

A Theory of Mercantilism

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Introduction

Recent concern with the so-called “declining international competitiveness” of the United States has drawn attention to some striking parallels with mercantilist concepts, and led many to wonder whether we are entering a new mercantile era. I have in Chipman (1993) analyzed the concept of international competitiveness at length; in the present paper I examine closely the doctrines of what seem to me the ablest English mercantilist writers, and try to develop a logical theory that captures the essential features of their doctrines. My aim is neither to attack nor to defend these doctrines; rather, simply to understand them. My hope is that if we can better sort out the extent to which differences between mercantilist and classical points of view are differences in methods of analysis and differences in value judgments, and if we can develop a common framework and vocabulary which can encompass both approaches, more rational discussion of policy proposals will be possible.

The term “mercantile system” was introduced by Adam Smith (1776, Book IV, Ch. I) to describe the body of thought typified by Mun (1664) according to which a country’s prosperity would best be achieved by policies to ensure a “favorable” balance of trade and thus an inflow of precious metals. According to Viner (1930, p. 252), the term “mercantilism” was introduced “with the aid of the Germans”; but no references were given. The first use of the term that I have found is that of Roscher (1851, pp. 123) who has this to say: “the usual classification of economic literature into mercantilism, physiocracy, and the industrial system is convenient enough, to be sure, but in reality is without adequate basis.” The term has been used by Heckscher (1955) to describe the practice of economic policy in Western Europe in the 16th and 17th centuries, which emphasized the management of trade by national governments. To try to formulate a single theory to embrace a set of often inconsistent policies as well as a variety of disparate and conflicting views of many writers would be a futile task. Instead I will try to formulate a theory that is internally consistent and also consistent with a reasonable interpretation of the main arguments of the most able mercantilist writers, and consistent as well with most of the types of economic policies that one associates with mercantilism.¹

In the following section I analyze the reasons invariably given in mercantilist writings for the emphasis on the balance of trade, which is the analogy with the excess of income over expenditure of a family. Owing to insufficiently developed principles of national accounting they overlooked the fact that the balance of trade corresponds not to saving but to the excess of saving over investment. However, there is little textual evidence to justify Viner's view that they advocated indefinite accumulation of precious metals, and indeed Mun strongly advocated that the trade surplus be reinvested in more roundabout trades—certainly a form of investment.

In the next section I show that the mercantilists recognized that there were mutual gains from trade starting from autarky, but that they were principally concerned with obtaining greater gains starting from free trade, which of course could only be at the expense of other countries. The question arises whether the balance of trade can correctly measure these gains from trade. I argue that what the mercantilists were groping for was a money measure of the gains from trade. I point out that Davenant used a measure of the balance of trade in which the old imports and exports were multiplied by the new prices, so that his measure corresponds to what I call the Paasche trade-variation, which in a special case coincides with the compensating trade-variation. I also point out that Pollexfen's objective was to maximize the balance of trade subject to a standard-of-living constraint, which is simply the dual of the problem of maximizing a country's standard of living subject to a balance-of-trade constraint. If a country follows such a policy, any deterioration in its terms of trade will lead to a trade deficit, and any improvement in its terms of trade to a trade surplus—an extreme form of the Laursen-Metzler effect. Under such conditions, a country's balance of trade would correctly indicate its gains from trade. A discussion of various money measures of gains from trade is given in the section following.

Finally it is argued that, given the mercantilists' formulation of a country's objectives, often what matters most is not a country's absolute welfare, but its welfare relative to that of the rest of the world—what Hume called the “jealousy of trade.” In the last section I show that while stringent conditions are needed to produce the result that technical change in one country will worsen the terms of trade, and thus the standard of living, of another, if a cardinal measure of welfare is adopted (and the Hicksian equivalent variation is recommended), much weaker conditions are needed to produce the result that a technical change in one country will improve its standard of living more than those of other countries: briefly, that the share of the expanding country's exports in its national income be “small” by which is meant less than half of the sum of the countries' elasticities of demand for imports less one.

The balance of trade as the excess of income over expenditure

Throughout the mercantilist literature one finds, at the very basis of their reasoning, the analogy between a country and a family. A family grows rich if it saves, i.e., spends less than it earns, and grows poor if it dissaves; likewise, a country grows rich if it maintains a positive balance of trade, and grows poor if it maintains a negative one. This analogy, or parable, may be found in one of the earliest mercantilist tracts, written in 1549 and first published in 1581, and recently attributed to Sir Thomas Smith (1969, p. 63):

For we must always take heed that we buy no more of strangers than we do sell them; for so we should impoverish ourselves and enrich them. For he were no good husband, that had no other yearly revenues but of his husbandry to live on, that would buy more in the market than he sells again.

The first sentence of this passage was quoted by Viner (1930, p. 256) (who attributed the authorship to John Hales) to support his contention that “the mercantilists wanted an export surplus primarily because they wanted more bullion and because they saw that for a country without gold or silver mines a favorable balance of trade was the only means available to procure bullion” (p. 264). However, he omitted the explanation provided in the second sentence.

Mun (1621) opened his *Discourse of Trade* with a passage that provided a similar explanation of the desirability of a positive balance of trade (pp. 1–2):

The trade of Merchandize, is not onely that laudable practize whereby the entercourse of Nations is so worthily performed, but also (as I may terme it) the verie *Touchstone* of a kingdomes prosperitie, when therein some certain rules shall be diligently obserued. For, as in the estates of priuate persons, wee may accompt that man to prosper and growe rich, who being possessed of reuenues more or lesse, doth accordingly proportion his expences; whereby he may yearelie aduance some maintenance for his posteritie. So doth it come to passe in those Kingdomes, which with great care and warinesse doe euer vent out more of their home commodities, then they import and vse of forren wares; for so vndoubtedly the remainder must returne to them in treasure. But where a contrarie course is taken, through wantonnesse and riot; to ouerwaste both foreign and domestike wares; there must the money of necessitie be exported, as the meanes to helpe to furnish such excesse, and so by the corruption of mens conditions and manners, manie rich countries are made exceeding poore, whilst the people thereof, too much affecting their owne enormities, doe lay the fault in something else.

A similar, expanded, account was given in Mun's posthumous work (1664, pp. 7–8), including an entire paragraph expanding on the analogy between a country and “the estate of a private man.”

Misselden, who first coined the expression “balance of trade” in the published literature, returned many times to the analogy among a merchant, a family, and a country. In one interesting passage he used accounting concepts (1623, p. 130):

A *Merchant* when hee will informe himselfe how his Estate standeth, is said to take a *Ballance* of his Estate: wherein he collecteth and considereth all his *Wares*, and *Monyes*, and *Debts*, as if hee would cast euery thing into the *Scale* to bee tried by waight: Which is therefore in *Merchants* and *Accomptants* termes, so called a *Ballance* of Accompt, or a *Ballance of Trade*. . . .

A *Father* or *Master of a Family*, doth also consider his Estate, by comparing his *Expence* with his *Reuenue*: and if he finde, that his *Expence* exceedeth his *Reuenue*; either he must *Lessen his charge*, or els *Consume his Estate*.

The analogy between a country and an individual economic unit was also stressed by Locke (1696). According to him (p. 27): “A Kingdom grows Rich, or Poor just as a Farmer doth, and no otherwise,” and he went on to illustrate how a farmer and his heirs could grow in wealth if they saved, or become poor if they dissaved. Again (p. 118): “Tis with a *Kingdom* as with a *Family*. Spending less than our own Commodities will pay for, is the sure and only way for the Nation to grow Rich.” And Pollexfen (1697a, p. 81) stated: “That undeniable Maxim, *That the way to be Rich is to be careful in Saving, as well as industrious in Getting*, hath the same reference to Nations as to particular Persons, or Families.”

What these passages make extremely clear is that the mercantilists considered a country's balance of trade to be equal to the excess of its income over its expenditures—an insight that was considered novel and important when rediscovered by Alexander (1952). There is, however, an important difference between the concept as they conceived it and as it is defined today. In the case of an individual or family, the surplus referred to by the mercantilists was clearly an excess of income over *consumption* expenditures, i.e., *saving*; whereas under contemporary balance-of-payments accounting, a country's balance of payments on goods and services is equal to the excess of saving over investment. Since the mercantilists invented the concept of the balance of trade, they should presumably be entitled to their own definition of it. Logically, then, it should *exclude* imports and exports of capital goods; thus, a country that exported only consumer goods and imported both consumer and capital goods should be considered to have a favorable balance of trade.² Indeed, Petty (1691a) came very close to such a concept in including imported durable goods as well as gold and silver in the capital balance; however, he esteemed them more as a store of value than as instrumental goods. Pollexfen (1697b, pp. 7, 40, 49) even judged the worth of a trade

by the balance of exports over imports of “perishable Commodities, and Materials to supply Luxury” (p. 40) as well as manufactures (p. 47); this idea would, if carried out explicitly, include non-perishable necessities in the capital balance—presumably to help maintain human capital.

It will of course be objected that mercantilists included only gold and silver in the capital balance, and that they therefore confused money with capital goods (cf. Viner 1930, p. 266), as might be suggested by Mun’s statement—that has so misled historians of economic thought—that the trade surplus “must return in treasure.”³ Mun, who was a very successful merchant, surely could not be supposed to believe that individuals saving to build up the wealth of their families and heirs would simply accumulate gold and not invest it.⁴ And indeed, he argued that the “treasure” accumulated from a trade surplus should be reinvested abroad (Mun, 1621, pp. 21–22): “whatsoever Summes of forren readie monyes are yearly sent from hence ... shall yearly bring in as much siluer, as they send forth; which hath beene alwayes truly performed, with an ouerplus, to the increase of this Kingdomes treasure.”

This argument, which was further elaborated in Mun (1664, Ch. IV), was ridiculed by Adam Smith (1776), but deserves to be interpreted more carefully. Mun argued specifically against “the keeping of our mony in the Kingdom” (p. 23) since this would reduce trade and cause inflation at home, hence it should be employed in more roundabout trade, i.e., “to enlarge our trade by enabling us to bring in more foreign wares, which being sent out again will in due time much encrease our treasure” (p. 20). He explained that importation of goods from the East-Indies for reexport to Europe would require investment in shipping and other expenses that would tie money up for a considerable time, but ultimately bring a good return (pp. 22–3):

For it is in the stock of the Kingdom as in the estates of private men, who having store of wares, doe not therefore say that they will not venture out or trade with their mony (for this were ridiculous) but do also turn that into wares, whereby they multiply their Mony, and so by a continual and orderly change of one into the other grow rich, and when they please turn all their estates into Treasure; for they that have Wares cannot want mony.

