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The Gains from International Trade Once Again

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THE GAINS FROM INTERNATIONAL TRADE ONCE AGAIN¹

I. INTRODUCTION

IN 1939 I wrote a paper that showed how some international trade makes a society potentially better off than it would be if restricted to autarky.² Although this paper has received a flattering amount of notice, I had always regarded it as somewhat incomplete and had long planned to follow it with a more definite companion piece. For it was written with two purposes in mind other than to say all that can be said about the gains from international trade.

First, it was an attempt to show how the new theories of revealed preference could be used to demonstrate important theorems in welfare economics. And second, it was intended to mediate the dispute between two of my famous teachers, Jacob Viner (then of Chicago) and Gottfreid Haberler (Harvard), over the doctrine of opportunity cost in international trade and value theory: my 1939 article was shaped to show how the eclectic doctrine of general equilibrium could take changes in factor supplies in its stride and by the index-number methods of revealed preference illustrate how the Haberlerian transformation curve could be generalised.

Even after the passage of twenty years, the final chapter seemed still to be lacking in the literature. And an interesting 1958 Danish criticism of my earlier paper's treatment of income distribution by Mr. Erling Olsen³ led me to defend the argument and at long last take up the thorough completion. This time there was no need to worry about the obsolete doctrine of opportunity cost; nor to use index numbers of revealed preference, since for better or worse this approach had already won its place in the literature of economic theory. Good fortune, however, brought Dr. Murray Kemp to M.I.T. as a visiting professor in 1959–61 on his way from Canada to a chair at the University of New South Wales. For, in discussing the present paper, Professor Kemp showed that my alternative approach of 1939 could indeed be carried through all the way to achieve the same final goals.⁴ In a real sense, therefore, our two papers are complementary and benefit from simultaneous publication.

¹ Grateful acknowledgement is made to the Ford Foundation for research assistance.

² P. A. Samuelson, "The Gains from International Trade," *Canadian Journal of Economics and Political Science*, Vol. V (May 1939), pp. 195–205. Reprinted in the *Readings in the Theory of International Trade* of the American Economic Association.

³ Erling Olsen, "Udenrigshandelns Gevinst," *Nationaløkonomisk Tideskrift*, Hæfte 1–2 (Argana, 1958), pp. 76–9. I am grateful to Mr. Olsen for sending me an English translation of his interesting paper.

⁴ Murray C. Kemp, "The Gain From International Trade," pp. 803–19 above.

II. THE SMALL COUNTRY CASE

On the special assumption that our country under consideration is too small to affect its terms of trade, and on the assumption that the price ratios abroad differ from those that would prevail at home under autarky, Fig. 1's heavy line EUF represents our "consumption possibility frontier" with

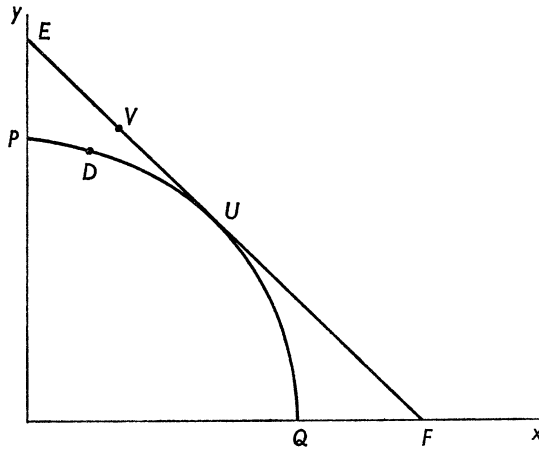


FIG. 1. With no trade, we end up at D . With free trade, production ends up at U , consumption at V , with UV the vector of algebraic imports.

some trade. With autarky the consumption possibility frontier is given by the production locus $PDUQ$. Since the trade frontier lies everywhere¹ north-east of the autarky frontier, our society can have more of all goods (and less of all irksome inputs) with some trade. It is in this sense that trade makes us potentially better off.

III. AN IMPORTANT ENVELOPE

I wish to increase the generality of my 1939 argument by now dropping the assumption that our country is small. Let us be large enough to affect our terms of trade as we move along Fig. 2's Marshallian offer curve of the rest of the world for our two-goods.

