Gottfried Haberler’s Principle of Comparative Advantage

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Abstract

Like the Torrens-Ricardo Principle of Comparative Advantage, Haberler’s Principle rests on the implicit assumption that, in autarchic equilibrium, each country produces and consumes all commodities, at least incipiently. Without that assumption, both principles must be substantially qualified. In the present paper, which focuses on Haberler’s Principle, the required qualifications are provided in detail.

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1. Introduction

Breaking away from Classical one-factor models of international trade, Gottfried Haberler (1930, especially Section 3) noted the necessity of working henceforth with non-linear production frontiers. He also noted that the relative opportunity costs of producing autarchic equilibrium quantities determine both the direction of free international trade and the manner in which the gains from trade are shared by the trading countries. Thus, in a single article, Haberler freed both descriptive and normative trade theory from more than a century of Classical inhibitions. In particular, he transformed the linear Torrens-Ricardo Principle of Comparative Advantage into a more general principle that accommodates non-linear production frontiers.

Like the Torrens-Ricardo Principle, however, Haberler’s Principle rests on the implicit assumption that, in autarchic equilibrium, each country produces and consumes all commodities, at least incipiently. Without that assumption, both principles must be substantially qualified.

In a companion paper (Kemp and Okawa, 2006), the necessary qualifications have been attached to the Torrens-Ricardo Principle. In the present paper, a similar service is
performed for Haberler’s Principle. For the most part, this paper follows Haberler in focussing on just two countries, each potentially producing the same pair of commodities by means of two primary factors of production; however, the many-commodities case is briefly considered. Neither the primary factors nor the technologies need be the same for each country, but it will be convenient to pretend that the same primary factors are available everywhere.

2. Analysis

In both England and Portugal, cloth and wine are non-jointly produced by labour and land under constant returns to scale, with one commodity (not necessarily the same in each country) relatively labour-intensive at all wage:rental ratios. In each country and in each industry, both factors are essential to production. For the time being it will be assumed that, in autarchic equilibrium, production and therefore consumption is completely specialized in each country on a country-specific commodity; for concreteness only, it will be assumed that, in autarchic equilibrium, England produces and consumes cloth only while Portugal produces and consumes wine only. Finally, throughout our analysis, the preferences of each country are those of a price taking representative agent. On the other hand, no special restrictions are placed on the utility functions of the two representative agents; specifically, they are not necessarily homothetic, nor need they rule out inferiority.

In Figure 1(a), $Q_E$ is the English production frontier and $U_E$ is a single English indifference curve. The English autarchic equilibrium occurs at point $C_E$. At that point, the English marginal rate of transformation ($MRT_E$) might differ from the English marginal rate of substitution ($MRSA_E$). If $MRT_E = MRSA_E$ then the market-clearing price ratio is equal to $MRSA_E$; otherwise, the equilibrium price ratio can be anywhere in the continuum bounded by $MRT_E$ and $MRSA_E$. We shall refer to the cone defined by $(MRT_E, MRSA_E)$ as the English autarchic price cone, not excluding the extreme case in which $MRT_E = MRSA_E$.

Figure 1(a): England’s Autarchic Equilibrium, with Complete Specialization

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1 This representation can be justified by the further assumption that all households are identical in all respects but are unaware of the fact or by introducing a family of post-compensation Scitovsky indifference curves.
Similarly, the Portuguese autarchic equilibrium is represented in Figure 1(b) by point $C_p$, where the Portuguese marginal rate of transformation ($MRT_p$) might differ from the Portuguese marginal rate of substitution ($MRSA_p$) and where the market-clearing price ratio must lie in the Portuguese autarchic price cone ($MRT_p^A, MRSA_p^A$) not excluding the extreme case in which $MRT_p^A = MRSA_p^A$.

Abandoning the assumption of autarchy, we may consider for each country all conceivable world price ratios; and for each price ratio we may consider the profit-maximizing pair of outputs and the utility-maximizing consumption pair of the price-taking representative agent. From that information the English and Portuguese offer curves can be derived. It is apparent that, for all hypothetical price ratios in a country’s autarchic price cone, production and consumption remain specialized at the autarchic level for that country. If and only if $MRT_j^A \neq MRSA_j^A$ country $j$’s offer curve has a kink at the origin as displayed in Figures 2(a) and 2(b) for $j = E$ and $j = P$, respectively.

Figure 1(b): Portugal’s Autarchic Equilibrium, with Complete Specialization

Figure 2(a): England’s Offer Curve, with Complete Autarchic Specialization
Figure 2(b): Portugal’s Offer Curve, with Complete Autarchic Specialization

We can now move forward to consider the central questions of the paper. Suppose first that the two autarchic price cones have no points in common. Rotating the Portuguese offer curve through 180° and then superimposing it on Figure 2(a), we obtain Figure 3(a) or Figure 3(b), depending on the relative positions of the price cones. In each figure the world equilibrium is represented by point $W$, where the world excess demands for cloth and wine are equated to zero by the unique price ratio $O_p$. Close scrutiny of the two parts of Figure 3 reveals that they differ in an important detail: in Figure 3(a), the equilibrium price ratio lies within the close embrace of the two autarchic marginal rates of transformation whereas, in Figure 3(b), it lies within the close embrace of the two autarchic marginal rates of substitution. On the other hand, each part of Figure 3 brings the same glad tidings: In spite of kinks in their offer curves, each country benefits from free international trade.²