From the point of view of Austrian capital theory, the adoption of more roundabout methods of production such as the reexport trade discussed by Mun is certainly a form of investment; but unfortunately there is no way to identify such investment activities in statistics of merchandise trade.⁵ These would show a zero balance from the activities Mun describes; hence the confusion.⁶ But as is clear from the parable at the end of the chapter, investment is what Mun had in mind (1664, p. 27):

For if we only behold the actions of the husbandman in the feed-time when he casteth away much good corn into the ground, we will rather accompt him a mad man than a husbandman: but when we consider his labours

in the harvest which is the end of his endeavours, we find the worth and plentiful encrease of his actions.

The confusion over different concepts of the balance of trade is reminiscent of the confusion that followed the publication of Keynes's *General Theory* over the senses in which saving and investment were unequal or necessarily equal. This was resolved by the concepts of *ex ante* and *ex post* saving and investment. The first expresses a disequilibrium concept useful in theory, according to which an excess of desired saving over desired investment will lead to a fall in interest rates which in turn will choke off some of the saving and call forth the remaining investment, with the result that *ex post* saving and investment—which alone can be observed statistically—will be equated at a higher level. In similar fashion we may regard Mun's Treasure as the excess of *ex ante* exports over *ex ante* imports, obtained from short-term trades, providing the cash-in-advance needed to finance the more roundabout trades, resulting in *ex post* exports and imports—again, which alone can be observed statistically—becoming equated at a higher level than previously.⁷

The question of exactly how accumulated gold and silver can be used to increase a country's wealth is admittedly not treated in a very satisfactory manner in many mercantilist writings. This is illustrated by the following curious passage from Pollexen (1697a, pp. 7–8):

Though it be granted that our *Gold* or *Silver* cannot afford us any increase while kept within the Kingdom, yet it being that in which the Riches of the Nation doth so much consist, and so necessary for the Payment of Fleets and Armies, and carrying on of Commerce, that we cannot be Safe, nor Rich, without it; this Nation being so well stored with Staple Commodities of our own growth, as well as others, from our Plantations, and other places for Exportation, it may be said, we rather want *Trade* than *Stock*. But if it should be thought we want *Stock*, it is more our Interest to apply our selves to increase our Products and Manufactories, and Consumption of them, and to retrieve our *Fishing Trade*, to add to our *Stock*, then to incourage the Exportation of *Bullion*
...

This could imply, for instance, that the precious metals are used in part to purchase ships from Sweden; although later (p. 91) Pollexfen suggests "Building more great Ships of our own" to retaliate for Sweden's high tariffs on English manufactures. But the passage shows that Pollexfen considered gold and silver useful for purposes other than mere hoarding; it also undoubtedly reflects his view that at the time he was writing, the existing stock was insufficient to satisfy the needs he enumerated (1697b, p. 8). In contrast to Mun he was very guarded about reinvesting gold and silver in trade (pp. 8–9):

Before Countenance should be given to *Trades* carried on by the Exportation of *Gold* and *Silver*, an Exact Inquiry should be made, what Returns we shall have for it, or wherein it will be Advantageous to the Nation; and if it appear, that except for the Uses aforesaid, for Stores or Goods for a further Manufactory, no *Trade* carried on by the Exportation of *Bullion* can bring us in any Returns, but what must be consumed in Luxury, or Prodigality, or hinder the expence of our own Manufactures, we should make but a bad Exchange.

Unsatisfactory as these explanations may be, I do not see how they can support the thesis that the mercantilists advocated *indefinite accumulation* of bullion, as Viner (1930, p. 264) insisted.⁸

The mercantilists were more convincing when they discussed the causes and remedies of a deficit rather than a surplus in the balance of trade. This was attributed to an excess of consumption over production. Misselden spoke of the “want of money” and explained (1622, p. 11):

The *general remote* cause of our want of money, is the *great excesse* of this *Kingdom*, in cõsuming the *Commodities* of *Foreign Countries*, which prove to us *discommodities*, in hindering us of so much *treasure*, which otherwise would bee brought in, in lieu of those *toyes*.

Misselden’s antagonist Malynes, though in complete agreement that the chief cause of “the decay of trade in England” was the “want of money” (Malynes, 1622, p. 104), attributed the problem to the exchange rate being below par (pp. 11–14).⁹ The following year Misselden argued—somewhat more logically in not singling out foreign commodities (1623, p. 132):

But if all the *Causes* of our *Vnder-ballance of Trade*, might be contracted in two words, surely they might be represented, in two extremities of the Kingdome at this day: *Poverty* alas, and *Prodigality*. The *Poore* sterue in the streets for want of labour: The *Prodigall* excell in excesse, as if the world, as they doe, ran vpon wheels. The one drawe’s on the *Over-ballance of Forraine Trade*: The other keepe’s backe in *Vnder-ballance our Trade*.

Likewise Pollexfen (1697a, p. 41):

Those that are prodigal in the consumption of Foreign Commodities, do by that prodigality bring the Nation in Debt more than necessary, as much as they might have saved to themselves in their own Expences; and those that are prodigal in the expence of their own Products, do decrease the Exportation of so much as they might have saved.

and quite succinctly (p. 51): “it being not the way to grow Rich to have many Eaters, and few Workers.”

Mun (1664, pp. 37–8) expressed the matter in terms almost identical with those used in recent discussions:

...the Commonwealth shall decline and grow poor by a disorder in the people, when through Pride and other Excesses they do consume more foreign wares in value than the wealth of the Kingdom can satisfie and pay by the exportation of our own commodities, which is the very quality of an unthrift who spends beyond his means.

It is hard not to compare such a passage with similar ones that occurred in the 1940s when Misselden's "want of money" was renamed "dollar shortage" by Crowther (1941), Kindleberger (1943), Balogh (1946) and others, and in the 1980s when a similar concern arose over the growing lack of "international competitiveness" of the United States. Harrod (1947, p. 43) said of the phrase "dollar shortage" that "it is no more than the young man going forward and living beyond his resources without leave." Haberler (1948, p. 435), who could certainly not be accused of being a mercantilist, observed that "the dollar shortage is merely a consequence of the fact that many countries are unwilling or unable for one reason or another to live within their means." Hatsopoulos, Krugman, and Summers (1988, p. 299) noted that "the trade deficit represents, in essence, a U.S. economy that has been living beyond its means."

Misselden's proposed remedies consisted of protection of manufactures to increase employment and production, and prohibition of imports of luxuries to discourage consumption. It is interesting that Pollexfen advocated tackling the problem directly, and protective measures only as a last resort (1697b, p. 47):

So long as the Nation keeps to Frugality and industry Laws may not be absolutely Necessary to Limit the Consumption of any Foreign Commodities, nor to increase or promote our own Manufactures: But if there be an appearance, that a Nation is running into a luxurious Prodigal Expence of Foreign Commodities, and to a neglect in Manufacturing and promoting their own, and to idleness, and spending of time in what is not profitable for the Nation, the usual Consequences of Luxury, (which we fear is our Case at present) then Laws will be necessary to put a stop to it, that the Treasure of the Nation may not be Consumed thereby: For by the Course of Trade no stop can happen to any such Consumptions nor Idleness, till want of Money occasion it.

and again (p. 56):

... whether such Laws be good and necessary, or not, depends wholly upon the Genius and Inclination of the People. If Parsimonious and Industrious, then no need of such Laws; but if Luxurious and Idle, must be Ruin'd without them.

In the late mercantilist writings we even find an anticipation of a phenomenon perceived by Kindleberger (1950, p. 181) and which became Nurkse's (1953) celebrated "demonstration effect"; according to Steuart (1767, Book II, Ch. XXIX; 1805, II, p. 112):

... the young people of one country travel into the other, where the inhabitants stay at home: a circumstance which would prove very prejudicial to the country of the travellers, if a wise statesman did not, by reasonable prohibitions upon certain articles of foreign consumption, prevent the bad consequences of adopting a taste for what his subjects cannot produce.

The great void in mercantilist writings is the lack of any concept of capital as a produced good and productive factor. In the absence of capital accumulation, one can only explain imbalances of trade on the basis of saving in one country offset by dissaving in another, or more generally, in differential propensities to save among countries. Pollexfen (1697a, p. 19) asserted that

no Reason can be given why *Bullion* or *Money*, should be Exported out of any Nation to a Foreign Country, to remain and continue there, but in order to pay, or contract some Debt; unless the Person that Exports it, intend to remove himself also, or to give it away.

In the absence of productive investment this would imply that a country with a surplus must be lending to a country that is living beyond its means (or at least, saving at a lower rate), the first country merely acquiring property in the second—hardly a promising investment. The same reasoning would apply within a country: for every family that saves and becomes rich, there must be another that dissaves and becomes poor (or at least saves at a lower rate), the first ultimately purchasing its estate from the second. If it is true as Pollexfen states (1697a, p. 134) that "Gains should arise by what got from Foreigners, which can only enrich the Nation, and not so much out of our own people, which can only make Riches change hands," then the same reasoning would imply that the gains of one country can only come at the expense of another. It should not be concluded, however, that the problem of explaining capital movements among countries was resolved by the classical economists; Adam Smith rather avoided the question of foreign investment than resolve it.

The balance of trade as a measure of gains from trade

The balance of trade in mercantilist writings was an indicator not only of increased wealth resulting from saving, but also of the gains from trade.

That there was some mutual gain from trade was recognized already by Malynes (1601), but expressed in mystical terms and not brought to bear on the more practical aspects of the discussion (p. 6):

God caused nature to distribute her benefits, or his blessings to seuerall climates, supplying the barrenesse of some things in our countrey, with the fruitfulness and store of other countries, to the ende that enterchangeably one common-weale should liue with another.

