A Simple Heckscher-Ohlin Synthesis of Trade, Investment, Factor Flows and Transfers

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1. INTRODUCTION

The basic Heckscher-Ohlin model with the assumptions of constant returns to scale and identical technologies throughout the world has formed the basis of much of trade theory for the last fifty years. In the simplest version of this model, where it is assumed that there are two commodities and two factors, a variety of different exchange or transfer scenarios have been examined. First and foremost has been the trade model where it is assumed that only the two commodities can move between the two countries and that factors are immobile. In the area of factor mobility two types of models have been considered. There can be pure factor flows where factor endowments are associated with individual consumers, and the consumers move from one country to another taking their factors of production with them. This gives rise to immigration. Another type of factor flow occurs when residents of one country allocate their capital services to another but continue to consume in their home country, repatriating their earnings in terms of one of the two commodities. This is referred to as foreign investment. A final type of commodity flow is a transfer, where goods are assumed to move in one direction only and which typically are not motivated by economic considerations (i.e. price differences). Examples are reparation payments and foreign aid.

All the models discussed in this paper are well known and have a long history in the international trade literature, and extensive references to the literature are not provided. Models that combine two or more of the basic models are not as common but there are a number of well known examples. Included would be MUNDELL (1957) who discussed factor flows and trade. Trade and investment were considered by JONES (1967) and KEMP (1966), and both DEARDORFF (1980) and ETHIER and SVENSSON (1986) considered models with many goods and factors in which both commodities and factors were mobile. The modern treatment of the transfer problem begins with SAMUELSON (1952) and recent contributions include JONES (1970 and 1984).

The models described above have been extensively discussed in the literature, and typically have been considered using somewhat different models. The principal purpose

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of this paper is to show that all of these phenomena can be analyzed using the same basic model. This approach allows us to compare the results of the various types of flows, and some new insights are derived. The important role of the assumption about preferences is also highlighted.

In Section II we consider the integrated world economy for the case where preferences are identical between countries and we consider the effects of factor movements, international trade, and investment. In Section III we consider the integrated world economy where preferences differ between countries and discuss the role and importance of the demand assumption. Section IV considers commodity and factor movements that are not motivated by economic considerations and considers immigration and transfers. Some concluding observations are provided in Section V.

2. THE INTEGRATED WORLD ECONOMY: IDENTICAL PREFERENCES

One of the procedures often used to compare the efficiency of different world equilibria is to define the integrated world economy (IWE) and to use this construct as a benchmark against which to compare other models. This IWE essentially assumes that the world is a single economy with all consumers and all factors of production located at the same place. The assumptions are the usual ones found in the Heckscher-Ohlin model. It is assumed that production functions for a commodity are identical everywhere in the world, that all production functions exhibit constant returns to scale, that there are no distortions, that there are no factor intensity reversals, and that all consumers in the world have identical and homothetic preferences. In certain circumstances the assumption on preferences can be relaxed, and as we will see later the assumption on tastes can be important in determining the characteristics of the final world equilibrium.

Because we will be concerned with movement of people from one country to another, it is important to specify carefully our assumptions about factor ownership. We assume that there are two types of consumers, some who provide labor services and some who own capital and provide capital services. Capital is completely divisible, and when individuals move from one location to another they take their capital or labor with them. Capital owners can provide capital services in a country other than their country of residence, but for simplicity we will assume that labor cannot, although we recognize the existence of guest workers. Our analysis will focus on the simple two-commodity two-factor world, although many of our results will generalize to higher dimensions.

The IWE can be represented in the world factor box diagram of Figure 1 (Melvin, 1989, 1995), where \( O_x \) represents the world supply of capital and labor. Because of the assumptions of our model, there will be a unique world equilibrium implying a unique world commodity price ratio and a unique factor price ratio. As a consequence, the

2. Alternatively, one can assume that all factors and goods are perfectly mobile (no transport costs) throughout the world.
equilibrium capital-labor ratios in both industries are uniquely determined, and these are shown as $k_x$ and $k_y$ in Figure 1. Note that we are assuming that commodity $Y$ is relatively capital intensive. Because of the assumption of identical preferences, the bundle of factors embodied in the consumption vector for every individual will be identical if they face identical commodity prices, and thus the consumption point, in terms of embodied factors, must lie along the straight line joining $O_x$ and $O_y$. A world optimum requires that consumption occurs on $O_xO_y$. The question of whether a world in which countries are explicitly recognized can reach an optimum is equivalent to the question of whether countries can achieve, through trade, factor flows or investment, an equilibrium on $O_xO_y$.

