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Two Essays on International Trade and Adjustment

J. Peter Neary

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ESSAY 1

INTERNATIONAL TRADE

Prepared for
The Social Science Encyclopaedia,
ed. by Adam and Jessica Kuper,
London: Routledge and Kegan Paul (forthcoming).

INTERNATIONAL TRADE

International trade is not intrinsically different from transactions in which commodities do not cross national boundaries. Nevertheless, the study of international trade has traditionally constituted a separate branch of microeconomics. It may be distinguished from other branches by its focus on situations where some but not all goods and factors are mobile between countries; and from international macroeconomics by its focus on real rather than nominal variables (trade flows and relative prices rather than exchange rates and money supplies) and by a tendency to examine medium-run issues using equilibrium analysis rather than short-run positions of disequilibrium.

One of the first and most durable contributions to the analysis of international trade is the doctrine of comparative advantage due to Ricardo. This is the antecedent of both the normative and positive strands of international trade theory. On the one hand, it postulates that an absolutely inefficient country will nevertheless gain from trade; on the other hand, it predicts the direction of trade: each country will tend to export those goods which it produces relatively cheaply in the absence of trade. As a positive explanation, the principle has met with some empirical success. However, in its classical form it is open to the objections that it unrealistically assumes production costs are independent of the scale of output and that it fails to explain why they differ between countries in the first place.

In an attempt to overcome these deficiencies, the Swedish economists Heckscher and Ohlin developed a theory which stressed international differences in factor endowments as the basis for comparative advantage and trade. Thus a country which is relatively capital-abundant will tend to export goods which are produced by relatively capital-intensive techniques. Largely through the influence of Samuelson, a highly simplified version of this theory, assuming only two goods and two factors in each country, has come to dominate the textbooks. In this form it is a useful teaching device

for introducing some basic concepts of general equilibrium theory but, not surprisingly, it is overwhelmingly rejected by the data. The most notable example of this is the so-called Leontief Paradox, an early application by Leontief of his technique of input-output analysis, which found that the presumably capital-abundant United States exported labour-intensive commodities, thus contradicting the theory.

Nevertheless, probably the preferred explanation of trade patterns for most economists is an eclectic theory of comparative advantage along Heckscher-Ohlin lines, allowing for many factors of production, some of them (such as natural resources) specific to individual sectors, as well as for international differences in technology. Even this theory fails to account adequately for certain features of contemporary international trade, and a variety of special models has been developed to explain different aspects of real-world transactions. Thus, the growth of trade in intermediate goods (as opposed to goods for final consumption) has inspired the theory of effective protection, which builds on the insight that an industry benefits from tariffs on its outputs but is harmed by tariffs on its inputs. Attention has also focussed on the increased international mobility of factors (in part through the medium of multinational corporations) which in different circumstances may act as a substitute for or a complement to trade. Finally, considerable attention has been devoted to the study of intra-industry trade, meaning trade in differentiated products within a single industry category, typically produced by non-competitive firms under conditions of increasing returns, and traded between countries with similar technology and factor endowments.

As well as attempting to explain the pattern of trade, positive trade theory also makes predictions about many aspects of open economies. Most notorious of these is the implication of the Heckscher-Ohlin model known as the factor price equalisation theorem, which predicts that free trade will bring about the equalisation of the prices of internationally immobile factors. The empirical irrelevance of this theorem is matched only by the implausibility of the many assumptions required for it to hold. Of greater

interest are the predictions of international trade theory concerning such issues as the effects of tariffs and international transfers on foreign and domestic prices, the effects of trade policy on domestic income distribution and the consequences of structural change.

Turning to normative trade theory, its traditional focus has been the merits of free trade relative to autarky, stemming both from increased specialisation in production and increased efficiency and diversity of choice in consumption. Similar arguments favour partially restricted trade relative to autarky although the benefits of selective trade liberalisation (such as the formation of a customs union) are not as clearcut. The persistence of protectionist sentiment, despite these theoretical arguments, may be explained by the fact that gains from trade accruing to the economy as a whole are not inconsistent with losses to individual groups, especially owners of factors specific to import-competing sectors.

Two other exceptions to the case for free trade are normally admitted. The optimal tariff argument states that a country with sufficient market power can gain by behaving like a monopolist and restricting the supply of its exports. The infant industry argument defends transitional protection to enable a new industry to benefit from learning and scale economies. As with many arguments for trade restriction, the latter on closer examination is less an argument against free trade than against laissez-faire. Finally, it should be noted that tariffs have declined in importance since the Second World War, due largely to international agreements such as the General Agreement on Tariffs and Trade (GATT) and the formation of free-trade areas and customs unions such as the European Economic Community (EEC). As a result, many countries now make much greater use of non-tariff barriers (such as quotas, health and safety regulations and government procurement policies) as methods of restricting trade.