This passage reappeared in Malynes (1622, pp. 58–9) where it was now clearly used as an argument against autarky. The argument was accepted by Malynes's antagonist Misselden (1622, p. 25):

And to the end there should be a *Commerce* amongst men, it hath pleased *God* to inuite as it were, one Countrey to traffique with another, by the variety of things which the one hath, and the other hath not: that so that which is wanting to the *one*, might be supplied by the *other*, that all might have sufficient.

On the face of it this seems to conflict with Misselden's view that the balance of trade is a measure of a country's gains from trade (1623, p. 116):

So is also this *Ballance of Trade*, an excellent and politique Inuention, to shew vs the difference of waight in the *Commerce* of one Kingdome with another.

However, this can be interpreted to mean either that: (1) starting from a position of free trade, any further gains one country makes from trade are necessarily at the expense of another country (which of course is simply a definition of the Pareto optimality of global free trade), and that such gains may be measured by the balance of trade; or that (2) what is important is not so much a country's *absolute* gains from trade as its gains *relative* to other countries.

In Pollexfen (1697a, p. 59) we find the mystical confronted with the practical:

Most *Trades* are carried on between Nations by a permutation of Commodities, as a mutual conveniency, for the supplying each the other with what they want; Providence having so ordained that different Nations may abound with different Commodities, and to want others, which makes the Exchange commodious. Those that want least, and have most to Export (to which Industry added to Natural Advantages doth much contribute) generally have the advantage; ...

Again (p. 157):

It is true, that the continuance of Trade depends much upon a mutual conveniency, but the advantage and increase of Riches, expected by trade, depends upon our Exporting more Goods than we Import; ...

This may be interpreted as affirming that there is mutual gain from trade when starting from autarky, which should be continued, but that starting from free trade one country can gain only at the expense of another.

What is understood today by gains from trade is essentially the improved terms of trade resulting from liberalization of trade, or from a country's exploiting its monopoly position in trade. Passages recognizing the benefits of improved terms of trade can be found in quite early mercantilist writings. An anonymous document, "A Discourse of Corporations" dating from 1587–89 and reproduced in Tawney & Power (1924, III, p. 267) contains the passage:

...it is the best policie so to gouverne our owne comodities that our Cuntrey and soile yeldeth, that they may carrie estimacion and value in those partes whither we transporte them, and not be too deare at home; and that forrein Comodities be kept at lowe and base prices amonge us.

And another is that the thinges which we carrie out do surmount in price the thinges which we bringe in; else shall we sone make a poore land and a poore people.

Viner (1930, p. 256), who quoted the second paragraph above, interpreted it to refer to the balance of trade, but the words "prices" seem certainly to refer to the terms of trade.¹⁰

Reference to the terms of trade may also be found in Mun (1621), who stressed the role of trade in providing abundant and cheap commodities for the population. For example (pp. 7–8):

Now as touching the Trade of *Callicoes*, of many sortes, into which the *English* lately made an entrance; although it cannot be truely sayd, that this commoditie is proffitable, for the state of *Christendome* in generall (in respect they are the manufacture of Infidells, and in great part the weare of Christians) yet neuertheless, this commoditie, likewise is of singular vse, for this common wealth in particuler; not onelie therewith to increase the Trade into forren parts; but also thereby, greatly to abate the excessiue prices of Cambricks, Holland, and other sorts of Linnen-cloath; which daily are brought into this Kingdom for a verie great summe of mony.

Mun also observed that the gain from trade could be measured by the amount of imports a country could get for its exports—i.e., the barter terms of trade (1621, p. 15):

...neither the *Venetians*, *French*, nor *Dutche*, doe vent so much of their owne Country commodities in those partes, as doe provide their necessarie wants of the proper wares of *Turkes* Only the *English* haue more advantage then any other Nation in this kinde, for they vent so great a quantitie of broad-cloathes, tinne, and other *English* commodities, that the proceede thereof, doth not only provide a sufficient quantitie of part of the sayd *Turkish* wares (which fit their vse), but also a proportion of about 300. great balles of *Persia* Raw-silke yearely.

A very succinct statement is found in Petty (1691b, p. 83):

Why should we forbid the use of any Foreign Commodity, which our own Hands and Countrey cannot produce, when we can employ our spare Hands and Lands upon such exportable Commodities as will produce the same, and more.

Post-mercantilist statements of the nature of the gains from trade, prior to Samuelson (1939), do not go much beyond these, or even as far.¹¹

The most precise statement of the nature of the gains from trade in mercantilist writings is to be found in Davenant (1696). It seems worth while to quote and analyze *in extenso* the following passage in which he explains the advantage to England of the East-India trade (pp. 31–4; 1771, I, pp. 102–3):

If the people of *England* are willing, and pleased to wear *Indian* Silks and Stuffs, of which the Prime Cost in *India*, is not above a Fourth part of what their own Commodities would stand them in here; and if they are thereby thus enabled to Export so much of their own Product, whatever is so sav'd is clear Gain to the Kingdom in General. But to set this Matter in a clearer Light.

Suppose 200,000 *l. per Annum* of the Prime Sum sent to *India*, is return'd in Commodities for our own Consumption: And,

Suppose half this Sum, *viz.* 100,000 *l.*, to be return'd in such Goods as are worn here, in the stead and room of the Woollen Manufactures.

From 100,000 <i>l.</i> Prime Cost to <i>India</i> , there may reasonably	<i>l.</i>
expected Goods that sell here for	400,000
So that by sending to <i>India</i>	100,000
We gain for our own Consumption clear	300,000

Now this must be clear Profit to the Kingdom, because this Sum would be other ways laid out and consum'd in our own Product; which Product we are, by this Means, enabled to Export. For when we come to examine into the true Reason of the Great Wealth of *Holland*, we shall find it

chiefly to arise from this Frugality of Consuming at Home what is Cheap, or comes Cheaply, and carrying abroad what is Rich, and will yield most Mony.

In Figure 1, excess demands (imports if positive, exports if negative) of commodities 1 and 2 are measured on the horizontal and vertical axes respectively, commodity 2 being clothing which is imported, and commodity 1 being a representative export good. To reproduce Davenant's example, kinked trade-indifference curves are drawn with kinks at z^0 and z^1 , supported by budget lines through the origin corresponding to price vectors p^0 and p^1 at the initial and final equilibrium respectively. It is assumed that trade is balanced in both equilibria. At the initial equilibrium, an amount $-z_1^0$ of the export good is exchanged for z_2^0 units of clothing imported, say, from France; at the new equilibrium, an amount $-z_1^1$ of the export good—one-fourth of the previous amount—is exchanged for the same amount $z_2^1 = z_2^0$ of clothing now imported from India. At the new prices, indicated by the line joining the origin and z^1 , the minimum trade deficit (which of course is the negative of the maximum trade surplus) subject to the old trade-utility level is indicated by the dashed line through z^0 . Measured in units of commodity 1, the gain from the East-India trade is measured by the distance OC , which is what in Chipman (1992) I called the compensating trade-variation, corresponding of course to Hicks's (1942) compensating variation. This, as in Davenant's example, is equal to three-fourths of the original outlay $0z_1^0$. Owing to the kinks in the trade-indifference curves, the compensating trade-variation also corresponds to what we may call, following Hicks, the Paasche trade-variation $p^1 z^1 - p^1 z^0 = -p^1 z^0$, which is simply the old balance of trade denominated in the new prices. Intuitively, the gains from trade are measured by the maximum balance of trade the country would have to have—i.e., the gold and silver it would have to acquire in exchange for consumable commodities at the new prices—in order for welfare to be reduced to the old level.

The diagram shows that a contra-mercantilist measure of gains from trade is equally possible. Starting from the original equilibrium z^0 one can ask what the minimum trade deficit (the negative of the maximum trade surplus) would be at the original prices p^0 to make the country as well off as in the new situation, z^1 . This is shown by the dashed line through z^1 intersecting the horizontal axis at E . Measured in units of commodity 1, the distance OE is the equivalent trade-variation, and again because of the kinks, it is also equal to the Laspeyres trade-variation. In money terms it is equal to $p^0 z^1 - p^0 z^0 = p^0 z^1$, which is the negative of the new balance of trade denominated in the old prices. Intuitively, the gains from trade are now measured by the minimum trade deficit the country would need to have—or the amount by which the country would have to live beyond its means, or the amount of bullion it would have to give up in exchange for goods—at the old prices, in order to enjoy the new standard of living.