![Figure 1](image)

3. FACTOR FLOWS AND INTERNATIONAL TRADE

To determine whether factor movements or international trade can establish a world optimum, we must first specify the allocation of factors between the two countries. In Figure 1 we assume that $E$ represents the endowment point for country $H$ as measured from $O_x$ and the endowment for country $F$ as measured from $O_y$. Thus the home country is relatively well endowed with capital. In the IWE an equilibrium wage-rental ratio exists, and this has been drawn through the endowment point $E$. This line represents the value of national income as measured in terms of factor payments, and the balance of payments condition requires that the value of factors associated with the endowment...
point $E$ be equal, in equilibrium, to the value of factors embodied in consumption. Thus, for fixed endowments, the consumption bundle must lie on $w/r$ through $E$, and since it must also lie on $O_xO_y$, the equilibrium consumption point must be $C$. The question of whether the world optimum can be achieved through investment or trade becomes a question of whether or not one can reach the consumption point $C$ from the endowment point $E$.

For factor flows the issue of whether a world optimum can be achieved becomes the question of whether from $E$, any point on the line $O_xO_y$ can be achieved through factor mobility. Recalling the assumption that the movement of consumers also implies the movement of factors, the answer is obviously yes. Thus if labor moves from the foreign country to the home country in the amount $EG$ we would achieve an optimum, or if capital moves from the home country to the foreign country in the amount $EA$ an optimum will be achieved. If both factors move, then any equilibrium on the line segment $AG$ could be achieved. Indeed, movements to any point on the line $O_xO_y$ will lead to an optimum for both countries.

We now assume that factors are internationally immobile, but that commodities can move from country to country. This gives us the traditional international trade model, and in terms of Figure 1 an optimum requires that we are able to achieve $C$ from endowment point $E$. If both commodities are produced in both countries, as they are with endowment point $E$, then trade in goods can be represented by trade in the embodied factors associated with the triangle $ELC$. Here $EL$ represents the vector of factors embodied in the export of good $Y$ by country $H$, while $LC$ represents the factors embodied in the exports of commodity $X$ by country $F$. Thus the embodied-factor trade triangle $ELC$ is exactly equivalent to the more traditional trade diagram shown in Figure 2, where the trade vectors are $Q_hC_h$ and $C_fQ_f$ for countries $H$ and $F$ respectively.

We can also represent the factor-flow equilibria in Figure 2 by making use of the Rybczynski lines. An alternative to moving from the consumption point $Q_h$ to $C_h$ through trade is to assume capital moves from country $H$ to country $F$, resulting in the production points $A$ and $A'$ for $H$ and $F$ respectively. Alternatively if labor moves from $F$ to $H$ the new production equilibria would be $G$ and $G'$ for countries $H$ and $F$ respectively. With these factor movements there would be a corresponding shift in the production possibility curves for the two countries. Thus for capital movements, the production possibility curve for the home country would be tangent to price line $P$ through $A$, and for the foreign country would be tangent to price line $P$ through $A'$.

It would also be possible to achieve exactly the same equilibrium through factor mobility as was achieved through trade. This would involve a movement of capital from $H$ to $F$ resulting in a production change from $Q_h$ to $D$ and the movement of labor from $F$ to $H$ resulting in the production change from $D$ to $C_h$. For the foreign country the similar factor flow triangle is $Q_fG C_f$. The factor flows that give rise to exactly the same equilibrium as achieved through international trade are represented in Figure 1 as a movement of capital $ES$ from $H$ to $F$ and the movement of labor $SC$ from $F$ to $H$. Of course these specific movements of capital and labor are no more likely than any other
factor movements that would produce points on the line segment $AG$ in Figure 1, and there is no reason to expect that the consumption equilibrium with factor flows will be the same as with commodity trade.