¹ At U itself the frontiers coincide. Thus, if there were some distribution of income which brought us under autarky to U rather than D , opening up trade would at that point (1) in fact be followed by no international transactions taking place, and hence would (2) represent the limiting case where trade neither helps nor hurts us. (If individuals' tastes and endowments happen to be much alike at home there might be no redistribution of income that would, under autarky, get us to U . In such a case we would know that the *cum*-trade utility frontier of Fig. 4 does lie uniformly outside the autarky utility frontier. On the other hand, if U is a possible autarky point the *cum*-trade frontier will touch the autarky utility frontier at one or more points; but it must always lie north-east of the autarky point corresponding to D —as we shall see.)

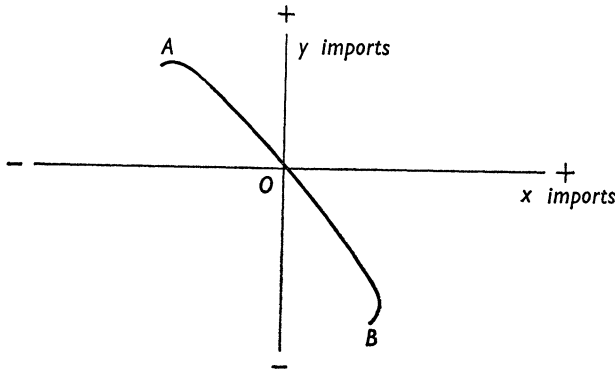


FIG. 2. *AOB* is the familiar Marshallian offer curve of the rest of the world, but plotted in terms of our algebraic imports.

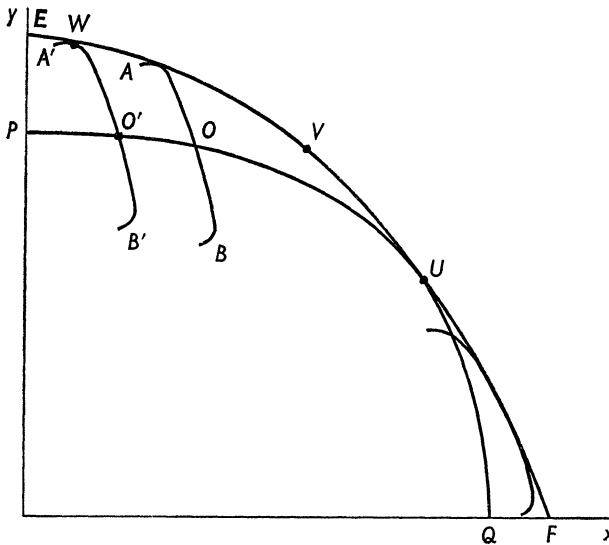


FIG. 3. The important Baldwin envelope *EF* is generated by sliding *AOB* along *PQ* in such a way as to trace out the frontier of consumable product. The slopes at *W* are necessarily equal to the slope at *O'*.

Now draw up the envelope frontier¹ of Fig. 3 by sliding the origin of the *AOB* offer curve along the domestic production possibility locus *PQ* in such a way as to trace out the maximal amount of each good that is available

¹ See R. E. Baldwin, "Equilibrium in International Trade: A Diagrammatic Analysis," *Quarterly Journal of Economics*, Vol. LXII (1948), pp. 748-62; "The New Welfare Economics and Gains in International Trade," *Quarterly Journal of Economics*, Vol. LXV (1952), pp. 91-101. See also the valuable paper by Peter B. Kenen, "On the Geometry of Welfare Economics," *Quarterly Journal of Economics*, Vol. LXXI (1957), pp. 426-47. Given more than two goods, we need modify the exposition only trivially.

for given amounts consumed of the other good.¹ The resulting envelope may be called society's *cum*-trade consumption possibility frontier. Like Fig. 1's *EUF*, of which it is a generalisation, the new consumption frontier lies uniformly (save ² for one point like *U*) outside the autarky consumption frontier. Hence our society is potentially better off in the sense that there is a way of reallocating the enlarged totals of goods so as to make every person better off.

It may be noted that the envelope frontier could be attained by an optimal Mill-Bickerdike tariff or by more direct means. The Kahn-Graaff paradox,³ that the size of the optimal tariff depends only on foreigners' demand elasticity and not on home consumers' demand, is easily resolved as follows: the envelope's slope at any point like *W* is related to the slope of *O'W* as determined by the *AOB* curve alone; but never forget that home demand must tell us which *W* will be the equilibrium one.

