

“Protection and Real Wages”: The History of an Idea

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Few contributions in economics have attained as much prominence as the 1941 article by Wolfgang Stolper and Paul Samuelson that bore the title, “Protection and Real Wages.” It suffered the same birthing pains experienced by some other famous articles – initial rejection by a major journal, in this case the *American Economic Review*, until finding a home in the *Review of Economic Studies*. Its success is reflected in the Golden Jubilee celebration at the University of Michigan in 1991. The volume of the proceedings of the conference contains a “Selected Annotated Bibliography” of 144 items, a fraction of the number of articles making reference to this important theorem. In recent years, in which the impact of increasing globalization and trade on real wages has commanded attention in the popular press, the theorem is even explicitly mentioned, although it is sometimes confused with the related but separate “Factor Price Equalization Theorem”.

The message of the original Stolper-Samuelson theorem is simple and powerful: A country producing two commodities in perfectly competitive conditions, with two productive inputs (call them capital and labor) and importing its labor-intensive commodity, could *unambiguously* improve the *real wage* of its workers by levying a tariff on imports. More explicitly, such protection would serve to increase the nominal wage rate by a greater percentage than that of the price of the import good. The theorem remains as a benchmark against which most discussions of the effect of protection or international trade on wages is measured. The purpose of the present article is to describe

how the interpretation of the theorem has been altered in succeeding decades. Scores of critics have argued that the theorem is basically flawed because of the difficulties in establishing results in the case of many commodities and productive factors, results that match the elegance found in the original setting. As I hope to reveal, there is a simple quite general result, easily obtainable, that requires a re-interpretation of the original proposition. Such a re-interpretation avoids the difficulties that bedeviled the efforts faced by mathematical economists to generalize the theorem and yields a result that is of direct relevance not only to the theory of international trade but, more widely, to the newly expanding field of political economy.

The original Stolper-Samuelson result was proved and illustrated by an early use of the production box diagram, which for decades has become standard fare in most micro-theory textbooks. The dimensions of the box reveal the quantities of the two productive factors, say capital and labor, available in fixed amounts to the economy.¹ Assuming smooth substitution possibilities between factors and the standard linear homogenous production technology typically found in competitive models, there exists a set of efficient factor allocations where the ratio of marginal products of the two factors in one industry matches the ratio in the other. Graphically these allocations make up the contract curve in the box diagram. Suppose, now, that a tariff is levied that increases the relative price of the (assumed) labor-intensive import-competing commodity. The production of this commodity increases, and the resulting move along the contract curve

¹ The fixity of factor endowments is not a crucial ingredient in the proof of the Stolper-Samuelson theorem.

raises the capital/labor ratio used in *both* industries.² In their 1941 article it is clear that Stolper and Samuelson realized that such a result, in which capital/labor ratios rise in *both* sectors and yet total supplies of capital and labor are assumed fixed, might seem counter-intuitive. With the over-all ratio of capital to labor fixed, both sectors can adopt more capital-intensive techniques only if the weights attached to outputs in the two sectors change, as they will in a manner favoring output of the labor-intensive import commodity. And, with both sectors using more capital-intensive techniques, the real marginal product of labor must increase. That is, the *real* wage rate must rise. This way of describing things is like putting the cart before the horse. It is the increase in the relative price of the labor-intensive commodity that forces an increase in the real wage, and this, in turn, will lead to a more intensive use of the now relatively cheaper capital in each sector. Not only *could* the capital/labor ratio move in the same direction in both sectors, it *must* do so if techniques can change at all because each sector economizes on labor as it faces the same increase in the wage/rental rate as does the other sector.

The basic logic of the Stolper-Samuelson result emerges more clearly if techniques of production are actually rigid in each sector, with no alteration in output levels as prices change.³ Consider the competitive profit conditions of equilibrium in each sector: unit costs must be matched by commodity prices. Keep the price of exportables constant and raise the price of the labor-intensive import-competing good. Unit costs must rise in this latter sector, and to accomplish this one of the factor returns must rise by more than the price of the import-competing good (unless both factor returns were to go up by the same

² The declining capital-intensive export sector is releasing more capital per unit of labor than is required, at initial factor prices, by the expanding labor-intensive import-competing sector.