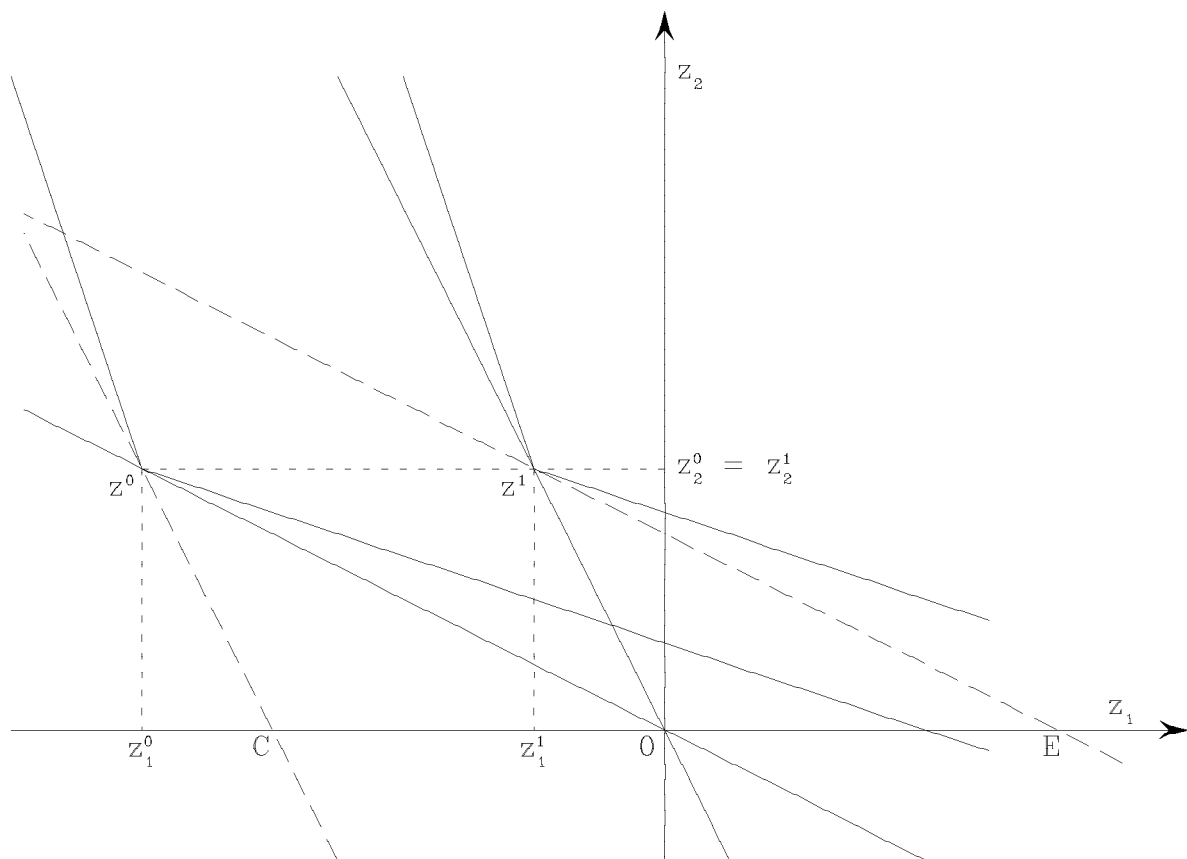


Figure 1

Of course, if we were to consider a worsening of the country's terms of trade given by a movement from z^1 to z^0 , everything would be interchanged and $0E$ would measure the decline in welfare in terms of the compensating and Paasche trade-variations, and $0C$ the same decline in terms of the equivalent and Laspeyres trade-variations.

Davenant did not assume fixed production, however, but recognized that the Indian imports would undersell domestic clothing manufactures. His suggestion—quite audacious for a mercantilist—was that these should be abandoned and the raw wool diverted to the production of textiles to be exported abroad:

That the *East-India* Goods do something interfere with the Woollen Manufacture, must undoubtedly be granted; but the Principal Matter to be consider'd, is, Which way the Nation in General is more Cheaply supply'd.

If 100,000 *l.* Prime Cost to *India*, brings Home so many Goods as stand in the stead, and supply the room of 400,000 *l.* of our own Manufactures, it must certainly be adviseable not to Prohibit such a Trade,

but rather to divert the Wooll used in these our Home Manufactures, and the Craft, Labour and Industry employ'd about 'em, to the making fine Broad Cloth, course and narrow Cloths, Stuffs and other Commodities, fit for Sale in Foreign Markets; since 'tis an undoubted Truth, that 400,000 *l.* worth of our Native Goods sold Abroad, does add more to the Nations General Stock and Wealth, than Four Millions worth of our Home Product consum'd within the Kingdom.

This conclusion aroused the ire of Pollexfen (1697b) who devoted his pamphlet to attacking Davenant's (1696) position. The controversy is of great interest in bringing out the nature of the older hard-line mercantilist view of the nature of the gains from trade. It also sheds light on the role of bullion *vis-à-vis* other commodities.

Pollexfen opened his attack by spelling out his position on the latter question (1697b, pp. 6–7):

...what may properly be called the Riches or Treasure of a Nation? Or what may be esteemed the most Useful, after what is absolutely Necessary, to supply the Necessities of Nature? Some being of Opinion that nothing doth deserve that Name, or to be so esteemed, but Gold and Silver; because no other Metal is so lasting and durable, or so fit to receive the Royal Stamp, nor to be ascertained in Value, and divided into several Denominations, nor so convenient to pay Fleets and Armies; and because hath a general esteem in all parts of *Europe*, as fit for such uses, and to be the Standard for the carrying on of Commerce, and to be Barter'd off for all other Commodities.

That Jewels, Lead, Tin or Iron, though durable, yet having not those other qualifications, do not so well deserve to be esteemed Treasure.

That Silks, Woollen Goods, Wines, &c. may be esteemed Riches between Man and Man, because may be converted into Gold and Silver, yet do not deserve to be esteemed the Riches of the Nation, till by Exportation to Foreign Countries are converted into Gold and Silver, and that brought hither, because are subject to corruption, and in a short course of Years will consume to nothing, and then of no value.

It should be noted that the first paragraph states that gold and silver are valuable not in themselves but because of their uses for the purposes enumerated, including that of being “Barter'd off for all other Commodities.” The second, that this value is not absolute, but that other durable commodities have some but not all of these desirable properties, hence are not as useful for this purpose—hardly the position of someone suffering from the delusion of Midas. The third and most interesting paragraph singles out a class of goods—luxuries—that are of value to the nation (as opposed to individuals) only insofar as they can be converted into gold and silver by exportation. It has been asserted by Viner (1930, p. 269) that mercantilists “justify

including other things than gold and silver as wealth only because gold and silver can be exchanged for them.” But Pollexfen’s statement could be regarded simply as an early recognition that the value of a commodity is to be reckoned by its *marginal* utility, or “value in exchange,” rather than its total utility or “value in use.” But what is especially noteworthy is that Pollexfen singled out luxuries in this way, and distinguished value to the nation from value to individuals, i.e., public from private interest. This is well brought out by the following passage (1697b, pp. 48–9):

All Traders have Reason to make it their business to get Money by their Trades, by sending out and bringing Home such Commodities as are most vendible, and yield them most Profit. But whether send out Goods or Bullion, or whether what bring back be necessary for the supply of our Necessities, or useful for a further Manufacture, or be spent in Prodigality, Luxury, or Debauchery, or to the hindrance of our Manufacture (so long as they get by it) they do not generally take it to be their Province to mind: But for the good of the whole, it may be presumed the State ought to mind it so far, as may be convenient to prevent the Exportation of our Treasure; if not, the Stock of Gold and Silver, which is absolutely necessary to Carry on trade, as well as for our Defence, will be Consumed; by which the Traders themselves as well as the generality will in time be involved in Misery.

Thus, the basic difference between Pollexfen and Davenant is one of value judgments. Davenant adhered to a principle of consumers’ sovereignty, and in this completely anticipated Adam Smith. Pollexfen rejected this principle completely; for him, people should be supplied with the necessities of life, but no more. A policy of full employment should be pursued, in order to maximize output and prevent people from becoming beggars and living on the welfare rolls and thus dissaving. For this purpose, protection of the labor-intensive industries was essential. Consumption of luxuries was to be discouraged by education, example, and if necessary by sumptuary laws and import restrictions. All the surplus productive power, which was to be maximized, was to go into building up the country’s power.

One may not agree with these objectives, but they form a consistent set of principles of action. Formally, we may observe that just as, in contemporary demand theory, a position of maximum utility subject to a budget constraint (that expenditures equal income) is also a position of minimum expenditure subject to a utility constraint, the same duality theorem holds for trade-utility functions and the trade-demand functions that they generate. For a country, a position of maximum trade-utility subject to a balance-of-trade constraint (that the value of excess demand be equal to the deficit in the balance of trade) is also a position of minimum trade deficit, or maximum trade surplus, subject to a standard-of-living constraint. Davenant would wish to impose a constraint that the balance of trade be nonnegative, and subject to this, maximize the country’s standard of living. Pollexfen would wish to impose a constraint on

the country's standard of living, that it be at the subsistence level, and subject to this constraint, maximize the country's balance of trade. The two principles agree completely except for the choice of the balance-of-trade level in the one case and the standard-of-living level in the other. One major difference, however, between Davenant and Pollexfen, is that Davenant would accept individual preferences as social preferences, whereas Pollexfen would definitely not; he would impose his own social preferences and enforce them by various regulatory measures.

Another interesting feature of the debate between Davenant and Pollexfen is their position on the distribution of income or welfare within the country. Davenant ignored any distributional effects of allowing imports from India, but Pollexfen emphasized them (1697b, pp. 17–18):

If it be said, that this Trade hath a good foundation, because Materials are plenty, and Labour cheap in *India*; it being agreed that these Manufactured Goods are spent both Abroad and at Home, in the room of our own. This instead of being an Argument for recommending this Trade, will appear the most dangerous part of it: For unless our Wooll fall to nothing, and the wages of those that work it up to 2 *d. per Day*, and Raw Silk and Silk *Weavers* Labour proportionable, the *India* Goods will occasion a stop to the Consumption of them; because those from *India* must otherwise be Cheapest, and all People will go to the Cheapest Markets, which will affect the Rents of Land, and bring our Working People to Poverty, and force them either to fly to Foreign parts, or to be maintained by the Parishes: And therefore how the Landed men are concerned in the Contest about this Trade, they may do well to consider.

Not only would the import of silks from India bring down wages and cause unemployment, but it would benefit only the rich consumers (1697b, p. 16):

...it is plain, that the pretended Gains made by that Trade on the Goods sold here is not Gains to the Nation, but gotten out of our own Peoples Pockets, by the Sales of such Goods to the Gentlemen and Landed men, or others, who are the Consumers ...

In his reply, Davenant made a headlong attack on the sanctity of gold and silver reserves (1698, II, p. 15; 1771, I, p. 345):

Gold and Silver are indeed the Measure of Trade, but the Spring and Original of it, in all Nations, is the Natural, or Artificial Product of the Country, that is to say, what their Land, or what their Labour and Industry produces.

And this is so true, that a Nation may be suppos'd, by some Accident, quite without the Species of Money, and yet, if the People are numerous, industrious, vers'd in Traffick, skill'd in Sea-Affairs, and if they have good

Ports, and a Soil fertile in variety of Commodities, such a People will have Trade, and gather Wealth, and they shall quickly get among 'em, a plenty of Gold and Silver: So that the real and effective Riches of a Country, is its Native Product.

The latter paragraph foreshadows Hume (1752), as of course Locke (1696, p. 117) did also. Davenant continued, in answer to Pollexfen's statement, as follows (1698, II, p. 16; 1771, I, p. 355):

Gold and Silver are so far from being (as this author says) *the only Things that deserve the Name of Treasure, or the Riches of the Nation*, that in truth, Money is at Bottom no more than the Counters with which Men, in their dealings, have been accustom'd to reckon. . . .