In Figures 1 and 2 the equilibria achieved through trade and factor flows are exactly equivalent. This need not be true, of course, for it is well known that trade cannot always achieve the world optimum. In particular, trade will result in a world optimum only if the initial endowment point lies in the diamond shaped region defined by the capital-labor ratios for the two industries shown in Figure 1. Factor flows, on the other hand, can achieve an equilibrium regardless of the position of $E$. This is just the well-known result associated with Mundell (1957), that factor flows can always achieve world efficiency whereas trade can do so only under conditions where factor prices are equalized.3

3. The condition for factor price equalization in Figure 1 is that the endowment point lie in the cone of diversification for both countries. These cones of diversification are defined by $k_y$ and $k_x$, and thus diversification in both countries is equivalent to the assumption that $E$ lies in the diamond shaped region formed by the $k_x$ and $k_y$ rays. For a discussion of the cone of diversification see Chipman (1966).
4. INVESTMENT AND TRADE

In the previous section we considered the consequences, first, of factor movements (no commodity flows) and then international trade (no factor mobility). In this section we assume that one factor, capital, and one of the two commodities is internationally mobile, while the other factor and the other commodity are immobile. Here residents of one country can allocate their capital services to the other, and repatriate their earnings in terms of one of the two commodities. This is what we define as foreign investment. We initially assume that the two countries represented in Figure 2 are in autarky equilibrium, and since tastes have been assumed to be identical and homothetic, the autarky commodity price ratio will be higher in country H than in country F. Because of the assumption of identical production functions, this in turn will lead to differences in the real and relative return to factors in the two countries, and in particular we will have that \((w/r)_h > (w/r)_f\). Thus in the autarky equilibrium we find that in country H commodity Y is relatively expensive and the return to capital is relatively low. When international investment is allowed, capital owners in H will allocate capital to country F to take advantage of the higher return. We initially assume that X is the mobile commodity, and thus the returns to capital will be repatriated in units of commodity X. In Figure 1 the movement of capital is represented by EM with the factors embodied in the movement of commodity X given by MC. Thus the foreign investment model produces exactly the same world optimum as was achieved through trade.

In Figure 2 foreign investment is represented by the movement of production from \(Q_h\) to \(S\) through the transfer of capital from H to F, and the importation of \(SC_h\) of commodity X. For the foreign country, the capital inflow results in a move in production from \(Q_f\) to \(S'\) and the export of \(C_fS'\) of commodity X. As was the case with pure factor flows, the production possibility curve for the two countries will change, with the new PPC for country H being tangent to price line P at point S and the PPC for country F being tangent to the price line P at \(S'\). In all future time periods only X flows between the two countries, since the flow of capital occurs only in the first time period. Because the home country imports X each year, and the foreign country exports X each year, and since there is no flow of commodity Y, country H will have a merchandise trade deficit and country F a merchandise trade surplus every year.

The pattern of investment we have described, where the returns to capital are repatriated in units of commodity X, could be thought of as the normal result, since in a trading world commodity X would be imported by the home country. We now suppose, however, that capital and commodity Y are mobile between the two countries with commodity X nontradable, and we investigate the question of whether a world optimum can be achieved under these conditions. From Figure 1 it is clear that an efficient world equilibrium is possible. If country H transfers the quantity of capital \(EN\) to country F and imports an amount of Y with embodied factors equal to vector NC, then both countries will achieve full efficiency.
We have seen that, in the situation of Figure 1, the world optimum with investment can be achieved by the repatriation of either \(X\) or \(Y\). This need not always be the case, however. With a different location for \(E\) or a different slope for \(w/r\) it may not be possible to achieve an optimum if only \(Y\) is tradable. In Figure 1, suppose \(w/r\) were less steep. With the appropriate choice of \(w/r\) this would require that \(N\) be below the line \(k_x\). This would put country \(H\) outside the cone of diversification and world production would not be efficient. Commodity trade would still produce a world optimum in this case, however, and thus we have the interesting result that investment may be inferior to trade in achieving a world equilibrium. This result, that trade can be superior to investment, is only true if earnings must be repatriated in \(Y\). If commodity \(X\) is tradable, then any trading equilibrium can be duplicated by investment. All endowment points \(E\) above \(O_xO_y\) and below \(k_x\) and \(k_y\) allow an optimum if \(K\) and \(X\) are mobile. And many \(E\) outside the diversification diamond also yield an optimum with such investment. Thus at \(E'\), investment with mobile \(X\) produces an optimum while trade does not. Not all choices of \(E\) allow an optimum, however. For example, if \(H\) has almost all the \(K\) and \(F\) has almost all the \(L\), so that \(E\) is in the upper left corner, then investment cannot produce an optimum no matter which commodity is mobile. In the trade literature it is often assumed that factor flows always dominate trade and that factor flows can always produce the world optimum. We have seen that this result must be qualified. If by factor flows one means migration, where consumers move and take their factors with them, then both statements are true. If factor flows include investment, then investment completely dominates trade only if earnings can be repatriated in terms of the labor-intensive commodities, and even in this case a world optimum is not always possible. If earnings must be repatriated in terms of the capital-intensive good, then there are situations where investment will not produce an optimum while commodity trade will.