³ That is, the economy is at a kink along its transformation schedule.

relative amount). By itself this would raise costs of producing exportables, and to keep these unit costs constant, the return to the other factor must actually fall. This is the *magnification* result (Jones, 1965), whereby with two commodities being produced, each using the same pair of factor inputs, any change in commodity prices must result in the relative change in each such price flanked by the relative change in the two factor returns because the percentage change in unit costs must be a positive weighted average of percentage changes in these factor returns. With protection raising the relative price of labor-intensive imports, it is the wage rate that must rise by relatively more than either commodity price and the return to capital by less than either commodity price. (With the export price kept constant, the return to capital must fall). The asymmetry between factor returns and commodity prices embodied in the *magnification effect* is directly a consequence of an assumption about production made by Stolper and Samuelson as well as in most work in production theory, *viz.* that it takes both factors to produce each commodity, in a separate production process. That is, there is no joint production. More on this later.

Before proceeding with an account of the development of the Stolper-Samuelson idea, it is important to stress that their paper was one of the first attempts to use general equilibrium theory to achieve comparative statics results. This was accomplished by dealing with a model of low dimensionality, albeit one in which factor allocations and factor returns respond to alterations in relative commodity prices.

The late 1940's witnessed two research results that served to highlight and alter the framework for the Stolper-Samuelson findings. The first result was the Factor-Price Equalization Theorem, proved by Samuelson in the first of two articles in the *Economic Journal*, 1948.⁴ This result, based on the same model as the earlier Stolper-Samuelson article, asked not what a tariff would do to factor returns, but instead asked about the effect of free trade on wage rates and rents in one country compared with those in another country that shared the same technology. If the two countries were identical, it would not be surprising to find factor prices equalized between countries once free trade led them to face the same commodity prices. Samuelson showed that this equalization result might hold even if countries differed in the relative supplies of capital and labor. Factors were assumed to be internationally immobile, so that there was no international labor market or capital market. Despite this fact, Samuelson showed that if relative factor supplies were not too different between countries, free trade would bring about an inter-country equality in wages and rents. I shall say more about this result later.

The second result was developed by Lloyd Metzler in 1949. What Metzler showed was that a country large enough to alter world commodity prices by its protectionist policy might not succeed in raising the relative domestic price of its import-competing commodity by levying a tariff. Why not? A tariff serves to reduce domestic demand for importables at their initial world price. If elasticities of demand are sufficiently low in world markets⁵, the tariff might improve the home country's terms of trade by more than

⁴ This result seemed so surprising that Samuelson wrote a follow-up explanatory piece one year later in the same journal.

⁵ The more precise condition for a tariff not to be protective is that foreign demand elasticity for imports be smaller than the home country's marginal propensity to consume its export commodity.

the amount of the tariff. That is, the relative domestic price of importables could fall, so that the Stolper-Samuelson result, whereby a tariff on a country's labor-intensive imports would raise the real wage rate, would be violated. To salvage the theorem, the Stolper-Samuelson result was re-interpreted to focus on the relationship between factor returns and domestic commodity prices. This helped to separate the Stolper-Samuelson theorem from the effects of international trade policy. The theorem directly links the real wage to the relative price of the labor-intensive commodity, regardless of whether protection would raise the relative price of imports if the domestic import-competing commodity were labor-intensive. Such a separation of the theorem from trade policy sets the stage for a much wider application of the theorem, dealing with the effects of any policy aimed at commodity markets and its effect on another set of markets – factor markets.

In the subsequent development of the Stolper-Samuelson idea special attention should be paid to the 1953 *Review of Economic Studies* article by Samuelson in which, *inter alia*, he developed the *reciprocity theorem*, whereby the consequences of a commodity price change on factor returns are closely linked to the consequences of a change in a country's factor supplies to commodity outputs (assuming commodity prices are given, as they would be for a small country with commodities traded internationally). Literally, suppose that the price of commodity j increases by one unit. What effect would this have on the return to factor i ? Obviously this depends on technological details – the i^{th} factor return might go up, or go down, or not change at all. Now ask a completely different question: What would be the consequence of a unit change in the economy's supply of factor i on the output of the j^{th} commodity if commodity prices are held constant?

