

**The
Economist**

Tariffs and wages

An inconvenient iota of truth

The third in our series looks at the Stolper-Samuelson theorem

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IN AUGUST 1960 Wolfgang Stolper, an American economist working for Nigeria's development ministry, embarked on a tour of the country's poor northern region, a land of "dirt and dignity", long ruled by conservative emirs and "second-rate British civil servants who didn't like business".



In this bleak commercial landscape one strange flower bloomed: Kaduna Textile Mills, built by a Lancashire firm a few years before, employed 1,400 people paid as little as £4.80 (\$6.36) a day in today's prices. And yet it required a 90% tariff to compete.

Skilled labour was scarce: the mill had found only six northerners worth training as foremen (three failed, two were "so-so", one was "superb"). Some employees walked ten miles to work, others carried the hopes of mendicant relatives on their backs. Many quit, adding to the cost of finding and training replacements. Those who stayed were often too tired, inexperienced or ill-educated to maintain the machines properly. "African labour is the worst paid and most expensive in the world," Stolper complained.

He concluded that Nigeria was not yet ready for large-scale industry. "Any industry which required high duties impoverished the country and wasn't worth having," he believed. This was not a popular view among his fellow planners. But Stolper's ideas carried unusual weight. He was a successful schmoozer, able to drink like a fish. He liked "getting his hands dirty" in empirical work. And his trump card, which won him the respect of friends and the ear of superiors, was the "Stolper-Samuelson theorem" that bore his name.

The theorem was set out 20 years earlier in a seminal paper, co-authored by Paul Samuelson,

one of the most celebrated thinkers in the discipline. It shed new light on an old subject: the relationship between tariffs and wages. Its fame and influence were pervasive and persistent, preceding Stolper to Nigeria and outlasting his death, in 2002, at the age of 89. Even today, the theorem is shaping debates on trade agreements like the Trans-Pacific Partnership (TPP) between America and 11 other Pacific-rim countries.

The paper was “remarkable”, according to Alan Deardorff of the University of Michigan, partly because it proved something seemingly obvious to non-economists: free trade with low-wage nations could hurt workers in a high-wage country. This commonsensical complaint had traditionally cut little ice with economists. They pointed out that poorly paid labour is not necessarily cheap, because low wages often reflect poor productivity—as Kaduna Textile Mills showed. The Stolper-Samuelson theorem, however, found “an iota of possible truth” (as Samuelson put it later) in the hoary argument that workers in rich countries needed protection from “pauper labour” paid a pittance elsewhere.

To understand why the theorem made a splash, it helps to understand the pool of received wisdom it disturbed. Economists had always known that tariffs helped the industries sheltered by them. But they were equally adamant that free trade benefited countries as a whole. David Ricardo showed in 1817 that a country could benefit from trade even if it did everything better than its neighbours. A country that is better at everything will still be “most better”, so to speak, at something. It should concentrate on that, Ricardo showed, importing what its neighbours do “least worse”.

If bad grammar is not enough to make the point, an old analogy might. Suppose that the best lawyer in town is also the best typist. He takes only ten minutes to type a document that his secretary finishes in 20. In that sense, typing costs him less. But in the time he spent typing he could have been lawyering. And he could have done vastly more legal work than his secretary could do, even in twice the time. In that sense typing costs him far more. It thus pays the fast-typing lawyer to specialise in legal work and “import” typing.

In Ricardo’s model, the same industry can require more labour in one country than in another. Such differences in labour requirements are one motivation for trade. Another is differences in labour supplies. In some nations, such as America, labour is scarce relative to the amount of land, capital or education the country has accumulated. In others the reverse is true. Countries differ in their mix of labour, land, capital, skill and other “factors of production”. In the 1920s and 1930s Eli Heckscher and his student, Bertil Ohlin, pioneered a model of trade driven by these differences.

In their model, trade allowed countries like America to economise on labour, by concentrating

on capital-intensive activities that made little use of it. Industries that required large amounts of elbow grease could be left to foreigners. In this way, trade alleviated labour scarcity.

That was good for the country, but was it good for workers? Scarcity is a source of value. If trade eased workers' rarity value, it would also erode their bargaining power. It was quite possible that free trade might reduce workers' share of the national income. But since trade would also enlarge that income, it should still leave workers better off, most economists felt. Moreover, even if foreign competition depressed "nominal" wages, it would also reduce the price of importable goods. Depending on their consumption patterns, workers' purchasing power might then increase, even if their wages fell.

Working hypothesis

There were other grounds for optimism. Labour, unlike oil, arable land, blast furnaces and many other productive resources, is required in every industry. Thus no matter how a country's industrial mix evolves, labour will always be in demand. Over time, labour is also versatile and adaptable. If trade allows one industry to expand and obliges another to contract, new workers will simply migrate towards the sunlit industrial uplands and turn their backs on the sunset sectors. "In the long run the working class as a whole has nothing to fear from international trade," concluded Gottfried Haberler, an Austrian economist, in 1936.