IV. THE UTILITY POSSIBILITY FRONTIER

Practical men and economic theorists have always known that trade may help some people and hurt others. Our problem is to show that trade lovers are theoretically able to compensate trade haters for the harm done them, thereby making everyone better off. The ordinal utility diagram of Fig. 4 is the natural tool to use for this purpose.⁴

The horizontal axis represents ordinal utility of one of our citizens. The vertical axis represents ordinal utility of a second citizen. And for simplicity I suppose there are only two citizens, or two classes of identical citizens in our country. A point represents the simultaneous position of both men: because utility need not be numerically measurable, only north and south and east and west relationships count.

The point *d* corresponds to point *D* of Fig. 1. The broken locus *d'dd''* represents the utility possibility frontier if the fixed goods totals of *D* are allocated in favour of man 1 or man 2 by ideal-sum transfers so that

¹ It may help the reader to imagine the offer curve as being cut out from Fig. 2 with scissors and then being carefully transposed over to Fig. 3 so as to trace out the envelope of its outlying tangents. At a point like *W* not only is the offer curve tangential to the envelope but in addition if we go back to the corresponding pivot point *O'* the slope of the production possibility schedule there will also necessarily be the same. This follows from the geometrical properties of an envelope and has the important economic interpretation that at an optimal point production substitution ratios must be equal to trading substitution ratios (as well as to consumption substitution ratios).

² If the autarky point *D* will in fact become outmoded by the opening of trade, then *D* and *U* cannot coincide and we know that—by going north-east from *D*—everyone can be made better off than they were under autarky.

³ See J. deV. Graaff, *Theoretical Welfare Economics* (Cambridge, 1957), Chapter IX.

⁴ Pareto's economics would have been better understood had he explicitly used the utility frontier concept. I may refer the reader to my *Foundations of Economic Analysis*, Chapter 8; to "Evaluation of Real National Income," *Oxford Economic Papers* (New Series), 2, pp. 1-29, particularly p. 6; to "Social Indifference Curves," *Quarterly Journal of Economics*, Vol. LXX (February 1956), pp. 1-22. As Graaff points out in Chapter IV of his just-cited book, Professor M. Allais of Paris also developed this social-utility-frontier concept.

there is no "inefficiency" or deadweight loss involved in the transfers. On the other hand, the envelope pq is generated by treating every point on PQ the way we have treated D and then drawing in the north-east frontier.

What is the envelope ef ? It is the frontier traced out by *all* the points on EF . Thus, it is tangential at v to the broken locus $v'vv''$ representing the

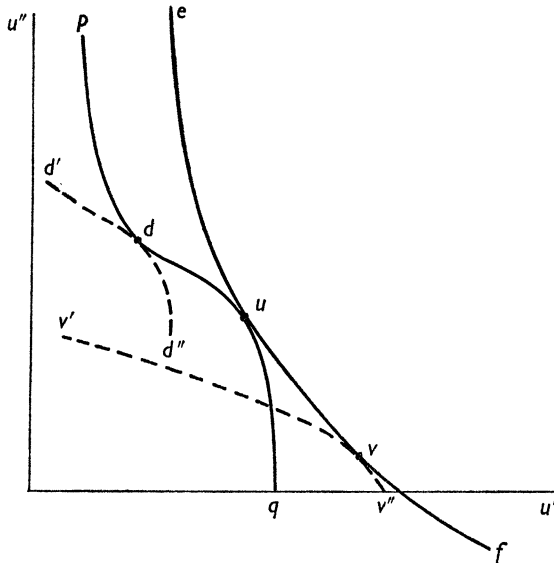


FIG. 4. The ef social utility frontier lies outside the autarky frontier pq . But the vv' frontier corresponding to reallocation of the actual post-trade totals may well loop inside the autarky point. (Utilities being ordinal not cardinal, the curvatures of the loci are of no definite signs.)

ideal reallocation of the goods at the post-trade point V . Since EF lies north-east of PQ , ef must obviously lie north-east of pq .¹

Now let us carefully compare the pre-trade point d with a post-trade point v . Since v is south-east of d , it would be dangerous to say that trade has made the world better off: man 1 is better off, man 2 is worse off. But let us ideally reallocate the goods of v , moving north-west on vv' to compensate man 2. Can we in this way make both men better off? Mr. Olsen's reply would be: Not necessarily. If I may translate his analysis into my terminology, he argues: The $v'v$ locus of reallocation may pass north-east of the autarky point d , or it may pass south-west of that point.