When a Country begins to thrive by Trade, it must not be imagin'd that the Increase and Profit is presently converted into Coin or Bullion, and a great ready Cash is not the only Sign of a thriving People, but their growing wealthy is to be discern'd by other Symptoms.

Explaining what these symptoms consisted of, he went on (1698, II, pp. 209–10; 1771, II, p. 11):

But here Mr. *P—n* will object, that there is no National Gain but where there is a return made in Gold and Silver, which he thinks is the only Balance, whereby we can guess at Loss and Profit. He insinuates that no Importation of Commodities for home Consumption, is to be esteemed a Gain, so that by his way of arguing, the Returns for what is Exported to Foreign Parts, is only to be call'd Profit, and that not unless it come in Bullion. . . .

We shall endeavour to show, that, generally speaking, by whatever the Returns are more worth than the Commodity exported, the Nation is by so much a Gainer, let the Goods imported be perishable or not.

He continued with a restatement of the same kind of analysis that he had used in his previous work, explaining that the returns consisted in the saving in the cost of imports that resulted from the improved terms of trade. He still used the balance of trade, however, as the criterion of gains from trade (1688, II, p. 217; 1771, II, p. 16):

To come at the right Knowledge of what a People get by Trade, it must be examin'd, to what Value they can naturally export of their own Product, and to what Value they can carry to Market of the Product of other Parts: It must afterwards be computed what their own Consumption is of Foreign Materials, by balancing this together; if there be an Overplus, that Overplus a Nation may be said to get by Traffick.

The apparent contradiction may be resolved by noting that in calculating the balance of trade, he multiplied the old imports and exports by the new prices, thus using the Paasche trade-variation as explained in Figure 1 above.

A Money Measure of the Gains from Trade

The analysis in the preceding section of Davenant's explanation of the nature of the gains from trade may of course be generalized. In Figure 2 is shown the diagram familiar to all students of international-trade theory—a diagram for which Viner (1937, p. 521) claimed priority. An equilibrium under autarky is shown at the point where the production vector y^0 is equal to the consumption vector x^0 , where a community-indifference curve is tangential to the production-possibility frontier. When trade is opened up, a new equilibrium is established where the new price line is tangential to the production-possibility frontier at y^1 and to a community indifference curve at x^1 . The price line has swung in a clockwise direction, indicating an improvement in the terms of trade. The community has moved to a higher indifference curve indicating that potential welfare has increased. As we know, some groups will necessarily become worse off (a point that was stressed by Pollexfen), but the classic argument of the “new welfare economics” is that all groups *could* become better off since, if necessary, the gainers could compensate the losers.

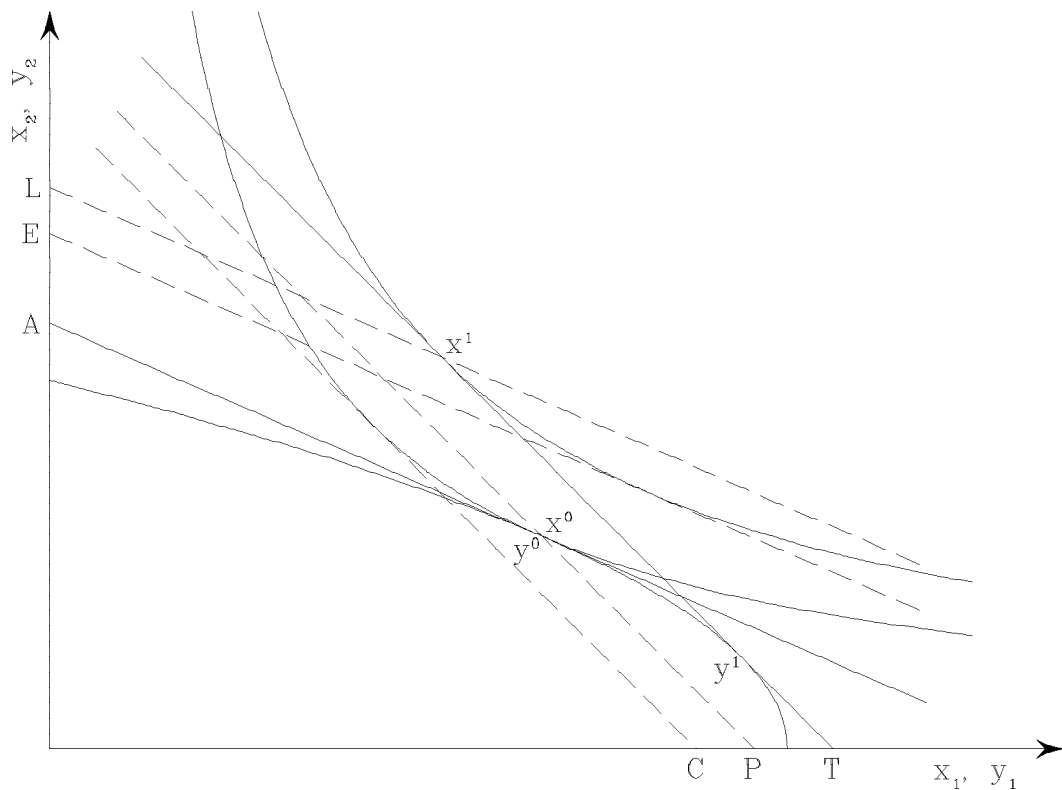


Figure 2

Several money measures of the gains from trade can be defined, following Hicks (1942). If, at the new terms of trade, we seek the minimum expenditure that will make the community just as well off as under autarky, this is shown by the dashed line that intersects the horizontal axis at the point C . The distance CT is the *compensating variation*, measured in units of commodity 1. We may consider this as the situation that would exist if, at the new prices, the country was required to make reparation payments to foreign countries at an amount that would bring its standard of living back to the autarky level. To do this, it would have to develop a surplus in its balance of trade. In nominal terms, therefore, this balance-of-trade surplus measures the gains from trade.

A problem with this measure is that it may be difficult to estimate statistically. If instead we draw a dashed line, parallel to the new price line, through the autarky equilibrium point $x^0 = y^0$, which intersects the horizontal axis at P , the distance PT measures Hicks's *Paasche variation*. In nominal terms (at the new prices) this measures the amount of money the country would have to give away (i.e., the surplus it would have to develop in its balance of trade) so as to be able to afford only the bundle it consumed under autarky. (Of course, under these circumstances, it

could and would do better, by moving to a higher indifference curve.) The Paasche variation underestimates the accurate measure, the compensating variation.

The corresponding measures can be derived using the old (autarky) prices as a base instead of the new (free-trade) ones. The budget line through $x^0 = y^0$ corresponding to the autarky equilibrium intersects the vertical axis at A , and the minimum expenditure at autarky prices that leaves the country as well off as under free trade intersects the vertical axis at E . The distance AE is the *equivalent variation*, measured in units of commodity 2. It may be interpreted as the *deficit* in the country's balance of trade that would be necessary (say by means of foreign aid) at autarky prices to achieve the same level of welfare as under free trade. Again, this is not so easy to measure statistically, so instead we may draw a line parallel to the autarky price line going through x^1 and intersecting the vertical axis at L . The distance AL is the *Laspeyres variation*, measured in units of commodity 2. It overestimates the accurate measure, the equivalent variation.

Similar concepts may be applied to a country's trade-indifference map, as was done in Figure 1 for a special case of kinked trade-indifference curves. This is shown in Figure 3.

Three possible competitive equilibria are shown: an autarky equilibrium at the origin, 0 , where prices are given by the components of the vector p^0 , and two free-trade equilibria indicated by the bases z^1 and z^2 of the normals p^1 and p^2 respectively, where solid price lines are tangential to the corresponding trade-indifference curves. Dashed lines corresponding to prices p^2 are shown which, at those prices, minimize the country's trade deficit (i.e., maximize its trade surplus) subject to the welfare levels prevailing in situations 1 and 0 respectively. The intersections of these lines with the horizontal axis define the compensating trade-variations C^{12} and C^{02} , considered as distances from the origin, 0 , measuring (in units of commodity 1) the improvement in welfare from situation 0 (autarky) to situation 2 and from situation 1 to situation 2 respectively, with situation 2's prices as a base. The dotted line whose slope is situation 2's price ratio and which goes through the equilibrium point z^1 and intersects the horizontal axis at P^{12} is the Paasche trade-variation, considered as a distance from the origin 0 and measured in units of commodity 1. As before, this underestimates the corresponding compensating trade-variation. It should be noted, however, that the corresponding Paasche trade-variation P^{02} is zero—showing that this is an unreliable indicator to use in the space of trades as opposed to the space of quantities produced and consumed depicted in Figure 2.