Perhaps not surprisingly, the *signs* of the answer to these two queries are the same. Samuelson showed that this duality result is even stronger – the two answers are numerically identical! The timing of this result proved to be auspicious, because 1953 was the same year that Wassily Leontief’s *paradoxical* result concerning trade patterns in the United States appeared: America’s trade pattern seemed to suggest that its import-competing sectors were capital-intensive relative to its export sectors. This surprising result – surprising because it was assumed that America was indeed a relatively capital-abundant country which, by standard trade theory associated with Heckscher (1919) and Ohlin (1933), would suggest its exports would be *more* capital-intensive – led to an avalanche of dissertations and articles based both upon Heckscher-Ohlin theory and the work of Stolper and Samuelson.⁶

The Samuelson reciprocity relationship was proven in the very general framework of many productive factors and many commodities. The Stolper-Samuelson result was limited dimensionally to the case of two factors and two commodities, the so-called 2x2 model. The question could then be put: Does the Stolper-Samuelson result survive in higher dimensions? The early 1970’s was particularly a time in which harsh criticisms were leveled at the Stolper-Samuelson theorem, the Factor-Price Equalization result, and the Heckscher-Ohlin proposition about the direction of trade flows because all were embedded in a 2x2 framework. Consider a sample of such criticism.⁷ Frank Hahn (1973) was particularly severe: “It is well known that an economy with only two goods has a number of important properties which do not carry over to the general case.” (p.

⁶ My own dissertation at M.I.T. was part of this group. See Jones (1956).

⁷ These are cited in Jones and Scheinkman (1977).

297). Earlier, Ivor Pearce, in his book (1970), maintained that "...many textbooks of international trade theory (even the most advanced) lay a great deal too much emphasis upon propositions which are true *only* for models with two commodities and two factors of production." (p. 320, italics added). Attempts have been made to generalize the Stolper-Samuelson result to higher dimensions. As I cite below, early efforts did have some success, but only for minor extensions of dimensionality. As important for this discussion is the fact that extensions of the 2x2 result require a statement of precisely what the proposition states in higher dimension, because there is no unique general statement. This is pointedly revealed in two efforts to expand the Stolper-Samuelson theorem in two independent articles that happened to appear in published form next to each other in the same journal.

Murray Kemp and Leon Wegge in the *International Economic Review* (1969) realized that to generalize the Stolper-Samuelson theorem to higher dimensions required not only a specification of what the theorem states, but as well a stricter set of assumptions regarding production structures than are required in the 2x2 model. They searched for conditions sufficient to yield the following changes subsequent to an increase in the price of some commodity, j , with all other commodities held constant: Some factor return rises by a greater relative amount than j 's commodity price, and all other factors lose. Additionally, for each factor there is a unique commodity with which it is associated in this "real winner" association. They restricted themselves (as is common, e.g. in the 2x2 case) to the "even" case in which the number of produced commodities exactly balances the number of productive factors, so that without any loss of generality the favored factor

for any given commodity price increase can be assigned the same number as that commodity. What restrictions on the productive structure do they impose? They assume that if you compare the ratio of factor i 's usage in producing the i^{th} commodity to that of *any* other factor used there, the ratio would exceed the comparable ratio of factor i to that other factor in *all* other commodities. This indeed is a strong version of the 2x2 requirement that one of the two goods utilizes a higher labor/capital ratio than does the other, and these conditions would not be satisfied for many production structures. But suppose they are. Are these sufficient to ensure the result they desire, whereby for any factor there will be a unique commodity such that an increase in that commodity price alone suffices to raise that factor's real return – with all other factors losing? Yes – in the 3x3 case, but not necessarily in higher dimensions. They even provide a counter-example for the case of four factors and four commodities.

John Chipman (1969), in the same issue of the *International Economic Review*, asked for conditions sufficient to yield an alternative, and weaker, set of factor price changes given a commodity price change. Raise the price (alone) of any commodity. Suppose the real return to a unique associated factor increases, but no restrictions are placed on the fate of other factors – they may rise, fall, or remain unchanged. What assumptions are required to guarantee that this result holds with a unique correspondence of factors to commodities, numbered as above so that commodity i is “intensive” in its use of factor i ? Only that the distributive factor share of factor i in industry i exceeds factor i 's share in any other industry (and for all i). However, just as in the Kemp-Wegge case, this condition proves insufficient in the 4x4 case, as shown once again by a counter-example.