Stolper was not so sure. He felt that Ohlin's model disagreed with Haberler even if Ohlin himself was less clear-cut. Stolper shared his doubts with Samuelson, his young Harvard colleague. "Work it out, Wolfie," Samuelson urged.

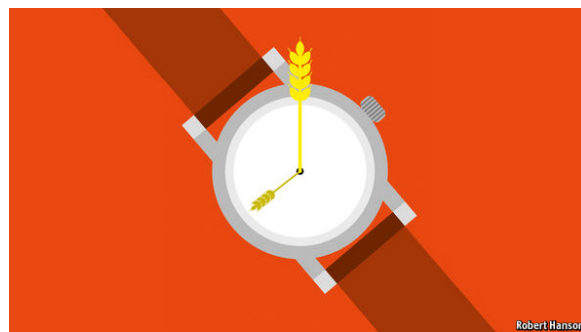
The pair worked it out first with a simple example: a small economy blessed with abundant capital (or land), but scarce labour, making watches and wheat. Subsequent economists have clarified the intuition underlying their model. In one telling, watchmaking (which is labour-intensive) benefits from a 10% tariff. When the tariff is repealed, watch prices fall by a similar amount. The industry, which can no longer break even, begins to lay off workers and vacate land. When the dust settles, what happens to wages and land rents? A layman might assume that both fall by 10%, returning the watchmakers to profit. A clever layman might guess instead that rents will fall by less than wages, because the shrinkage of watchmaking releases more labour than land.

Both would be wrong, because both ignore what is going on in the rest of the economy. In particular, wheat prices have not fallen. Thus if wages and rents both decrease, wheat growers will become unusually profitable and expand. Since they require more land than labour, their expansion puts more upward pressure on rents than on wages. At the same time, the watch

industry's contraction puts more downward pressure on wages than on rents. In the push and pull between the two industries, wages fall disproportionately—by more than 10%—while rents, paradoxically, rise a little.

This combination of slightly pricier land and much cheaper labour restores the *modus vivendi* between the two industries, halting the watchmakers' contraction and the wheat-farmers' expansion. Because the farmers need more land than labour, slightly higher rents deter them as forcefully as much lower wages attract them. The combination also restores the profits of the watchmakers, because the much cheaper labour helps them more than the slightly pricier land hurts them.

The upshot is that wages have fallen by more than watch prices, and rents have actually risen. It follows that workers are unambiguously worse off. Their versatility will not save them. Nor does it matter what mix of watches and wheat they buy.



Stolper, Samuelson and their successors subsequently extended the theorem to more complicated cases, albeit with some loss of crispness. One popular variation is to split labour into two—skilled and unskilled. That kind of distinction helps shed light on what Stolper later witnessed in Nigeria, where educated workers were vanishingly rare. With a 90% tariff, Kaduna Textile Mills could afford to train local foremen and hire technicians. Without it, Nigeria would probably have imported textiles from Lancashire instead. Free trade would thus have hurt the “scarce” factor.

In rich countries, skilled workers are abundant by international standards and unskilled workers are scarce. As globalisation has advanced, college-educated workers have enjoyed faster wage gains than their less educated countrymen, many of whom have suffered stagnant real earnings. On the face of it, this wage pattern is consistent with the Stolper-Samuelson theorem. Globalisation has hurt the scarce “factor” (unskilled labour) and helped the abundant one.

But look closer and puzzles remain. The theorem is unable to explain why skilled workers have prospered even in developing countries, where they are not abundant. Its assumption that every country makes everything—both watches and wheat—may also overstate trade's dangers. In reality, countries will import some things they no longer produce and others they never made. Imports cannot hurt a local industry that never existed (nor keep hurting an industry that is already dead).

Some of the theorem's other premises are also questionable. Its assumption that workers will move from one industry to another can blind it to the true source of their hardship. Chinese imports have not squeezed American manufacturing workers into less labour-intensive industries; they have squeezed them out of the labour force altogether, according to David Autor of the Massachusetts Institute of Technology and his co-authors. The "China shock", they point out, was concentrated in a few hard-hit manufacturing localities from which workers struggled to escape. Thanks to globalisation, goods now move easily across borders. But workers move uneasily even within them.

Grain men

Acclaim for the Stolper-Samuelson theorem was not instant or universal. The original paper was rejected by the *American Economic Review*, whose editors described it as "a very narrow study in formal theory". Even Samuelson's own textbook handled the proposition gingerly. After acknowledging that free trade could leave American workers worse off, he added a health warning: "Although admitting this as a slight theoretical possibility, most economists are still inclined to think that its grain of truth is outweighed by other, more realistic considerations," he wrote.

What did Stolper think? A veteran of economic practice as well as principles, he was not a slave to formalism or blind to "realistic considerations". Indeed, in Nigeria, Stolper discovered that he could "suspend theory" more easily than some of his politically minded colleagues (perhaps because theory was revealed to them, but written by him).

He was nonetheless sure that his paper was worth the fuss. He said he would give his left eye to produce another one like it. By the paper's 50th anniversary, he had indeed lost the use of that eye, he pointed out wistfully. The other side of the bargain was, however, left unfulfilled: he never did write another paper as good. Not many people have.

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