Further Reading

Jones, R.W. and P.B. Kenen (eds.): Handbook of International Economics: Volume I, Amsterdam: North-Holland, 1984: especially Chapter 1: "The Positive Theory of International Trade," by R.W. Jones and J.P. Neary, and Chapter 2: "The Normative Theory of International Trade," by W.M. Corden.

ESSAY 2

THEORY AND POLICY OF ADJUSTMENT IN AN OPEN ECONOMY

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Current Issues in International
Trade Theory and Policy,
ed. by David Greenaway, London: Macmillan.

THEORY AND POLICY OF ADJUSTMENT IN AN OPEN ECONOMY [1]

I. INTRODUCTION

Almost all discussions of economic policy are concerned with issues of adjustment and this is especially true in matters relating to international trade. Whether it is the effects of changes in world prices, increased foreign competition or a currency realignment, policy makers and the general public want to know how the economy will move towards its new equilibrium and not just what that equilibrium will look like. Economists, whose job it is to answer such questions, must dip into their theoretical tool-kit and attempt as best they can to apply the most relevant theoretical framework to the problem at hand. Typically, the most difficult part of this task is not to elucidate the properties of a particular model, but to choose which model in the first place is appropriate to a given problem.

In this chapter, I try to illustrate the range of theoretical tools which may be used to examine how an open economy adjusts from one equilibrium to another. I emphasise in particular that very different models may be relevant depending on the time period under consideration. Thus, Section II deals with the very short run during which only one factor, labour, is mobile between sectors. Section III looks at the medium run in which both capital and labour are mobile, while Section IV considers the long run when in addition the rate of capital accumulation is endogenous. These sections consider how the economy is likely to adjust in the absense of government intervention whereas Section V discusses the rationale for such intervention and the forms it is likely to take in practice. Finally, Section VI makes some concluding remarks while Section VII gives some suggestions for further reading.

II. SHORT-RUN ADJUSTMENT: LABOUR-MARKET DISEQUILIBRIUM

We begin by considering what is probably the simplest example of adjustment to an exogenous shock. We deal with the case of a competitive small open economy which produces and consumes two goods facing given world prices and we ask what will be the consequences of a fall in the relative price of imports. To highlight the main issues we wish to stress, we abstract from a great many real-world features, including government activity, non-competitive behaviour and the interaction of real and monetary phenomena.

Figure 1 shows how the effects of this change are typically portrayed. Curve PP is a production possibilities curve showing the maximum amounts of the two goods which can be produced, given the economy's technology and factor endowments, while the curves II and I'I' are social indifference curves.[2] Before the change, the economy produces at point A and consumes at point G, with the value of good X imported matching the value of good Y exported. The exogenous fall in the world relative price of Y amounts to a worsening of the economy's terms of trade. Production of Y is discouraged and the production point shifts from A to B; while home consumption of Y is encouraged by the change in relative prices but in the example illustrated the fall in real income reduces consumption of both goods from G to H on the lower social indifference curve I'I'.

This illustration is familiar from introductory textbooks but in fact it ignores a whole host of issues. We can perhaps concede that adjustment of demand patterns to changed circumstances is relatively rapid, although even this is a major simplification. Habits die hard, especially if the level of current consumption is related to the existing stock of durable goods (as was the case with developed countries' oil imports in the 1970s, for example). An even more serious simplification of reality is the assumption that the pattern of production adjusts instantaneously. In fact, the movement from A to B conceals a great deal of what is going on in the economy. To examine this further we must go behind the production possibilities curve and consider alternative assumptions about the structure of production and the organisation of factor markets.

Figure 2 illustrates one set of assumptions about the underpinnings of Figure 1, which is both simple to understand and reasonably plausible as a description of short-run equilibrium. Known as the specific-factors model, this assumes that each sector uses a single factor, labour, in common with other sectors. In addition, each uses a range of other factors specific to it, which may include plant and equipment, non-traded natural resources and entrepreneurial and managerial skills. The law of diminishing returns implies that as more of the variable factor is applied to the specific factor its marginal product falls, and this is illlustrated in the diagram. The curve labelled L_X (drawn with respect to the origin O_X) shows the value marginal product of labour and hence (under competitive assumptions) the demand for labour in sector X. The same applies to the curve labelled L_Y (which is drawn with respect to the origin O_Y). It should be clear that point a represents the unique competitive equilibrium in this economy. Only at this point is the aggregate demand for labour in the economy, O_Xf from sector X plus O_Yf from sector Y, equal to the fixed total supply, O_XO_Y. Hence, O_Xj measures the competitive market-clearing wage rate in the initial equilibrium.