¹ As mentioned in footnote 1 on p. 821, ef might touch pq at one or more points (indeed in the limiting case where trade is always indifferent, at all points). It would be wrong, though, to think that ef must somewhere touch pq : as already indicated, the point u corresponding to U might never touch the pq frontier; and in that case ef would lie everywhere north-east of pq . If ef refers to a country large enough to affect its terms of trade, we can define a new frontier midway, so to speak, between the autarky frontier pq and the optimum-tariff frontier ef . I refer to the free-trade frontier that results from zero tariffs but with different lump-sum redistributions of income. This new frontier can never loop inside pq or outside ef . It corresponds to a free-trade locus that could be pencilled into Fig. 3 midway between PQ and EF .

I have no dispute with this last possibility. In fact, Fig. 4 is drawn with vv' passing below d so that the gainers from trade cannot (by reallocating the given totals) bribe the losers into acquiescing to trade.

But nothing in my 1939¹ or present argument required that the compensation or bribing be possible out of *fixed totals*. What I was concerned to argue was that the *cum-trade* utility envelope frontier ef —not vv' —lay outside the autarky frontier pq . And this is true despite the Olsen contention.

As a matter of fact, imagine compensation beginning to take place at v and V . *This will automatically change the pattern of imports*, moving v north-westward on ef and moving V north-westward on EF . Where will the process end? If the losers are fully compensated—and my argument proves conclusively that they *can* be—the points v and V will be moved so far north-westward as to cause the Olsen effect to disappear necessarily. Thus, we end up north-east of d .

I hope no one will think that I advocate: (1) compensation, or (2) non-compensation. We need a Bergson social-welfare function to answer these questions, and I have always pointed out the illogic of those new welfare economists who used to try to reach normative conclusions on the basis of insufficient norms.

V. SCITOVSKY COLLECTIVE INDIFFERENCE CURVES

In 1939, two years before Professor Tibor Scitovsky² introduced his collective indifference curves, I, of course, did not use them in my exposition. Nor have I yet used them here. But in that Olsen has used them, I ought to mention them briefly.

Through D in Fig. 1 (or as well in Fig. 3), Olsen would draw a Scitovsky indifference curve: this gives the minimum required totals of the goods needed to keep all men as well off as they actually were under autarky. Olsen then argues that the after-trade point V could conceivably lie *under* this Scitovsky curve, not above it. This I freely admit (as in my Fig. 4's passing of vv' below d).

But what do I need for my argument that some trade makes a society potentially better off in the sense of making it possible for all men to be made better off, the gainers being able to more than compensate the losers? Not that V lie above the D Scitovsky indifference curve. But rather the weaker, and inevitable, condition that the EF envelope frontier *somewhere*

¹ See Robert E. Baldwin, "A Comparison of Welfare Criteria," *Review of Economic Studies*, Vol. XXI (1953-54), p. 160, for a defence of my 1939 argument against an Olsen-like criticism.

² T. Scitovsky, "A Reconstruction of the Theory of Tariffs," *Review of Economic Studies*, Vol. IX (1941-42), pp. 89-110, reprinted in *Readings in the Theory of International Trade*. See, too, my cited *Quarterly Journal* article for a discussion of how these concepts all fit together.

pass above the Scitovsky indifference curve. Fig. 5 shows how inevitable this is, and how irrelevant the crossing of the V and D Scitovsky curves is.

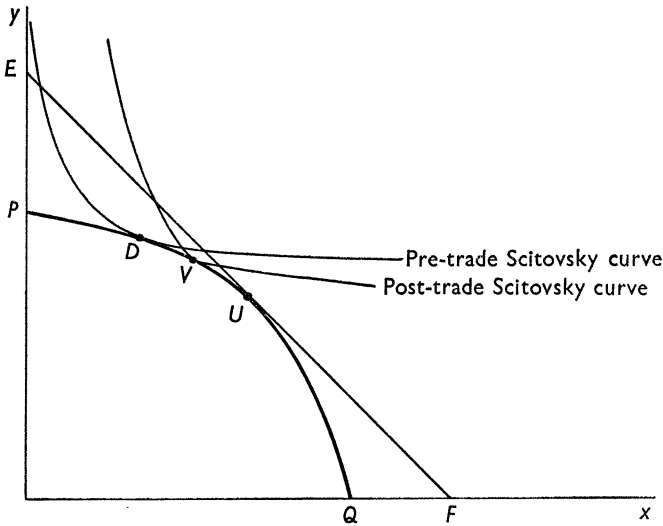


FIG. 5. The Scitovsky community indifference curve of the actual post-trade configuration V may well pass above the community indifference curve of the actual autarky configuration D . But for the winners to be able ideally to compensate the losers requires only that UE cut somewhere above the autarky community indifference curve—as is always the case. The fact that the post-trade community indifference curve always passes above the autarky point means that trade satisfies the 1941 Scitovsky test for an improvement—namely, the losers from trade can never afford to bribe the trade gainers into unanimously repealing all trade.