² Figures 3(a) and 3(b) are drawn on the assumption that $MRT_A^j \neq MRS_A^j$, $j = E, P$. If that assumption is put aside, we return to the familiar textbook case in which the offer curves are free of kinks so that if only $MRT_A^j = MRT_P^j$, trade and gains from trade are assured.
Figure 3: The Trading Equilibrium, with Complete Autarchic Specialization and Non-intersecting Price Cones

Suppose alternatively that the two autarchic price cones intersect. Then, instead of Figure 3(a) or 3(b), we obtain Figure 4(a) or 4(b), depending on the relative positions of the two (intersecting) cones. In each case, equilibrium world trade is zero; hence neither country benefits from free trade.
Proposition: Suppose that under autarchy each country specializes in the production and consumption of a different commodity. If and only if the two autarchic price cones have no points in common, free trade is beneficial to each country; moreover, each country exports the commodity in the production of which it is relatively more efficient under autarchy. If the cones intersect, equilibrium world trade is zero.

In deriving the Proposition it was convenient to focus on the case in which, under autarchy, each country specializes in the production and consumption of a particular country-specific commodity. However, the Proposition is valid without that assumption;
that is, it is valid even if, under autarchy, the two countries specialize in producing and consuming the same commodity and even if, under autarchy, only one country specializes. Thus we may confidently conclude that Haberler’s Principle of Comparative Advantage survives if and only if the two autarchic price cones are discrete, with no points in common.

In this section we have followed Haberler in focussing on the familiar two-country, two-commodity case. We now turn our attention to more ample world economies with more than two member countries.

3. More Than Two Countries

Suppose that England and Portugal are joined by France, each country capable of producing cloth and wine but under autarchy completely specializing in the production and consumption of cloth and therefore possessing its own autarchic price cone. Three cases will be considered in detail:

[1] No two of the autarchic price cones intersect.
[3] Each autarchic price cone intersects at least one of the other cones.

Case [1] This case is illustrated by Figure 5. It is not difficult to see that any equilibrium world price ratio must lie in the cone \((MRT_A^E, MRS_A^E)\), which we will call the \textit{world price cone}, for any other price ratio would fail to induce a positive net supply of each commodity.

Figure 5: Non-Intersecting Autarchic Price Cones

Suppose next that the equilibrium world price ratio lies in the sub-cone \((MRT_A^E, MRS_A^P)\). At that price England imports cloth from Portugal and France in exchange for wine; there is no trade between Portugal and France. Similarly, if the equilibrium world price ratio lies in the sub-cone \((MRS_A^F, MRT_A^P)\), France imports wine from England and Portugal in exchange for its exports of cloth; there is no trade between England and Portugal. In each sub-case all three countries gain from trade.

So far, there are no surprises. If, however, the equilibrium world price ratio lies in the remaining sub-cone \((MRT_A^P, MRS_A^P)\), the outcome is quite different. For that sub-cone coincides with Portugal’s autarchic price cone, implying that, in the world equilibrium, Portugal does not trade. England and France, on the other hand, trade in English wine and French cloth. Thus, although the three autarchic price cones have no points in common, only two countries gain from trade. Evidently our Proposition needs modification to accommodate an additional country.
**Case [2]** This case is illustrated by Figure 6, in which the autarchic price cones of Portugal and France intersect. Any equilibrium world price ratio must lie in the new world price cone \((MRS_A^F, MRT_A^E)\). If the equilibrium price ratio falls in the sub-cone \((MRS_A^F, MRT_A^E)\), England exports wine to Portugal and France in exchange for cloth. Portugal and France do not trade with each other. All countries gain from trade. If, on the other hand, the equilibrium world price ratio lies in the sub-cone \((MRS_A^F, MRS_A^E)\) and therefore in Portugal’s autarchic price cone, Portugal does not trade with England or France. The latter trade with each other in English wine and French cloth, to the advantage of each country.

![Figure 6: Two Autarchic Price Cones Intersect](image_url)

Thus in cases [1] and [2], we encounter essentially the same list of possible outcomes. No new possibilities are created by Case [2]’s limited intersection of autarchic price cones.

**Case [3]** This case is illustrated by Figures 7(a) and 7(b). In Figure 7(a), the English and French autarchic price cones intersect the Portuguese cone but do not intersect each other; in Figure 7(b) the three autarchic price cones have a common intersection that coincides with the French cone. In the sub-case depicted in Figure 7(a), any equilibrium world price ratio must lie in the world price cone \((MRT_A^E, MRS_A^P)\); any other price ratio can be ruled out because no two countries would trade on opposite sides of the market. Since any equilibrium price ratio lies in Portugal’s autarchic price cone, Portugal does not trade. England exports wine to France in exchange for cloth, to the benefit of each country.

![Figure 7(a): Multiple Intersections of Autarchic Price Cones](image_url)

![Figure 7(b): Multiple Intersections of Autarchic Price Cones with No World Price Cone](image_url)
In the sub-case depicted in Figure 7(b), on the other hand, there is no possibility of trade. At each imaginable price ratio, either no country wishes to trade or those countries willing to trade are all on the same side of the market.

Summarizing, in a world of three countries with non-intersecting autarchic price cones, the opening of trade might benefit all countries or it might benefit only the “extreme” countries, that is, those countries with autarchic price cones in terms of the largest and smallest marginal rates of substitution and transformation. This remains true if some but not all of the autarchic price cones intersect. Only if the three autarchic price cones have a common intersection is all trade ruled out, as in our Proposition.

In each of our three cases, it has been assumed that under autarchy all countries specialize in cloth production. However, that assumption does not rule out mutually profitable trade. In fact, all of our conclusions can be derived without that assumption.

References