The choice that Kemp and Wegge (1969) selected as the generalization of Stolper-Samuelson is known as the *strong form* because it specified that with each commodity price change there would be one winner, with every other factor losing, whereas Chipman (1969) considers the *weak form*, that allows for the possibility that some of the non-intensive factors might nonetheless also gain. Note that in the 2x2 version there is only a *single* winner when one commodity price changes, but there is also only a *single* loser, so that it is possible to consider a production structure that would, in higher dimensions yield roughly as many winners as losers accompanying a commodity price rise. Such a structure would seem to have as much claim to represent a generalization of Stolper-Samuelson as the Kemp-Wegge strong form. An example leading to such a balanced outcome of factor winners and losers was provided by Jones and Henryk Kierzkowski (1986). Their structure highlights the possibility that any factor of production has limited access to industries in which they may find employment. Suppose there are a number of commodities produced in a country. Furthermore, suppose each commodity uses only two inputs and that each factor input is employed in only two commodities.⁸ A price rise only in a single commodity will cause one or both of its input returns to increase. In the neighboring industry one factor's return rises, causing the other factor employed there to fall since that industry's price is constant. The next industry thus employs one factor whose return has fallen, causing its other factor to

⁸ In the article a circular location of "neighboring" industries is suggested, with each factor situated between two such industries and employed only in its two "neighbors".

experience a rise in its return. There ensues a kind of “ripple effect” leading to a balance between the number of gainers and losers.⁹

The kinds of negative results in higher dimensions associated with the Kemp-Wegge and Chipman contributions cast a pall for many years on attempts at generalization.¹⁰ There is one extension, however, that is quite simple and yields an interesting variation on the Stolper-Samuelson theorem. Maintain the two-factor assumption, but let there be a number of different commodities that can be produced. A basic feature of international trade in this context is that a country need not produce all commodities on its own – trade allows a high degree of concentration. Indeed, assuming there are many countries, two countries that share the same technology might each produce just one or a pair of commodities, and these could be different from those produced in the other country. At the other extreme, if the two countries have factor endowment proportions that are very similar, they may produce, say, the same pair of commodities. Suppose that endowment proportions are not that similar, so that with international trade the two countries produce a single, overlapping good in common but also another commodity that differs between countries. In the more capital-abundant country that other commodity will be produced by more capital-intensive techniques than the commodity produced in common, while in the more labor-abundant country the “other” commodity will be its labor-intensive commodity. Suppose as well that the

⁹ Suppose there are n commodities and n factors. If n is an even number (such as in the 2x2 case), there is exactly the same number of winners as losers, and in the favored sector (where the price rises) there is one winner and one loser. If n is an odd number, there is one more winner than loser; in the favored sector both factor inputs are nominal winners.

¹⁰ This is not to say that attempts were not made. See Wilfred Ethier (1984) for a useful discussion of many of the formal results derived for higher dimensional cases.

commodity that is produced in common is nonetheless exported by the more labor-abundant country and imported by the capital-abundant country, and that initially there is free trade. If the importing, capital-abundant country levies a tariff (on its imports of its labor-intensive good), its real wage rate will increase a la Stolper and Samuelson (assuming away the Metzler paradox). Such a tariff serves to lower the price of the commonly-produced commodity in the labor-abundant country, but this commodity is produced by relatively capital-intensive techniques there, so that the other country's tariff *raises* the real wage in that country as well. This parallel movement in the two countries' wage rates is a consequence of a kind of "factor-intensity reversal" that *must* occur if the two countries have endowments fairly close but not close enough to result in identical production patterns. In the framework of the original Stolper-Samuelson theorem, the 2x2 case, a tariff would raise the real wage in one country and lower it in the other. That instead there could be a common upward or downward movement of real wages in both exporting and importing countries does *not* contradict Heckscher-Ohlin (or Stolper-Samuelson) theory; it merely illustrates that such theory is more robust in its predictions in the many-commodity case.

Earlier, mention was made of the "Factor-Price Equalization Theorem", whereby free trade in commodities between a pair of countries that shared common knowledge of technology and factor skills could result in factor prices brought to equality between countries despite the lack of international factor mobility *if* their endowment proportions were not too different. This latter proviso is important, because with international trade a country need not produce more commodities than the number of its employed factors of

production, so that if endowment differences are sufficiently different, the set of commodities produced in the two countries could differ (even if overlapping). (In the 2x2 discussion one of the countries, or both, could become specialized.) Does such an equalization result hold in higher dimensions (where the number of possible commodities exceeds the number of factors)? When mathematical economists turned to this issue, they ended up asking a different question: If an economy produces the same number of commodities as it has factors of production, are factor returns *uniquely* determined by a given set of commodity prices? This depends upon properties of the array (or matrix) of distributive factor shares, since these are the weights that represent the importance of any factor in unit costs (which, in equilibrium, are equal to commodity prices). Without going into the mathematical details in this literature, note how the focus of the question has changed. There is no mention of similarity or difference of factor endowments between countries, or that countries' technologies are assumed to be identical. Instead, the original query about factor-price equalization with trade gets converted into a query about the mathematical properties of the distributive share matrix.¹¹