In this model there is no presumption about which commodity will move from \(F\) to \(H\). In the investment case with mobile \(Y\), country \(H\) imports \(Y\), and thus the country well endowed with capital is "importing" the capital-intensive commodity, which contradicts the premise of the Heckscher-Ohlin Theorem. Note, however, that in this case the two things that move between countries are capital and commodity \(Y\). While commodity \(Y\) is capital intensive relative to commodity \(X\), it is clearly not capital intensive relative to capital itself. Country \(H\) is exchanging \(K\) for commodity \(Y\) and thus the spirit of the Heckscher-Ohlin Theorem is maintained.

So far in this section we have assumed that capital and only one of the two commodities is mobile. This is a somewhat artificial assumption so we now turn to the case where \(K\), \(X\), and \(Y\) are all freely mobile between the two countries so that we can have trade, investment, or both. The extra degree of freedom this provides creates an infinity of possible ways of achieving the optimum world equilibrium of \(C\). As well as the trade or investment possibilities just described we can have any combination of the two. As one interesting case suppose we have a capital outflow from country \(H\) in the amount \(EA\) in Figure 1. The returns to capital could be repatriated by the import of \(AB\) of commodity \(X\) and \(BC\) of commodity \(Y\). Note that in this case country \(H\) would be
observed to be *importing both commodities* with country $F$ *exporting both commodities*. In this model the original relative endowments in the two countries provide us with no information concerning equilibrium commodity flows, and thus the Heckscher-Ohlin Theorem cannot predict trade patterns. Attempts to provide empirical verification of the Heckscher-Ohlin Theorem should not be expected to produce meaningful results unless the calculations include all past and present foreign investment.

Would the situation with investment of $EA$ and repatriated import flows of $AB$ (commodity $X$) and $BC$ (commodity $Y$) be feasible? Note that the capital flow $EA$ is the amount of pure capital flow (immigration of consumers with their capital equipment) that would be required to achieve a world optimum without commodity flows. Suppose such migration had taken place, but that consumers, while happy with the return received on their $K$, were not happy with amenities in $F$ and all moved back to $H$, leaving their $K$ in $F$. When these individuals repatriate their earnings they will do so by receiving both $X$ and $Y$ from the foreign country.

5. **THE INTEGRATED WORLD ECONOMY: DIFFERENT PREFERENCES**

The similarities among the effects of factor flows, trade, and investment discussed in the last section depend crucially on the assumption that preferences are identical and homothetic for all consumers in the world. Such preferences give rise to the condition that any point on the line $O_xO_y$ in Figure 1 is a world optimum. We now assume that preferences differ between consumers in the two countries, and in particular we will assume that consumers in the home country have a relative preference for commodity $Y$, the commodity in which country $H$ has a comparative advantage. For any given equilibrium commodity price ratio, consumers in $H$ will consume relatively more $Y$, and as a consequence the factor bundle embodied in the consumption vector will contain relatively more $K$. In Figure 3, for a given equilibrium commodity price ratio, the embodied factors in consumption in country $H$ will be $O_xC$ while the embodied factors in consumption for country $F$ will be $O_yC$.

