



## Real wages and non-traded goods

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### ABSTRACT

This paper examines the connection between a terms-of-trade improvement and the real wage rate for a country that is immersed in a trading world with many traded commodities as well as a non-tradeable. There is an array of commodities that are imported but not produced at home, and the price of one of these commodities is lowered, which would, by itself, raise real wage rates if local wage rates are tied to world prices with sufficient diversity in local production to tie factor prices to world commodity prices. If the improvement is sufficiently great, the home country may cease production of one of its tradeables, and the price of non-tradeables changes to clear its market. Details of how this affects the real wage rate depend upon two attributes: Is the non-tradeable labor-intensive relative to the remaining tradeable, and is the income effect of increasing the demand for non-tradeables overpowered by the substitution effect tending to reduce demand? Furthermore, with large changes new traded commodities enter the production mix, so that factor prices once again are tied to world prices. And a wealthier country with the same technology may find its real wage improving at the same time as the opposite change takes place in the home country.

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Certainly since the time of the famous [Stolper–Samuelson \(1941\)](#) article, much of the literature on the theory of international trade that is concerned with income distribution has focused directly on the impact on real wages made by changes in a country's terms of trade (or tariff-induced changes in domestic prices) in models in which all commodities are traded on world markets. However, one of the principle underlying features of trade among nations is that not all commodities produced in a country have access to world markets, either because of high natural barriers to trade or, increasingly, because of man-made regulations that help to sustain a national market for non-traded goods. The purpose of the present paper is to examine the similarity, or lack of similarity, in some of the competitive trade models that do allow for non-traded commodities, in the response of real wage rates to disturbances originating abroad (e.g. changes in the terms of trade) and to emphasize the roles of local technology, the pattern of production, and the elasticity in demand behavior, all of which underlie the endogenous response of the real wage rate even in a small open economy. The change in the terms of trade may be sufficiently large so as to cause a change in the array of commodities produced.

### 1. Prelude: the Stolper–Samuelson result with a non-traded good

In the Stolper/Samuelson analysis an economy produces two traded commodities whose prices are determined in world markets. The question then concerns the effect of a change in the relative price ratio, either because of a change in world markets or because of the country's use of a tariff to alter the domestic price ratio, on factor prices, and the result is strong: An increase in the relative price of the labor-intensive commodity unambiguously increases the *real* wage rate because the percentage increase in the nominal wage rate is larger than the relative increase in any commodity price. Spelled out in non-technical terms, the result

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follows from the assumption that markets are competitive, with prices brought down to the level of unit costs in equilibrium as well as the assumption (almost universally adopted in trade and other areas of economics) that technology does not involve joint production — each commodity is produced in a separate process using inputs of capital and labor. As a consequence, each relative change in a commodity price must reflect a positive weighted average of relative changes in wage rates and return to capital, with weights provided by the distributive factor shares in production. Thus the increase in the price of the import-competing commodity produced at home has a *magnified* effect on the wage rate so that the direction of the change in the *real* wage rate must be determined, barring any change in other commodity prices.

How does the presence of another commodity, a so-called *non-traded* commodity, also produced in competitive conditions using labor and capital, affect this result? Its price must be consistent with the levels of wages and rentals that are determined by the prices of the two traded commodities. In seeking what the consequence on the real wage rate is of a change in the relative price of the import-competing commodity, the change in the nominal wage rate must be adjusted by the *overall* cost of living, which now also includes the change in the price of the non-tradeable good. Suppose that this commodity is even more labor-intensive than is the import-competing commodity whose price has increased. As a consequence, the price of non-tradeables would increase by more than the price of the import-competing good. No matter. The nominal wage rate increase must exceed, in relative terms, the price of *any* produced commodity, thus insuring that the real wage still increases.

**2. The Heckscher–Ohlin model in a broader setting**

Now consider a Heckscher–Ohlin setting in which there are many tradeable commodities: A small open economy is faced with given world prices for a set, *T*, of commodities that it would be capable of producing if local factor prices were appropriate given the country’s own technology. Of course, if labor and capital, both mobile internally between sectors, are the only two inputs utilized in production (which we continue to assume), with international trade the country is not required to produce more than a pair of these commodities, and one of them could be imported instead of exported. Furthermore, it is assumed that another set of commodities, *M*, is available in world markets for consumption (initially at fixed prices), and regardless of world prices or the home country’s factor endowments Home’s technology does *not* allow for their production. As opposed to the situation considered in Section 1, the “terms-of-trade” change considered in this scenario involves a decrease in the price of one of the commodities in set *M*, i.e. a commodity imported but not producible in Home. Finally, there is another set of commodities produced locally but with no access to world markets, due to high “trade costs” of some kind, natural or because of government regulations. To simplify matters, I assume that this set consists of a single commodity, *N*.

It is assumed that an initial equilibrium, with Home producing a pair of traded commodities, is disturbed by a lowering of the world price of one of the commodities in set *M*. Call this commodity 15. How is Home’s *real wage rate* affected by such a foreign-sourced improvement in Home’s terms of trade? The answer to this query may be dependent on how large the price fall for commodity 15 is, particularly if there is any endogenously-determined change in the country’s pattern of production.

This setting is laid out geometrically in Fig. 1. The set, *T*, is assumed to consist of eight commodities, and the home country’s technology, together with the given world prices of these eight commodities, yields the aggregate rising step-function in Fig. 1. This function is derived in standard fashion by constructing a Hicksian composite unit-value isoquant, showing, for each capital/labor ratio devoted to production of traded goods in set *T*, the commodity or pair of traded commodities the country

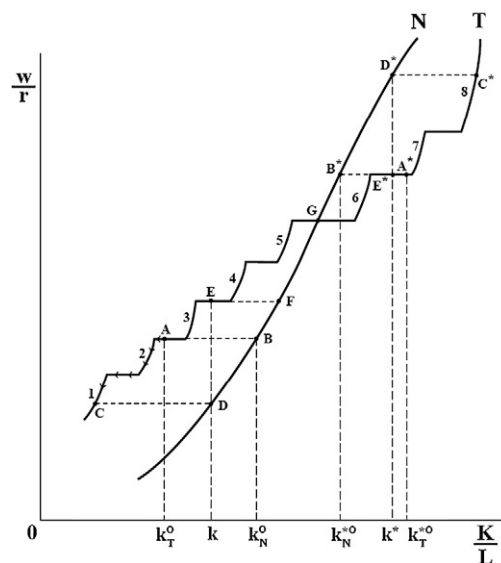


Fig. 1. Traded and non-traded commodities.

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