VI. INDEX NUMBER COMPARISONS

Finally, let me review and extend the index-number type of argument used in my 1939 paper. For simplicity, I shall revert back to Fig. 1's case where the country is too small to affect its terms of trade.¹ In Figs. 1 and 5 the tangent line of the equilibrium point V contains U inside of it, and *a fortiori* because of the strong curvature of PQ it must contain D inside of it: in terms of index number comparisons,² this means

$$\sum P_V Q_V \geq \sum P_D Q_D$$

If only a single individual or a "representative man" standing for identical citizens were involved we could, from the familiar economic theory of index numbers,³ deduce that the post-trade point was "better

¹ Since convexity of PQ makes the EF envelope convex too, I believe the argument could be extended to the general case.

² I have changed my 1939 notation and am neglecting changes in factor supplies.

³ See *Foundations*, Chapter VI, for the conclusions of the Pigou, Könus, Staehle, Frisch, Haberler, Leontief, R. G. D. Allen, Lerner, Samuelson, Hicks line of reasoning.

than " the autarky point. Most of my 1939 paper dealt with this one-person case; and the remainder, to which Mr. Olsen's remarks all apply, was well advised not to use the index-number method.

What does the above index-number comparison mean when there are different men in our economy so that it must be written

$$\sum P_v(q_v' + q''_v + \dots) \geq \sum P_v(q_D' + q_D'' + \dots),$$

and when we observe only the totals in parentheses?

Professor Hicks stated in 1940 a beautiful theorem¹ that gives a partial answer. By it, the index-number comparison alone will tell us that the post-trade point v in Fig. 4 necessarily lies outside the autarky loci pq or dd'' . Thus, Mr. Olsen's conclusion—which he derived in his last paragraph by perceiving that the Scitovsky collective indifference curve through V would have to lie outside the point D (and indeed outside all autarky points of PQ)—follows: Those hurt by trade are never able to bribe the trade winners into going back to autarky.

In terms of welfare economics, Mr. Olsen has proved that the post-trade situation satisfies the 1941 test² added by Scitovsky to supplement the Kaldor-Hicks 1939 test that the gainers from trade—or any improvement—be capable of bribing the losers. Though Mr. Olsen has proved that the Scitovsky test holds, I believe he has not thereby shown that my proof of the Kaldor-Hicks tests' holding is faulty. Actually, my proof I deem satisfactory, and by it I establish something stronger—that an *infinity* of tests or comparisons between the pre-trade and post-trade utility frontiers show the latter to be the frontier farther out. (All this is specified at a glance in Fig. 4.)

In this sense trade makes a country potentially better off.

VII. A WARNING ABOUT FEASIBILITY

What in the way of policy can we conclude from the fact that trade is a *potential* boon? As I pointed out in my 1950 paper, we can actually conclude very little.

To see this turn to Fig. 6, which is much like Fig. 4. Suppose the social welfare function, if we knew it, "favoured" the man hurt by trade, man 2—as shown by the Bergson contours of welfare indifference. And suppose, as is the simple truth, that ideal lump-sum redistributions are never really available to us. Instead the only feasible redistributions must cause harmful substitution and other effects. Then the feasibility locus upon which we

¹ J. R. Hicks, "The Valuation of Social Income," *Economica*, New Series, Vol. VII (1940), pp. 105–24. See my cited *Oxford* 1950 paper, pp. 7–10, for a reformulation and proof of the Hicks theorem on group index-number comparison.

² T. Scitovsky, "A Note on Welfare Propositions in Economics," *Review of Economic Studies*, Vol. VIII (1941), pp. 77–88.

are free to move looks like the dotted curve in Fig. 6, vg , looping inside the ef frontier. Now it is quite possible that this feasibility locus might even loop inside the autarky point d . It evidently follows that, with the given Bergson contours, autarky is preferable to the post-trade situation—showing how difficult must be any rigorous interpretation of “potential” improvement.¹