It is clear that the change in the demand assumptions is of no consequence for either the trade model or the investment model. Thus, in Figure 3, full world optimality can be achieved through the trade triangle $ELC$ or through the investment triangles $EMC$ or $ENC$. It should be noted, however, that while modest changes in tastes do not affect the outcome for trade or investment, the IWE becomes considerably more complex. With differing tastes one can no longer assume that the optimum is unique, and some equilibria may be unstable. As a consequence the situation for factor flows will not be identical to our previous results. But before analyzing factor flows it is important to specify exactly what is meant by differences in preferences for the two countries.

Two distinct interpretations of different preferences can be identified. Different tastes could mean that the preferences of individual consumers are fundamentally different, in which case we would expect an individual, when moving from one location to another,
to take her preferences with her. Certainly one does observe that when individuals move from one country to another they do not immediately consume the same basket of goods as the individuals they join. This is particularly true for commodities like food, where it is well known that food preferences vary significantly between cultures and ethnic groups. Alternatively, we could assume that preferences are a reflection of the location of a consumer rather than of fundamental differences among individuals. A consumer moving from Greece to Finland would almost certainly change her consumption patterns and allocate a larger proportion of her budget to such things as clothing, shelter, and heat. Thus differences in taste may simply be a reflection of the environment associated with different locations.

Figure 3

The assumption about how preferences differ is crucial to the determination of how an equilibrium is determined when people move from one location to another. If preferences are associated with individuals, then a reallocation of individuals in the world will not change aggregate demand. On the other hand, if preferences are associated with location, then moving people from one location to another will change aggregate demand, and this in turn will affect all the parameters in the model. In the following we will assume that preferences are associated with location, and that an individual moving from one place to another will take up the preferences of the individuals who are already there.

Turning now to the factor-flow model, we note from Figure 3 that the migration of capital or labor between countries will not result in the same equilibrium found from
trade or investment, for factor flows will not preserve consumption point C. This is perhaps most easily seen in Figure 4, which shows the same production conditions as in Figure 2 but which now assumes that tastes in country H are biased towards commodity Y. With international trade we would have equilibrium at prices \( P \) with the trade vectors for countries H and F equal to \( Q_hC_h \) and \( Q_fC_f \) respectively. We now assume that commodities cannot move between countries but that factors can. Recalling our assumption that the movement of factors implies the movement of both the consumer and her factor services, the movement of capital out of country H that would result in the same equilibrium as associated with free trade would be the movement along the Rybczynski line to point A. At this point the new production possibility curve for country H would be tangent to the price line \( P \) and at these prices there would be zero excess demands and supplies in the home country. The movement of capital out of the home country that gave rise to the output change from \( Q_h \) to \( A \) would result in an equal output expansion in country F, moving the production point from \( Q_f \) to \( A' \). For country F, however, \( A' \) does not represent an autarky equilibrium, for at that point there would be an excess supply of Y and an excess demand for X. The desired trade vector for country F would be \( A'C_f \). It is therefore clear that the movement of capital from one country to another cannot produce exactly the same world equilibrium as produced by trade in commodities. In particular, since there is excess supply of Y and excess demand for X in the world, a global optimum will require an increase in the relative price of X.

Now consider an equilibrium achieved through the movement of labor from country F to country H. A movement of labor out of country F sufficient to shift production from \( Q_f \) to \( G \) would leave the foreign country in autarky at prices \( P \) with the production possibility curve tangent to price line \( P \) at point \( G \). The corresponding increase in the labor supply in country H would move production from \( Q_h \) to \( G' \), and it is again clear that because of differences in preferences, \( G' \) does not represent an autarky equilibrium for country H. In particular at prices \( P \) country H would wish to consume at \( C_h' \) and thus there will be an excess supply of X and an excess demand for Y. A global optimum can therefore be achieved only if the relative price of X falls.

The changes in the terms of trade required to produce a world optimum will, through the Stolper-Samuelson results, produce a change in real factor rewards worldwide. In particular, we find that if capital moves from country H to country F to take advantage of the higher return to capital in F, in the final equilibrium the world return to capital will be less than it would have been had equilibrium been achieved through international trade. Similarly if labor moves from country F to country H to take advantage of the relatively higher rates of return to labor in H, then the result will be that the world real return to labor in the global optimum would be lower than it would have been had equilibrium been achieved through trade. Thus, with the choice of preferences assumed in Figure 4, factors of production would always encourage the other factor to move to achieve a world optimum. Of course, if both factors move then the effects on real factor rewards will be moderated. Indeed, it is possible for factor movements to result in exactly the same equilibrium that would be achieved through international trade. This is most
easily seen from Figure 3 where a capital outflow of $ES$ from country $H$ and a labor outflow of $SC$ from country $F$ will produce the world equilibrium $C$. Of course this single configuration of factor flows that leaves world factor prices unchanged is no more likely than any of the other infinity of possibilities.