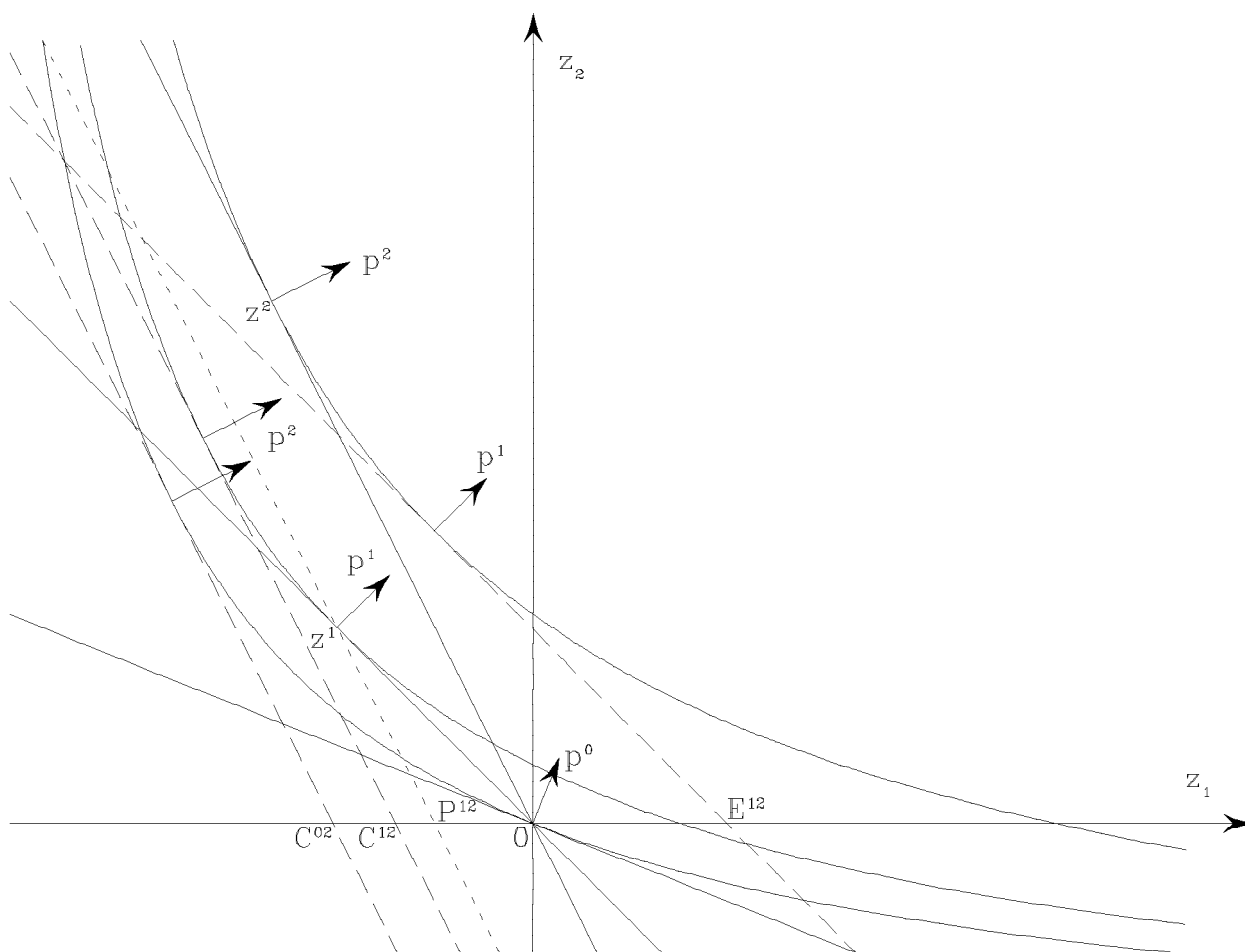


Figure 3

Using situation 1 as a base, the equivalent trade-variation in going from situation 1 to situation 2 is measured by the distance from the origin to E^{12} in units of commodity 1. It measures the trade *deficit* the country would have to run if in situation 1 at prices p^1 it wanted to enjoy the standard of living that obtains in situation 2. In contrast, the distance from the origin to C^{12} , which is the compensating trade-variation with prices p^2 as a base, measures the same improvement in standard of living between situation 1 and situation 2 by the trade *surplus* the country would have to run if in situation 2 it were to have its standard of living lowered to the level of situation 1.

So far, the trade surpluses and deficits we have defined in terms of Hicks's four welfare measures are purely *hypothetical* constructs, not corresponding to any actual surpluses or deficits that might be observed in a country's balance of trade. But for the mercantilist writers and their latter-day successors, these surpluses and deficits have always been something very real. How can we make the connection?

The answer is to be found in the dual approach to the country's maximization problem. Virtually every mercantilist, in theory as well as in practice (cf. Heckscher,

1955), has insisted that the means of subsistence and survival of the population be met; but no more. Of course, what is meant by “subsistence level” depends very much on the culture of the society and objective realities. But if it is social policy that this subsistence level be maintained, whatever it may be, then any deterioration in a country’s terms of trade will require a deficit in the balance of trade, whether this is financed by borrowing, foreign aid, or loss of reserves. Likewise, any improvement in the terms of trade will provide some slack which, if mercantilist policies are adhered to, will result in a surplus in the balance of trade. The question arises, what will be done with this surplus? Perhaps it will be saved for a rainy day, or perhaps it will go to building up the country’s power and influence by making loans and grants to other countries. Under this dual hypothesis, the hypothetical Hicksian measure of compensating variation becomes transformed into an actual observed measure of the country’s balance of trade. The observed balance of trade is then a valid measure of the country’s gains from trade.

A different mechanism may lead to the same result. Hicks (1953), in trying to find an explanation for the “dollar shortage,” assumed as though it were obvious that any external event that worsened a country’s terms of trade (such as—in his analysis—import-competing technical change in a foreign country) would lead to a deficit in the country’s balance of trade (or payments). None of the subsequent literature spawned by Hicks’s paper questioned this cause-and-effect relationship (cf., e.g., Johnson, 1959). An explanation had been provided, however, by Laursen and Metzler (1950, p. 286); their reasoning was that a worsening of the terms of trade would lead people to reduce their saving in order to partially preserve their previous standard of living, and conversely, an improvement of the terms of trade would improve their standard of living and thus increase their propensity to save. Starting from balanced trade, the first would lead to a deficit and the second to a surplus in the balance of trade. As contemporary economists have pointed out (see, e.g., Obstfeld, 1982; Svensson & Razin, 1983), and as Laursen and Metzler fully recognized, on the basis of pure intertemporal analysis the cause-and-effect relationship could just as well go the other way around (in which case a trade *deficit* would provide a better indicator of the gains from trade, in accordance with the above equivalent-variation criterion). The point is, however, that one can make a perfectly reasonable case for inferring gains from trade from empirical data showing a “favorable” balance of trade. The dual criterion of maximizing the balance of trade subject to a standard-of-living constraint is simply an extreme form of the Laursen-Metzler effect.

It has been mentioned previously that a principal mercantilist objective has been promotion of a country’s *relative* productive capacity, or *power*. Under the dual criterion of maximization of the balance of trade subject to a standard-of-living constraint, it is clear that only the relative position of a country matters. This relative position is exactly what Misselden meant by the *balance* of trade. Even if the objective includes not only power but also the achievement of higher absolute wealth, it is obvious that this will require only a high *relative* share of the world’s purchasing power. Nowhere

is this idea stated more pithily than in Locke (1696, p. 15):

Riches do not consist in having more Gold and Silver, but in having more in proportion, than the rest of the World, or than our Neighbours, whereby we are enabled to procure to ourselves a greater Plenty of the Conveniences of Life than comes within the reach of Neighbouring Kingdoms and States, who, sharing the Gold and Silver of the World in less proportion, want the means of Plenty and Power, and so are Poorer. Nor would they be one jot the Richer, if by discovery of new Mines the quantity of Gold and Silver in the World becoming twice as much as it is, their shares of them should be doubled.

In the discussions that took place in the 1940s concerning the so-called “dollar shortage” the emphasis was on “competitive power” and the world *distribution* of welfare (Balogh, 1946). Stolper (1950, p. 285), in trying to explain Balogh’s thesis, suggested that “it may be that foreign countries, particularly those who have suffered from the war, wish to reach their prewar standard of living. Or it may be that foreign countries wish (subconsciously or consciously) to maintain about the same ratio in their standard of living to that of the United States as existed before the war.” MacDougall (1957, pp. 71–2) suggested that as a consequence of an increase in productivity in the United States, “other countries will attempt in vain to emulate the higher standard of living in the United States that results from her higher productivity, and so tend constantly to live beyond their means.” In a similar vein, Hatsopoulos, Krugman, and Summers (1988, p. 299) stated: “we would not view the United States as competitive unless it is able in the long run to maintain a rate of growth in living standards that keeps pace with that of the rest of the industrial world.” Such hypotheses require one, of course, to adopt a cardinal measure of welfare; otherwise it would not be possible to compare the welfares of two countries. But a money measure of welfare such as the equivalent variation exactly fills the bill. Following Hicks’s (1953) seminal article, a flood of contributions appeared attempting to find conditions under which technical change in one country would lead to a deterioration in the terms of trade of another, and thus “dollar shortage”. The conditions for this to take place turned out to be so narrow that atrocious terminology such as “ultra-anti-trade-biased” (Johnson, 1959) had to be devised to describe them. However, if it is required only that a technical change in one country increase its welfare *relatively* to that of the foreign country, i.e., that the foreign country’s welfare decline *relatively* but not necessarily absolutely to that of the progressive country, a considerably less stringent set of conditions is needed to produce the result. In the following and final section, the corresponding theoretical exercise is carried out.

The Effect of Technical Change on Countries' Relative Welfares

Let country k 's demand function $h_j^k(p_1, p_2, Y^k)$ for commodity j —where p_i is the price of commodity i assumed the same in both countries and Y^k is country k 's disposable income—be generated by a utility function $U^k(x_1^k, x_2^k)$ where x_j^k is the amount of commodity k consumed in country k . Let $\Pi^k(p_1, p_2, l_1^k, l_2^k)$ be country k 's national-product function, which maximizes the value $p_1 y_1^k + p_2 y_2^k$ of country k 's national product over the production-possibility set

$$\mathcal{Y}^k(l_1^k, l_2^k) = \left\{ (y_1^k, y_2^k) \mid y_j^k = f_j^k(v_{1j}^k, v_{2j}^k) \ (j = 1, 2), \ v_{i1}^k + v_{i2}^k = l_i^k \ (i = 1, 2) \right\}$$

where f_j^k is the production function for commodity j in country k —assumed to be concave and homogeneous of first degree, v_{ij}^k is the amount of factor i allocated to industry j in country k , and l_i^k is country k 's endowment in factor i . We may define country k 's *indirect trade-utility function* by

$$(1) \quad \hat{V}^k(p_1, p_2, D^k, l_1^k, l_2^k) = V^k(p_1, p_2, \Pi^k(p_1, p_2, l_1^k, l_2^k) + D^k) = U^k(h_1^k(p_1, p_2, \Pi^k(p_1, p_2, l_1^k, l_2^k) + D^k), h_2^k(p_1, p_2, \Pi^k(p_1, p_2, l_1^k, l_2^k) + D^k)),$$

where $V^k(p_1, p_2, Y^k)$ is the consumers' aggregate indirect utility function and D^k is the deficit in country k 's balance of trade.