It is possible to argue that the literature about extending the Stolper-Samuelson result also re-routed a question that initially was of interest to economists into one of more

¹¹ In Jones (1995) I have argued that a variation of the factor-price equalization theorem may be more fundamental than the question of whether trade equalizes factor prices between countries. This variation asks about *factor-price dependence* – the extent to which producing commodities for the world market at given world prices lessens the control that can be maintained by a country over returns to its non-traded factors. If the country produces as many commodities for the world market as it has factors, its factor returns are completely *determined* by world commodity prices, regardless of whether other countries produce the same commodities or have the same technology. As Peter Neary (1985) has shown, as the number of commodities produced by a country approaches the number of its factors, the degree of dependence monotonically increases. For a country that puts value on its ability to control returns in its own factor markets, it may be willing to forego some of the gains from trade in commodities in order to preserve some control over factor prices.

interest to mathematicians. Without stating things in a formal fashion, suppose that a country produces n commodities with the use of an “even” number of productive factors, n , with unit costs equal, in equilibrium, to the set of commodity prices. If factor prices change, so will unit costs, and in any industry the percentage change in unit costs will be a positive weighted average of the percentage changes in all the factor returns. The weights will depict the distributive factor shares. Each element of the *inverse* of the matrix of distributive shares answers the following question: If a particular commodity goes up in price, all other commodity prices constant, what will be the effect on one of the factor returns? In the 2×2 case if factor i is intensively used to produce commodity i , the inverse of the factor share matrix must have a diagonal whose elements are positive and exceed unity, and negative off-diagonal elements. The kind of question posed by Kemp and Wegge (1969) for the higher-dimensional $n \times n$ case is what conditions on technology suffice to ensure that again the inverse exhibits diagonal elements all exceeding unity and negative off-diagonal elements. Such an inverse matrix satisfies the *strong* Stolper-Samuelson condition whereby each commodity is associated with a unique factor (different for each commodity) such that an increase in that commodity’s price alone results in the *real* return to the associated productive factor to rise, with all other factor returns falling. The conditions they supplied, as narrow as they are, prove to be sufficient in the 3×3 case, but not higher.¹²

¹² In Jones, Sugata Marjit and Tapan Mitra (1993) sufficient conditions are provided for this result. These conditions are more strict than, but are related to, the Kemp-Wegge conditions. In order for a commodity price increase to result in all factors save one to be losers, the difference in their intensity ratios relative to the use of the winning factor cannot be very large from factor to factor. That is, a similarity in outcome (all the losers have a fall in factor return) must be reflected in fairly similar factor intensities for these factors, compared to the intensity of the winning factor. Related conditions for the *weak* theorem of Chipman are provided in Mitra and Jones (1999).

A more interesting version of the Stolper-Samuelson theorem was suggested in Jones (1985). Suppose an arbitrarily-selected factor of production knocks on the door of its government representative and says, “Help – can you do something that will serve to increase my real factor reward?” The representative reaches into its desk drawer to pull out a checkbook. “No”, replies the factor, “the media would pounce on me if they found out about such a direct intervention. Instead, can you use a technique that is *less transparent*, can you change taxes, regulations, the pattern of government spending, or some other device that serves to *alter relative commodity prices* in a manner that will increase my real return? If taxes are levied, I cannot be seen to partake of the tax revenue, or of tariff revenue if tariffs are imposed. Does there exist a change in relative commodity prices that will result in my real factor return unambiguously rising?” The answer, not surprisingly, is “perhaps”. That is, certain conditions must be satisfied. Are these conditions of the type that lead to inverse matrices with positive diagonals and negative off-diagonal elements? No – they are much weaker. First, suppose that technology does not exhibit joint production – i.e. each commodity is produced in a separate production process utilizing all productive factors. Secondly, if alterations in commodity prices are to do the “heavy lifting”, there must be enough weapons – the number of produced commodities must be at least as large as the number of factors. Anything more? No. This pair of conditions suffices to ensure that the *real* return to *any* productive factor can be improved by the appropriate change in relative commodity prices. The proof is simple, and makes use of Samuelson’s reciprocity theorem described earlier.¹³