The conclusions about the relationship between changes in factor rewards and the type of factor flow depend crucially on how tastes differ between the two countries. Thus in Figure 4 if demand assumptions were switched and it was assumed that country $H$ consumes along the ray $OC_f$ and country $F$ consumes along the ray $OC_h$, then factor migration would produce the opposite changes in the real returns to factors. In particular a capital movement from country $H$ to $F$ would result in a higher real return to capital, and a flow of labor from $F$ to $H$ would result in a higher real return to labor, than would have occurred had equilibrium been achieved through international trade in $X$ and $Y$. In this case, factor mobility will benefit not only the actual factors that move, but also all other similar factor owners in the world.

Since the seminal work on factor flows by Mundell (1957) it has often been assumed that, for cases where trade results in the equalization of factor prices, factor flows and commodity flows are perfect substitutes, and that factor flows are preferable to commodity flows in situations where factor price equalization is not achieved through trade. It was shown earlier that, when factor flows are interpreted as investment, the superiority of investment over trade depends on which commodity is tradable. In a world in which
there are pure factor flows, with both the consumer and the factor migrating, these results must be further modified. While both trade and factor flows will result in a global optimum, if preferences differ between countries then in general these optima will not be the same. Factors will be advantaged or disadvantaged relative to the trading situation depending on preferences and depending on which factor moves. Of course this does not make trade preferable to factor movements. The global equilibria are optimal in both cases and there can be no presumption that one situation is better than another. Factor owners, of course, will always prefer one type of equilibrating process to another, and there will always be conflict between the owners of capital and labor as to which should move.

6. NONMARKET FACTOR MOBILITY AND TRANSFERS

In the discussion to this point commodity and factor movements have been in response to price differences. There are, however, movements of both factors and commodities that are not motivated by market forces. Individuals may move from one country to another to escape persecution, because of nonmarket amenities or simply to join other family members. On the commodity side countries make transfers because of demands for reparation payments or to provide foreign aid. In such cases movements of factors and commodities can be considered to take place from situations where we initially had an equilibrium. We will first consider migration and then turn to a consideration of transfers.

In Figure 5 we have reproduced the equilibrium shown in Figure 2. If preferences are identical across countries, then $C_h$ and $C_f$ will represent the consumption points in the home and foreign countries respectively. This is an equilibrium in which factor prices are equalized through trade and thus there is no economic incentive for factors to move between countries. We now assume that for some non-economic reason some capital owners in country $H$ decide to move to country $F$. This will move production along the Rybczynski line $R_k$ in both $H$ and $F$. Because factors are not moving to equalize factor prices there is no «correct» amount of factors to move between the two countries. Thus, for simplicity and without loss of generality, we will assume that the movement of capital out of country $H$ is just sufficient to move production from $Q_h$ to $B_h$. Of course the addition of this amount of capital in the foreign country will move production from $Q_f$ to $B_f$. The question now is whether or not this movement of capital from one country to the other will result in a change in the equilibrium terms of trade. In Figure 5, because $Q_h B_h Q_f B_f$ is a parallelogram, and because $Q_h C_h$ is equal to $C_f Q_f$, then it must necessarily be the case that $B_h C_f$ is equal to $B_f C_h$. Note that with the transfer of capital from one country to another, the resulting change in income has resulted in a switch in the consumption points for the two countries so that the old $C_f$ is the new consumption point for $H$ and similarly for country $F$. Because $B_h C_f = C_h B_f$ the balance of trade condition is satisfied and there will be no change in the world equilibrium terms of trade.
The fact that the movement of capital from one country to another has not changed the world equilibrium in Figure 5 depends crucially on the demand assumptions. We now assume that preferences are biased in country \( H \) towards \( Y \) and towards commodity \( X \) in country \( F \). The initial equilibrium will therefore have consumption at \( C_h' \) and \( C_f' \) in countries \( H \) and \( F \) respectively. If we now consider exactly the same amount of capital movement from country \( H \) to country \( F \) we obtain the new production point \( C_h'' \) and \( C_f'' \) for countries \( H \) and \( F \) respectively. Now, because the line segment \( C_h''C_f'' \) is steeper than \( C_f'C_f' \), it will not be the case that at given prices \( P \) there will be a balance of trade equilibrium. In particular, we can see that \( B_hC_h'' > C_f''B_f \). There is therefore excess demand for \( X \) and excess supply of \( Y \) in the world and a new equilibrium will be achieved through an increase in \( P \). With tastes different as shown in Figure 1, a movement of capital from country \( H \) to country \( F \) will deteriorate the terms of trade of the home country and improve the terms of trade of the foreign country. Of course, these changes in the terms of trade have the usual Stolper-Samuelson effects. The real return to labor will rise and the real return to capital will fall, and thus the movement of capital from \( H \) to \( F \) has resulted in a worldwide reduction in the real return to capital and a worldwide increase in the real return to labor.