We shall consider the factor endowments l_i^k to be measured in efficiency units, so that an increase in l_i^k is interpreted as a factor-augmenting improvement in the productive power of factor i in country k . Assuming trade to be balanced between the two countries under consideration, we may define the *potential-welfare function* for country k by

$$(2) \quad W^k(l_1^1, l_2^1, l_1^2, l_2^2) = \hat{V}^k(\bar{p}_1, \bar{p}_2(l_1^1, l_2^1, l_1^2, l_2^2), 0; l_1^k, l_2^k)$$

where the price of commodity 1, p_1 , is taken as numéraire and held constant ($= \bar{p}_1$), and the function $\bar{p}_2(\cdot)$ is defined implicitly by the condition for world equilibrium:

$$(3) \quad \hat{h}_2^1(\bar{p}_1, \bar{p}_2(\cdot), D^1; l_1^1, l_2^1) + \hat{h}_2^2(\bar{p}_1, \bar{p}_2(\cdot), D^2; l_1^2, l_2^2) = 0,$$

where $\hat{h}_j^k(\cdot)$ is country k 's trade-demand function for commodity j , defined by:

$$(4) \quad \hat{h}_j^k(p_1, p_2, D^k; l_1^k, l_2^k) = h_j^k(p_1, p_2, \Pi^k(p_1, p_2, l_1^k, l_2^k + D^k)) - \hat{y}_j^k(p_1, p_2, l_1^k, l_2^k),$$

where $\hat{y}_j^k = \partial \Pi^k / \partial p_j$ is the Rybczynski (supply) function for commodity j .

Uniform technical progress in country 2

I consider first the case in which there is uniform factor-augmenting technical improvement in country 2, the effect of which on country k 's potential welfare is measured by a scale parameter λ by which country 2's factor endowments are multiplied. I shall assume that preferences within each country are identical and homothetic; from this it follows that both commodities are superior goods. Later it will be assumed that preferences are also identical as between countries. We define the respective countries' potential welfares and the world price of commodity 2 as functions of the two countries' factor endowments and this scale parameter:

$$(5) \quad \begin{aligned} \check{W}^k(l_1^1, l_2^1, l_1^2, l_2^2, \lambda) &= W^k(l_1^1, l_2^1, \lambda l_1^2, \lambda l_2^2) \quad (k = 1, 2), \\ \check{p}_2(l_1^1, l_2^1, l_1^2, l_2^2, \lambda) &= \bar{p}_2(l_1^1, l_2^1, \lambda l_1^2, \lambda l_2^2). \end{aligned}$$

From definitions (5) and (2) we obtain

$$(6) \quad \begin{aligned} \frac{\partial \check{W}^1}{\partial \lambda} &= \frac{\partial \hat{V}^1}{\partial p_2} \frac{\partial \check{p}_2}{\partial \lambda}, \\ \frac{\partial \check{W}^2}{\partial \lambda} &= \frac{\partial \hat{V}^2}{\partial p_2} \frac{\partial \check{p}_2}{\partial \lambda} + \frac{\partial \hat{V}^2}{\partial l_1^2} l_1^2 + \frac{\partial \hat{V}^2}{\partial l_2^2} l_2^2. \end{aligned}$$

Now from equation (3) (replacing $\bar{p}_2(\cdot)$ by $\check{p}_2(\cdot)$) we find that

$$(7) \quad \frac{\partial \check{p}_2}{\partial \lambda} = - \frac{\frac{\partial \hat{h}_2^2}{\partial l_1^2} l_1^2 + \frac{\partial \hat{h}_2^2}{\partial l_2^2} l_2^2}{\frac{\partial \hat{h}_2^1}{\partial p_2} + \frac{\partial \hat{h}_2^2}{\partial p_2}}.$$

To evaluate the numerator, we see from (4) that

$$(8) \quad \frac{\partial \hat{h}_j^2}{\partial l_i^2} = \frac{\partial h_j^2}{\partial Y^2} w_i^2 - \frac{\partial \hat{y}_j^2}{\partial l_i^2},$$

where we use the fact that $\partial \Pi^2 / \partial l_i^2 = w_i^2$, hence—using the property $\partial h_j^2 / \partial Y^2 = x_j^2 / Y^2$ from homotheticity of preferences, as well as the homogeneity of \hat{y}_j^2 of degree 1 in the factor endowments:

$$\begin{aligned} \sum_{i=1}^2 \frac{\partial \hat{h}_j^2}{\partial l_i^2} l_i^2 &= \frac{\partial h_j^2}{\partial Y^2} [w_1^2 l_1^2 + w_2^2 l_2^2] - \left[\frac{\partial \hat{y}_j^2}{\partial l_1^2} l_1^2 + \frac{\partial \hat{y}_j^2}{\partial l_2^2} l_2^2 \right] \\ &= \frac{\partial h_j^2}{\partial Y^2} Y^2 - y_j^2 \\ &= \frac{x_j^2}{Y^2} Y^2 - y_j^2 = x_j^2 - y_j^2 = z_j^2. \end{aligned}$$

Accordingly, (7) becomes

$$(9) \quad \frac{\partial \check{p}_2}{\partial \lambda} = -\frac{z_2^2}{\frac{\partial \hat{h}_2^1}{\partial p_2} + \frac{\partial \hat{h}_2^2}{\partial p_2}} = -\frac{p_2}{\eta^1 + \eta^2 - 1},$$

where

$$\eta^k = \frac{p_j}{\hat{h}_j^k} \frac{\partial \hat{h}_j^k}{\partial p_j} \quad (j \neq k)$$

is country k 's elasticity of demand for imports (see for example Chipman 1987, p. 944). Since $\eta^1 + \eta^2 - 1 > 0$ is the well-known "Marshall-Lerner condition" of dynamic stability, formula (9) confirms the well-known fact that a uniform technical improvement in country 2 will lower p_2 , i.e., worsen country 2's terms of trade.

Returning to (6) we see from (1) that

$$(10) \quad \frac{\partial \hat{V}^k}{\partial l_i^k} = \frac{\partial V^k}{\partial Y^k} w_i^k$$

hence

$$\sum_{i=1}^2 \frac{\partial \hat{V}^k}{\partial l_i^k} l_i^k = \frac{\partial V^k}{\partial Y^k} \sum_{i=1}^2 w_i^k l_i^k = \frac{\partial V^k}{\partial Y^k} Y^k.$$

Using these relations as well as the Antonelli-Allen-Roy partial differential equation

$$(11) \quad \frac{\partial \hat{V}^k}{\partial p_j} = -\frac{\partial \hat{V}^k}{\partial D^k} \hat{h}_j^k,$$

substitution of (9) in (6) gives

$$(12) \quad \begin{aligned} \frac{\partial \check{W}^1}{\partial \lambda} &= \frac{\partial \hat{V}^1}{\partial D^1} \frac{p_2 z_2^1}{\eta^1 + \eta^2 - 1} \\ \frac{\partial \check{W}^2}{\partial \lambda} &= \frac{\partial \hat{V}^2}{\partial D^2} \left[Y^2 + \frac{p_2 z_2^2}{\eta^1 + \eta^2 - 1} \right]. \end{aligned}$$

Now from (1) we have

$$(13) \quad \frac{\partial \hat{V}^k}{\partial D^k} = \frac{\partial V^k}{\partial Y^k}.$$

From the assumption that preferences in each country are homothetic and representable by a utility function that is homogeneous of degree 1, and that preferences as between the two countries are identical, we have

$$V^k(p_1, p_2, Y^k) = Y^k V^k(p_1, p_2, 1) \equiv Y^k \mu(p_1, p_2)$$

where $1/\mu(p_1, p_2)$ may be interpreted as a cost-of-living index. Accordingly, we have

$$(14) \quad \frac{\partial \hat{V}^k}{\partial D^k} = \frac{\partial V^k}{\partial Y^k} = \mu.$$

It follows that

$$(15) \quad \begin{aligned} \frac{\partial \hat{W}^1}{\partial \lambda} &= \mu \frac{p_2 z_2^1}{\eta^1 + \eta^2 - 1} \\ \frac{\partial \hat{W}^2}{\partial \lambda} &= \mu \left[Y^2 + \frac{p_2 z_2^2}{\eta^1 + \eta^2 - 1} \right], \end{aligned}$$

and therefore (since $z_2^1 = -z_2^2$)

$$(16) \quad \frac{\partial \hat{W}^2}{\partial \lambda} - \frac{\partial \hat{W}^1}{\partial \lambda} = \mu \left[Y^2 + 2 \frac{p_2 z_2^2}{\eta^1 + \eta^2 - 1} \right].$$

From these results we may now draw the following conclusions:

THEOREM 1. *Let country 2 experience uniform technical improvement. Then country 1's potential welfare always increases. Furthermore:*

(a) *Country 2's potential welfare increases if and only if*

$$\frac{p_2 |z_2^2|}{Y^2} < \eta^1 + \eta^2 - 1;$$

in words, if and only if the share of exports in country 2's national income is less than the sum of the two countries' elasticities of demand for imports minus one. Thus, the condition

$$\frac{p_2 |z_2^2|}{Y^2} > \eta^1 + \eta^2 - 1.$$

is necessary and sufficient for country 2 to experience "immiserizing growth" (cf. Bhagwati 1958).

