

Edward Leamer (1980)
The Leontief paradox, reconsidered.
Journal of Political Economy 88(3): 495-503

Leontief's actual estimates

Capital used per million \$ of US exports, 1947:	\$2.55M
Labor used per million \$ of US exports, 1947:	182K person-years
K/L ratio used in export production, 1947:	\$14.01/person-year
Capital used per million \$ of US import-equivalents, 1947:	\$3.09M
Labor used per million \$ of US import-equivalents, 1947:	170K person-years
K/L ratio used in import-equivalent production, 1947:	\$18.18/person-year

However, given the large US trade surplus in 1947 (exports = \$16.7B; imports = \$6.2B), the US was a net exporter of K *and* L services (inputs).

Leamer shows mathematically that in that situation, comparing the capital/labor intensity of exports to that of domestically-consumed production is a better test of revealed factor endowments than comparing exports to imports. In fact, the K/L intensity of US net exports was much greater than the K/L intensity for US production overall – the US was exporting the more K-intensive of the many products it produced.

Robert M. Stern and Keith E. Maskus (1981)
Determinants of the structure of U.S. foreign trade, 1956-76
Journal of International Economics 11: 207-224.

Note the common distinction made among

<i>Types of traded goods</i>	“Ricardian goods”	“Heckscher-Ohlin goods”	“product-cycle goods”
<i>Characteristics</i>	natural resources	basic manufactures	advanced manufactures
<i>Trade flows depend on:</i>	relative availability	factor proportions	factor proportions, which vary over time w/in a given PLC
<i>Advantage measured by</i>	labor productivity	comparative advantage	firm-specific competitive advantage

The Leontief paradox disappeared by 1972, when we consider

- *net exports* by industry (in which sectors does the US have the largest net exports),
- human capital vs. overall labor or overall capital, and
- non-natural-resource sectors.

“US net exports of manufactures have been making less direct use of unskilled labor... over” the 1958-76 period [213].

“The fact that we do not observe the Leontief paradox in 1972 as compared to 1958 no doubt reflects changes in the composition of trade that occurred in the intervening years, especially the decline in the relative importance of the imports of Ricardian (natural resource) goods” [223]. The US became more focused on human-capital intensive production for export, as it was able to import more labor-intensive H-O-type manufactures from the rest of the world.

Daniel Trefler (1993)
International factor price differences: Leontief was right!
Journal of Political Economy 101(6): 961-987

“a simple productivity-related modification of the HOV model explains much of the factor content of trade and the cross-country variation in factor prices. ...Leontief was right in maintaining that in 1947 the United States was labor abundant as measured in productivity-equivalent workers” [962].

Daniel Trefler (1995)
The case of the missing trade and other mysteries
The American Economic Review 85(5): 1029-1046

The Heckscher-Ohlin-Vanek (HOV) theorem maintains its sway despite the empirical finding that “factor endowments correctly predict the direction of factor service trade about 50 percent of the time” [1029].

Furthermore, the only empirical-cum-theoretical problem with HOV that has received much attention is the Leontief paradox, which “is not a paradox (Leamer, 1980) and disappeared from the data at least 20 years ago (Stern and Maskus, 1981)” [1029].

Suggests that empirical, theoretical, and policy attention should be focused on trade in factor services (the factors embedded in imports and exports) rather than on the actual flows of traded goods and services – it’s the factor services that we care about, and that the theory is really trying to address.

Through a fair amount of specification of alternative models with direct estimation of factor endowments (with 9 factors), he suggests a model “allowing for Armington home bias [a general preference to consume domestic goods, when country-of-origin can be traced among heterogeneous products] and “neutral technology difference” [international differences in technology that affect total-factor productivity but not K/L ratios].

What I think this implies is that the direction and quantity of factor-service trade can be explained by a combination of

- **the relative abundance of factors (countries will export the services of their abundant factors),**
- **the tendency of national economies to use domestic goods and services – because of trade barriers, transportation costs, and tastes, and**

- **international differences in productivity of all factors, based on technology in use – leading some countries to export factor services even when their relative abundance is lower than in some trading partners.**