A movement of labor from country \( F \) to country \( H \) will produce the opposite change in the terms of trade. At the initial equilibrium price \( P \) the labor movement will result in excess demand for \( Y \) and excess supply of \( X \) and to reestablish equilibrium \( P \) must fall. This represents an improvement in the terms of trade for \( H \) and a deterioration in the terms of trade for \( F \), and from the Stolper-Samuelson Theorem there will be a worldwide
increase in the real return to capital and a world-wide fall in the real return to labor. Thus, given these assumptions, migration will always make the migrants worse off. Indeed, all similar factors in the world will be disadvantaged (and the factor that does not move will be made better off). Clearly, in such circumstances, one would encourage the other factor to move.

The conclusion that factors will be disadvantaged by moving depends both on the assumption about the direction of factor movement and on the demand assumptions. Because the factor movements considered in Figure 5 are not economically motivated there is no more reason to suppose that capital will move from \( H \) to \( F \) than there is to suppose that capital will move from \( F \) to \( H \). Similarly labor may migrate in either direction. Changes in the direction of migration will just reverse the conclusions about the changes in the terms of trade and the consequent changes in real factor rewards. It is also clear that our conclusions depend crucially on the assumption that preferences are biased towards the good in which the country has a comparative advantage. Reversing these demand assumptions, and assuming for example that in the initial equilibrium of Figure 5, country \( H \) consumes at \( C'_f \) and country \( F \) consumes at \( C'_h \), will also reverse the conclusions about the changes in the terms of trade and the effects on real factor returns. In this case there is an advantage to moving, for migration will increase the real return of the abundant factor everywhere in the world. There will thus be an incentive for \( K \) to leave \( H \) and for \( L \) to leave \( F \).

We now turn to a consideration of transfers, and it is clear that this is a simple extension of the analysis just completed. In Figure 5 we initially assume that preferences are identical in the two countries with consumption at \( C_h \) and \( C_f \) in countries \( H \) and \( F \) respectively. We now assume a transfer of the quantity of \( X \) equal to \( Q_h S_h \) from country \( H \) to country \( F \). After the transfer the endowment point for country \( H \) will be \( S_h \) and the endowment point for country \( F \) will be \( S_f \). We note that since \( S_h B_h = S_f B_f \), the exact argument used to consider the effects of a capital movement from \( H \) to \( F \) provides us with the effects of the transfer. In particular, with identical preferences, \( S_h C_f \) (the trade vector for \( H \)) is equal to \( S_f C_h \) (the trade vector for \( F \)). Thus after the transfer world demands and supplies are equal at prices \( P \) and there will be no change in the terms of trade.

