 Expenditures of Merchandise
           Exports and Imports, 1958, 1963, 1971.

$\tilde{\theta}^f$	1958	1963	1971
Exports	.1900	.1931	.1891
Imports	.1963	.1944	.1845

End Use	Relative Share 1958	1971	% Rate of Growth
Food, Feed, Beverage			
Exports	.220	.208	.963
Imports	.349	.173	.438
Industrial Supplies and Materials			
Exports	.292	.258	.838
Imports	.505	.383	1.20
Capital Goods			
Exports	.287	.369	1.67
Imports	.049	.164	8.80
Consumer Goods			
Exports	.062	.054	.806
Imports	.048	.101	5.08
Automobiles			
Exports	.105	.101	1.00
Imports	.048	.178	8.65
Ordnance			
Exports	.034	.010	-.368
Imports	.001	.002	6.16

Sources: The same as Table 3.

ranking of industries by unskilled labor intensity did
not change between 1958 and 1971.

Looking at Table 4, American exports are less
unskilled labor intensive than are imports in 1958, the
two are nearly equal in 1963, but by 1971, exports are
more unskilled labor intensive than were imports.
According to the numbers in Table 4, the Leontief
Paradox had not disappeared in the late 1960's, but
instead had become more pronounced. A second interesting
point in Table 4 is the secular trend in the unskilled
labor intensity of both exports and imports. Between
1958 and 1971, there was a downward trend in both ratios,
especially for imports. It is clear from these numbers
that the composition of foreign trade was shifting away
from products having a large unskilled labor content.

Looking at the breakdown of exports and imports by
end use category in Table 4 provides some explanations
for the trends noted above. It is relatively clear why
the unskilled labor intensity of both exports and
imports has fallen. The end use categories for both
exports and imports that had the highest rate of growth
were also those with relatively low unskilled labor
content. Automobile and capital goods imports grew much
faster over the 1958-71 period than the unskilled
intensive agricultural sector. This is clearly
evidenced in the rapidly declining share of imported

agricultural products in total imports for 1971 compared
to 1958, while capital goods and autos increased their
relative share in both the total export and import
bundle, and especially so for imports. The reversal
of factor intensities by 1971 seems to be largely
explained by the tremendous increase in American imports
of foreign capital goods and automobiles as a proportion
of all imports. It may be that part of this increase is
due to particular institutional factors; for example,
American import of autos was given a big boost by the
U.S.-Canada automobile agreement in 1965. It is also
possible the 1971 composition of foreign trade was in
some way unique to that year and the relative factor
intensities of exports and imports would return to their
'expected' position if later data was available. However,
if Table 4 is represenative of the secular shift in the
factor intensity of exports and imports, it would
appear the standard Heckscher-Ohlin theory of trade may
require further qualifications.

6. Does Foreign Trade Benefit the American Working Poor?

From the analysis presented in this paper, the
answer to this question would seem to be both yes and no.
Exports are the least unskilled labor intensive of the
major final demand categories. Furthermore, since 1963

at least, the unskilled labor content of American exports
has declined even further. If the composition of final
demands were to shift away from domestic sources of
demand and towards increased exports, the derived demand
for unskilled labor would decline, and ceteris paribus,
lead to a greater dispersion of incomes between skilled
and unskilled workers. In this case foreign trade
would clearly work to the disadvantage of the working
poor.

In the long run, however, any expansion in export
expenditures must be met by an equal rise in imports.
We have found for 1958 and 1963 that imports were more
unskilled labor intensive than were exports. Thus, not
only were exports the least unskilled labor intensive
among major components of final demand, but the
unskilled labor displaced by imports would be, in the
long run, even greater than that generated from export
expenditures. By 1971, however, we found this situation
to have reversed with exports now the more unskilled
labor intensive. Therefore, on a dollar for dollar
basis foreign trade results in a net gain for American
unskilled workers.

FOOTNOTES

1. Williamson (1976).

2. Input-Output Structure of the U.S. Economy: 1963, Table 1, p. 35.

3. Eldridge and Saunders (1973), p. 19.

4. Miller (1971), p. 130.

5. Williamson (1976), Table 1. For a more detailed explanation of the method used in calculating the sectoral unskilled labor intensities, see pp. 11-16.

6. Theoretically at least, the method used to calculate the sectoral unskilled labor intensities may tend to misrepresent the difference in unskilled labor intensities between sectors. In particular, all employed man-hours in each sector were assigned an unskilled annual earnings rate, regardless of occupation mix. Two sectors with the same man-hour input and identical dollar output would yield identical direct payments impact on the working poor. However, it may be that one of these sectors uses mostly professional and technical workers while the other sector uses mostly laborers. In this case our calculations would overstate the payments impact on the working poor in the sector with the professional and technical people.

   Williamson, in a forthcoming study, has recalculated the $\tilde{\theta}_j$ taking into account the occupational mix by sector. His procedure was to allocate occupations into alternative definitions of high and low wage (unskilled) labor. Only low wage man-hour inputs are used in the calculation of the $\tilde{\theta}_j$. I have recalculated Table 4 using one of his three alternative measures, call it $\tilde{\theta}_j$, where the unskilled are defined to include: operatives, farm laborers, nonfarm laborers, sales workers, craftsmen and kindred workers, clerical and kindred workers, service workers, farmers, and private household workers.

   As Williamson found, use of the original definition of $\tilde{\theta}_j$ in fact _understates_ the unskilled labor intensity differentials between sectors. All of our conclusions in the text remain the

same, only the disparity between the exports and
import sectors is slightly larger. We continue
to use the original definition of θ_j, however,
to maintain comparability with the original work
of Williamson.

7. Kindelberger (1973), pp. 27-29.

8. Leontief (1953)

9. Baldwin (1971)

10. Leontief (1956)

11. Baldwin (1971)

12. Mitchell (1975), pp. 355.

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