(b) *Country 2's potential welfare increases more than country 1's if and only if*

$$\frac{p_2 |z_2^2|}{Y^2} < \frac{\eta^1 + \eta^2 - 1}{2}.$$

Thus, country 1's potential welfare increases more than country 2's if and only if

$$\frac{p_2 |z_2^2|}{Y^2} > \frac{\eta^1 + \eta^2 - 1}{2}.$$

Thus, for both countries to gain, and for country 1 to gain more than country 2, it is necessary and sufficient that

$$\frac{\eta^1 + \eta^2 - 1}{2} < \frac{p_2 |z_2^2|}{Y^2} < \eta^1 + \eta^2 - 1.$$

Factor-augmenting technical progress in country 2

I shall adopt the convention that labels of the commodities and factors are so chosen that industry 1 (country 2's import-competing industry) uses factor 1 relatively intensively, and industry 2 (country 2's export industry) uses factor 2 relatively intensively. From (2) and the definition of $\bar{p}_2(\cdot)$ in (3) we have

$$(17) \quad \begin{aligned} \frac{\partial W^1}{\partial l_i^2} &= \frac{\partial V^1}{\partial p_2} \frac{\partial \bar{p}_2}{\partial l_i^2} \\ \frac{\partial W^2}{\partial l_i^2} &= \frac{\partial V^2}{\partial p_2} \frac{\partial \bar{p}_2}{\partial l_i^2} + \frac{\partial \hat{V}^2}{\partial l_i^2}. \end{aligned}$$

From (3) we have

$$(18) \quad \frac{\partial \bar{p}_2}{\partial l_i^2} = - \frac{\frac{\partial \hat{h}_2^2}{\partial l_i^2}}{\frac{\partial \hat{h}_2^1}{\partial p_2} + \frac{\partial \hat{h}_2^2}{\partial p_2}},$$

and applying Samuelson's (1953) reciprocity theorem to (8) we have

$$(19) \quad \frac{\partial \hat{h}_j^2}{\partial l_i^2} = \frac{\partial h_j^2}{\partial Y^2} w_i^2 - \frac{\partial \hat{w}_i^2}{\partial p_2} = \frac{w_i^2}{p_2} \left[p_2 \frac{\partial h_2^2}{\partial Y^2} - \frac{p_2}{w_i^2} \frac{\partial \hat{w}_i^2}{\partial p_2} \right].$$

Accordingly, using (11),

$$(20) \quad \begin{aligned} \frac{\partial W^1}{\partial l_i^2} &= \frac{\partial \hat{V}^1}{\partial D^1} w_i^2 \frac{\omega_{i2}^2 - m_2^2}{\eta^1 + \eta^2 - 1} \\ \frac{\partial W^2}{\partial l_i^2} &= \frac{\partial \hat{V}^1}{\partial D^2} w_i^2 \left[1 - \frac{\omega_{i2}^2 - m_2^2}{\eta^1 + \eta^2 - 1} \right] \end{aligned}$$

where

$$\omega_{ij}^k = \frac{p_j}{w_i^2} \frac{\partial \hat{w}_i^k}{\partial p_j} \quad \text{and} \quad m_j^k = p_j \frac{\partial h_j^k}{\partial Y^k}$$

define the Stolper-Samuelson elasticity of country 2's i th factor rental with respect to its j th commodity price and country k 's marginal propensity to consume commodity j . Applying (14) we then obtain

$$(21) \quad \frac{\partial \hat{W}^2}{\partial l_i^2} - \frac{\partial \hat{W}^1}{\partial l_i^2} = \mu w_i \left[1 - 2 \frac{\omega_{i2}^2 - m_2^2}{\eta^1 + \eta^2 - 1} \right].$$

If $i = 1$, i.e., the factor-augmenting improvement occurs in country 2's import-competing industry, then $\omega_{i2}^2 < 0$ by the Stolper-Samuelson theorem, hence from (20) we have immediately that $\partial W^1 / \partial l_1^2 < 0$ and $\partial W^2 / \partial l_1^2 > 0$; that is, country 1 loses and

country 2 gains, absolutely as well as relatively. To examine the subtleties of relative versus absolute gains, therefore, I will focus on the case $i = 2$, in which country 2's factor-augmenting improvement occurs in the factor used relatively intensively in its export industry. The following theorem may be stated as a consequence of the above analysis.

THEOREM 2. *Let country 2 experience a factor-augmenting improvement in the factor used relatively intensively in its export industry (industry 2). Then country 1's potential welfare always increases (since $\omega_{22}^2 > 1 > m_2^2$ by the Stolper-Samuelson theorem and the superiority of commodity 1).*

(a) *Country 2's potential welfare increases if and only if*

$$\omega_{22}^2 - m_2^2 < \eta^1 + \eta^2 - 1;$$

in words: if and only if the excess in country 2 of the elasticity of the rental of factor 2 with respect to the price of commodity 2 over the marginal propensity to consume commodity 2 falls short of the sum of the two countries' elasticities of demand for imports minus one. Thus, the condition

$$\omega_{22}^2 - m_2^2 > \eta^1 + \eta^2 - 1$$

is necessary and sufficient for country 2 to experience immiserizing growth.

(b) *Country 2's potential welfare increases more than country 1's if and only if*

$$\omega_{22}^2 - m_2^2 < \frac{\eta^1 + \eta^2 - 1}{2}.$$

Thus, for country 1 to gain more than country 2, it is necessary and sufficient that

$$\omega_{22}^2 - m_2^2 > \frac{\eta^1 + \eta^2 - 1}{2}.$$

Thus, for both countries to gain, and for country 1 to gain more than country 2, it is necessary and sufficient that

$$\frac{\eta^1 + \eta^2 - 1}{2} < \omega_{22}^2 - m_2^2 < \eta^1 + \eta^2 - 1.$$

These conditions may be related to those of Theorem 1 in the following way. By the Rybczynski theorem,

$$\frac{l_2^2}{y_2^2} \frac{\partial \hat{y}_2^2}{\partial l_2^2} > 1,$$

hence, using Samuelson's reciprocity theorem and homotheticity of preferences,

$$\frac{p_2}{w_2^2} \frac{\partial \hat{w}_2^2}{\partial p_2} = \frac{p_2}{w_2^2} \frac{\partial \hat{y}_2^2}{\partial l_2^2} > \frac{p_2}{w_2^2} \frac{y_2^2}{l_2^2},$$

from which it follows that

$$\omega_{22}^2 - m_2^2 = \frac{p_2}{w_2^2} \frac{\partial \hat{w}_2^2}{\partial p_2} - p_2 \frac{\partial h_2^2}{\partial Y^2} > \frac{p_2}{w_2^2} \frac{y_2^2}{l_2^2} - p_2 \frac{h_2^2}{Y^2} > \frac{p_2 y_2^2}{Y^2} - \frac{p_2 x_2^2}{Y^2} = \frac{p_2 |z_2^2|}{Y^2}.$$

From this we obtain the following:

COROLLARY TO THEOREM 2. *Under the assumptions of Theorem 2:*

(a) *A necessary condition for country 2's potential welfare to increase is that*

$$\frac{p_2 |z_2^2|}{Y^2} < \eta^1 + \eta^2 - 1.$$

A sufficient condition for its potential welfare to decrease (i.e., for immiserizing growth to occur) is that

$$\frac{p_2 |z_2^2|}{Y^2} > \eta^1 + \eta^2 - 1.$$

(b) *A necessary condition for country 2's potential welfare to increase more than country 1's is that*

$$\frac{p_2 |z_2^2|}{Y^2} < \frac{\eta^1 + \eta^2 - 1}{2}.$$

A sufficient condition for country 1's potential welfare to increase more than country 2's is that

$$\frac{p_2 |z_2^2|}{Y^2} > \frac{\eta^1 + \eta^2 - 1}{2}.$$

Footnotes

* Work supported by NSF grant SES86-07652.

1. The main references on mercantilist theory that I have benefited from are Roscher (1851, 1878), Oncken (1902), Dubois (1903), Suviranta (1923), Viner (1930, 1937), and Schumpeter (1954). I have found the Suviranta monograph particularly helpful in its scholarly approach to the subject.
2. This would provide an answer to Viner's criticism of the "modern apologists for mercantilism" (1930, p. 264n): "How a favorable balance of trade can increase the total amount of capital or wealth *within* a country they no not explain."
3. In discussing Viner's view that the mercantilists confused wealth with money, Schumpeter (1954, p. 362) states, referring to Seligman (1935, p. 60): "Yet turns of phrase like Wealth is Money do occur frequently. Sometimes they can easily be disposed of as *façons de parler*. Why, Milles even says that 'Though money were the beames and exchange the very light, yet bullion is the sonne' (quoted by Seligman in his article 'Bullionists'). Shall we infer that he thought bullion and the sun were the same thing?"

4. The anonymous editor of the 1910 reprint of Mun (1664) states (p. v): “Mun continued to enjoy great prosperity in his business undertakings, and was able to buy several estates in Kent, and thus lay the foundations of a county family.” Yet Viner (1930, p. 264) would have us believe that: “The central problem in the interpretation of the mercantilist theories is the discovery of the grounds on which their belief in the desirability of an indefinite accumulation of the precious metals was based.”
5. If they were many, and staggered, they would not even show up in monthly statistics. Indeed, neither would adoption of more roundabout methods of production be included under investment in the national accounts.
6. Mun also gave an example of surplus money being invested in industry in the East-Indies which led to the subsequent importation of English metals (p. 26).
7. This may be one of the reasons that led Child (1693) to depart from the mercantilist criterion of the gains from trade and replace it by the the volume of trade (the value of exports plus—rather than minus—the value of imports).
8. Cannan (1894, p. 3) made the observation:

It would be ridiculous, indeed, to contend that a nation could be well fed and comfortably clothed and housed by gold alone; but there is no reason to suppose that the wildest mercantilist ever suffered from this delusion. The mere existence of the fable of Midas was a sufficient safeguard.

Viner retorted (1930, p. 265): “But I have failed to find any references to the Midas fable in the mercantilist literature prior to 1760,” as if this proved that the mercantilists *did* suffer from the delusion of Midas.

9. Cf. Suviranta (1923, p. 77), who seems to have the order of Malynes’s and Misselden’s tracts reversed. The controversy between Malynes and Misselden proceeded in the order: Malynes (1601), Misselden (1622), Malynes (1622), Misselden (1623), and Malynes (1623). Publication lags were not as long in those days as they have become in modern times!
10. A passage from Malynes (1601, p. 3) also cited by Viner and interpreted by him as revealing in the words “by selling our home commodities too good cheape: or by buying the forreine commodities too deare” (see also Malynes, 1622, p. 77) a confusion between money and wealth, likewise may be interpreted as referring to the terms of trade. Of course, the terms of trade and balance of trade are not unconnected: a deterioration of the terms of trade may lead to a movement towards deficit in the balance of trade. On this see the next section.

11. Ricardo stated (1815, p. 25): “There are two ways in which a country may be benefited by trade—one by increase of the general rate of profits ... the other by the abundance of commodities, in which the whole community participate.” Cairnes stated (1874, p. 418): “the true criterion of the gain on foreign trade [is] the degree in which it cheapens commodities, and renders them more abundant.” And according to Viner (1937, p. 533): “free trade ... makes *available* to the community *as a whole* a greater physical real income in the form of more of *all* commodities ...”.

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