If tastes differ between the two countries with \( C_h' \) and \( C_f' \) being the initial consumption points, then the transfer of \( X \) from \( H \) to \( F \) will produce a situation where \( S_h C_h'' > S_f C_f'' \). This excess supply of \( Y \) and excess demand for \( X \) will result in an increase in \( P \), and this represents a deterioration in the terms of trade for \( H \) and an improvement in the terms of trade for \( F \). These, of course, are just the standard results from the transfer problem literature. In terms of our model, if preferences are biased towards the commodity in which a country has a comparative advantage, then the transfer will impose a secondary burden on the transferring country. Switching the demand assumptions or the direction of the transfer will reverse the terms-of-trade effect. Thus with tastes differing as shown in Figure 5, a transfer of \( X \) from \( F \) to \( H \) will deteriorate the terms of trade for \( F \). If demand conditions are reversed, a transfer of \( X \) from \( H \) to \( F \) will improve the terms of trade of
From Figure 5 it is also clear that whether X, Y or some of both are transferred is of no consequence for the results.

For both the migration and the transfer examples considered above, if there is a secondary burden or benefit associated with the change in the terms of trade, then there will also be a tertiary burden or benefit associated with the change in the real factor rewards associated with the terms-of-trade change. It is well known that, in the case of a transfer, even if there is a secondary benefit, this benefit cannot outweigh the primary burden associated with making the initial transfer. Overall a country cannot make itself better off by giving things away. But while the entire economy cannot be better off from a transfer, it is certainly possible that some factors can be made better off. Thus consider the case where the home country, with preferences biased towards commodity Y, makes a transfer of some X and Y to country F. There will be the primary burden associated with giving up the X and Y and a secondary benefit associated with the fact that the transfer will improve the home country’s terms of trade. There is also a tertiary effect because this increase in relative price of Y will increase the real return to capital and reduce the real return to labor. It is clearly possible for the improvement in the real return to capital to be larger than the per capita cost associated with making the transfer. Thus, while it will never be profitable for a country as a whole to make a transfer or to provide foreign aid, it may well be to the benefit of one of the factors to make such a transfer. Note also that the real returns to factors in the other country will have changed in exactly the same way. Thus a transfer from H to F under the demand assumptions we have made will directly increase the income of all consumers in the foreign country, will deteriorate country F’s terms of trade, but will increase the real return to capital and reduce the real return to labor. It is possible, therefore, that foreign aid will benefit capital everywhere in the world but would be of particular benefit to capitalists in the foreign country and will disadvantage labor everywhere but will particularly disadvantage labor in the home country.

7. SUMMARY AND CONCLUSIONS

The paper has presented a synthesis of factor flows, trade, investment and transfers. It has been shown that all these commodity and factor movements can be analyzed in a single framework, and this framework facilitates the comparison of the results for each case. We found that, while it is commonly supposed that foreign investment is preferred to trade in that it produces a full world optimum in a wider variety of cases, this result depends on being able to repatriate the earnings of capital in the labor-intensive

4. This is strictly true only in a world with only two countries. For a discussion of this issue see JONES (1984).

5. We are implicitly assuming that the transfer is financed through a head tax imposed on all citizens of country H, so that all individuals pay the same amount in tax.
commodity. Otherwise some types of investment are more restrictive than commodity trade. It was also found that the assumptions about demand play a crucial role in determining whether factor flows, trade and investment are equivalent. With differences in preferences between countries the WIE is no longer so well defined and in fact provides more complications than exist in a world where one only has to consider international trade or foreign investment. With preferences differing, here assumed to mean that preferences are functions of location rather than inherent to the individual, it was found that migration does not produce the same results as trade or foreign investment. Although migration will always provide a world optimum, the optimum will differ depending on which factor moves, and the equilibrium terms will be affected. These changes in the terms of trade will affect real factor rewards, leading to the possibility that some types of migration would be preferred by factor classes. Similar results were found for transfers, and we identified a tertiary cost or benefit associated with the changes in the real factor rewards associated with the changes in the terms of trade.

REFERENCES


SUMMARY

There is an extensive literature in the Heckscher-Ohlin framework which considers trade, investment, factor flows and transfers, but the models to investigate these phenomenon are typically different. This paper shows that all of these can be analyzed in the same simple two-sector trade model. A world-factor box diagram is used and it is shown that whether or not investment can duplicate the international trade equilibria will depend on which commodity is repatriated. It is shown that the assumption of tastes becomes crucial when factors flow, and when international transfers are analyzed the traditional results that the secondary burden of a transfer depends on preferences is re-established. It is shown that because of the Stolper-Samuelson result a tertiary burden or benefit is possible and indeed for one of the two factors a transfer could improve welfare.