¹³ Suppose factor i pleads for such support. Consider the following question: If all commodity prices are constant suppose the endowment of factor i increases (alone). Techniques are unchanged because factor

The assumption of lack of joint production can be weakened somewhat. In a sense what is required is that the array of factors used in any process be less diverse than the array of outputs emerging from the activity.¹⁴ After all, the statement of the *magnification* effect, whereby for any commodity price change the alterations in *some* factor returns are greater, points to an asymmetry between factor price changes and commodity price changes, and such an asymmetry must reflect an asymmetry between inputs and outputs in the production structure. This is what a lack of joint production entails – it takes many inputs to make a single output.

The focus on individual elements of the inverse of the matrix of distributive shares is natural for mathematicians. But it is of little relevance to the political economy issue posed in the form of asking if changes in relative commodity prices can ensure an increase in the real return to any pre-assigned factor. After all, it may be the case that an increase in a *single* commodity price may *not* be sufficient to raise the selected real factor return. So what? It is easy to show that the desired result can be achieved by raising a subset of commodity prices by the same relative amount, and keep all other prices constant. And, of course, nothing has been said about all other factor prices falling. Indeed, it would be of great convenience to the factor seeking this kind of help if some other factor returns go up as well. In this day and age of concern with income

prices (in this $n \times n$ case) are determined by the commodity prices and thus remain constant. Since all other endowments are constant, not all commodity outputs can increase. Suppose the output of commodity j falls. Then the reciprocity results ensures that a decrease in the price of commodity j , all other prices constant, must raise the return to factor i . Such a price change must increase the real return to factor i – the generalized Stolper-Samuelson result. For further details see Jones (1985).

¹⁴ This is really too loose a statement. Basically the *cone* of outputs should contain the *cone* of inputs into the process.

distribution, the factor that seeks indirect help would welcome other gainers....”they did it for *them*”.

It is easy to see why it is stipulated that there be enough commodities – at least as many as the number of factors. The specific-factors model (Jones, 1971 and Samuelson, 1971) provides an example to illustrate how having more factors than goods obviates the Stolper-Samuelson result. In the simple 3x2 case, a pair of commodities is produced, with one type of capital and labor used in one sector and a different type of capital and labor used in the other. Labor is freely mobile from sector to sector. An increase in either commodity price raises the nominal wage rate, but only by a fraction of the price rise. The real winner for any price change is the specific factor used in that sector. No change in relative commodity prices can succeed in raising the nominal wage rate for mobile labor by more than any commodity price.

Is it possible to conceive of even weaker statements that suggest that the indirect use of policies that change relative commodity prices can effectively improve the *real* return of any pre-selected factor? Yes, but at the expense of giving up the magnification effect associated with the original statement of the Stolper-Samuelson theorem. A given factor’s real return improves if its nominal return increases relatively more than that factor’s cost of living, even if it’s nominal return might not increase relative to *all* commodity price changes. With this in mind, note that for given factor endowments and technology, the proportional change in any factor return is a weighted average of the proportional

changes in all commodity prices.¹⁵ Of course some of the weights can be negative, and some might exceed unity. Now consider the change in the cost of living for this factor. If the factor consumes something of all items, the proportional increase in the cost of living is a positive weighted average of all commodity price changes.¹⁶ As long as the weights used for the cost of living index are not identical to those for the change in the nominal factor return, the proposition can be obtained: That is, *regardless of the number of factors and commodities and whether or not there is joint production in some activities, any factor's real return can be improved by policies that alter relative commodity prices.* My own preference is for the previous result that relied on having a sufficient number of commodities and the relative absence of joint production, since then no reference need be made of taste patterns of the favored factor, and this was one of the key surprising features of the original Stolper-Samuelson theorem. However, the more general remarks serve to emphasize the power of altering prices in one set of markets in order to facilitate a significant change of real returns in other markets. This surely is an important characteristic of competitive economies that has a central role to play in discussions of political economy. And it owes much to the pioneering work of Wolfgang Stolper and Paul Samuelson that focused on the effect of tariff protection on real wages over sixty years ago.

¹⁵ Imagine a 10% increase in *all* commodity prices. This should lead to a uniform 10% change in every factor return if there is no “money illusion”.

¹⁶ If some commodity is not consumed, its weight would be zero.

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