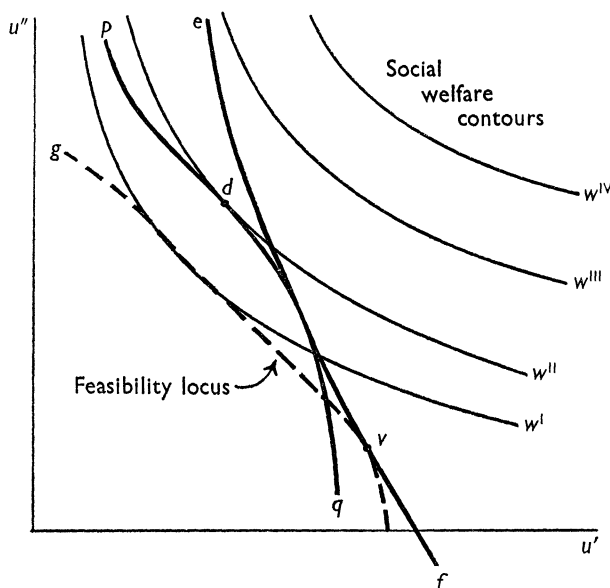


FIG. 6. If lump-sum transfers are not feasible, so that vg rather than ef is the feasibility frontier, the highest social-welfare contour obtainable from free trade might be lower than that obtainable under autarky.

VIII. CONCLUSIONS

Rather than summarise what has been a lengthy argument, I shall simply stand by my earlier position and jot down some truths that are perhaps better understood to-day than twenty years ago.²

¹ Perhaps some situation very near to autarky, but involving a little trade, could be proved to give points north-east of d . This is suggested by the fact that small redistributions will usually involve small deadweight distortions of a higher order of infinitesimals. For the theory of feasibility—sometimes called the theory of the second best—and still in its infancy, see F. P. Ramsey, “A Contribution to the Theory of Taxation,” *Economic Journal*, Vol. XXXVII (1927), pp. 47–61; M. Boiteux, “Sur la question des Monopoles Publics astreints à l’équilibre budgétaire,” *Econometrica*, Vol. 24 (1956), pp. 22–40; R. G. Lipsey and R. K. Lancaster, “The General Theory of the Second Best,” *Review of Economic Studies*, Vol. XXIV (1956–57), pp. 11–32; I. M. D. Little, *A Critique of Welfare Economics* (Oxford, 1957), 2nd edition, Appendix IV; J. de V. Graaff, *loc. cit.*, Chapter V; P. A. Samuelson, *Oxford Economic Papers, loc. cit.*, pp. 18–19.

² See P. A. Samuelson, “Welfare Economics and International Trade,” *American Economic Review*, Vol XXVIII (1938), pp. 261–68, for a discussion of these issues and for what appears to be the first of the modern rediscoveries of the Mill-Bickerdike theorem that some tariff is optimal.

1. If the laws of returns were appropriate for perfect competition (no external effects, indivisibilities, monopolies, dynamic uncertainties, learning processes, etc.), free trade ¹ and ideal transfers could be used to give maximal *world* production in the sense of a farthest out world production possibility frontier.

2. Free trade and ideal transfers could give a similar maximal world utility frontier for all individuals.

3. Free trade will *not* necessarily maximise the real income or consumption and utility possibilities of *any one country*—even though by ideal bribes the international winning countries could bribe the losers into a unanimous vote for free trade.

4. Free trade will not necessarily maximise the income, consumption and utility possibilities of a *subset* of persons or factors within a country.

5. If all but one country will always trade freely it (almost) always pays that one country to behave monopolistically, imposing optimum Mill-Bickerdike tariffs or other interferences to take advantage of less-than-infinitely-elastic international demand.

6. Whatever the fixed pattern of tariffs abroad, it usually pays one country to introduce an optimum duty unilaterally. Some countries may then end up better off than under free trade; or perhaps none will end up better off. But never can *all* countries end up better off; and indeed, the losers from the tariff pattern can always theoretically offer the winners large enough ideal bribes to get rid of all tariffs and interferences with free trade.

7. Only at a point reachable by free trade would an international individualistic social welfare function be at its *maximum maximorum*.

8. For a given country, autarky cannot be optimal if ideal transfers are possible. Some trade is better than no trade in the sense of making the nation better off, with a farther out consumption-possibility frontier and farther out utility-possibility frontier.

If ideal lump-sum reallocations of income are not feasible the above conclusions need serious modification and qualification. The same is true when we introduce imperfections of competition, uncertainties, induced changes of an irreversible type and game-theoretic struggles for power and welfare.

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¹ Other devices, such as perfect planning or perfect discrimination, might accomplish the same result.