Consider now the effects of a fall in the relative price of Y. Without loss of generality, we choose good X as numeraire, which implies that price changes do not affect the location of the L_X curve and that the vertical axis measures the wage rate in terms of good X. The reduction in the price of good Y therefore leads to an equal proportionate downward shift in that sector's labour demand schedule from L_Y to L_Y'. Evidently, the new equilibrium is at point b (which corresponds to point B in Figure 1): the restoration of labour market equilibrium requires a fall in the wage rate in terms of X, leading sector X to expand its output and employment and sector Y to contract.

The question we must now consider is how will the economy actually move from the initial equilibrium represented by points A and a to the new equilibrium represented by points B and b. Two extreme cases may be distinguished. In the first, the labour markets in the two sectors are temporarily segmented but the wage rates in each adjust

freely to ensure continual full employment. In this case, sector X is insulated from the shock in the very short run, whereas the wage in sector Y falls by the full amount of the price change from fa to fm. Over time, the resulting disparity in wages between sectors induces migration from the sector Y labour market to that in sector X. Hence, the production points in the two sectors move along the L_X and L'_Y schedules until the new equilibrium at b is attained. The second extreme case is where the two sectors draw on a common labour market, with no barriers to intersectoral labour mobility even in the very short run, but the common wage rate is downwardly sticky. Assuming for simplicity that it is pegged in terms of X, the wage remains equal to $O_X j$ in the short run. Once again, sector X is temporarily insulated from the change and its production point remains at a. By contrast, entrepreneurs in sector Y are no longer able to pay the same wage and instead reduce their employment from ak to nk. The resulting unemployment of an tends to reduce the wage rate over time and both sectors move down their labour demand schedules towards b. Naturally, the process of adjustment in an actual economy is likely to combine elements of both these extreme mechanisms, with both sectors exhibiting a combination of an imbalance between supply and demand and sluggish wage change throughout the adjustment period.

The two alternative paths of adjustment in this model may be illustrated in a different fashion. In Figure 3, the vertical axis measures the wage in terms of good X, just as in Figure 2, whereas the horizontal axis measures the price of good Y (relative to the numeraire good, X, of course). The curve LL shows those combinations of w and p which equate demand and supply of labour. In obvious notation, the equation of this curve is:

$$(1) \qquad L^X(w) + L^Y(w/p) = L.$$

This curve must be upward-sloping, since, starting from a point of labour-market equilibrium, a higher wage rate alone generates unemployment (U), while an increase in p with unchanged w generates excess demand for labour (EDL). Furthermore, it must be less

steeply sloped than a ray from the origin, as shown, reflecting the fact that an increase in p requires a less than proportionate increase in w if labour-market equilibrium is to be maintained.[3]

The two alternative adjustment paths introduced in Figure 2 may now be illustrated in Figure 3 as well. (Once again, corresponding points in the two diagrams have been given matching labels, to facilitate comparison between the two.) With initial equilibrium at a', the fall in p implies a new equilibrium at point b'. Under the first adjustment mechanism introduced above, sectors X and Y move to points n' and m' in the short run[4] and then converge towards b' as shown by the arrows. Under the second adjustment mechanism, the new short-run equilibrium for both sectors is represented by point n', and unemployment gradually drives down the economy-wide wage rate.

Figure 3 tells the same story as Figure 2 but has the advantage that it is more easily adapted to the case where goods prices are endogenous. Even the smallest open economy typically produces some goods which are differentiated from goods produced abroad, so that their prices are at least in part influenced by home conditions, as well as some non-traded goods or services, whose prices are exclusively determined by the interaction of domestic supply and demand. (Indeed, an additional aspect of the adjustment process, which we do not consider here, is that the degree to which the prices of different goods are domestically determined may itself vary with the time horizon under consideration.) To examine how domestic price determination affects the adjustment process, it is convenient to concentrate on an extreme case where the economy produces and consumes a single traded and a single non-traded good. Assume that the good previously labelled X is the traded good, a composite commodity aggregating both imported and exported goods, and that that labelled Y is now non-traded. The price ratio, p, is therefore the relative price of non-traded to traded goods, sometimes referred to as the "real exchange rate." A rise in p - a "real appreciation" - encourages a move of production towards non-traded relative to traded goods and an opposite move in consumption. Because of this pivotal

role of the real exchange rate in measuring the incentives to switch production and expenditure between the two sectors, it is often viewed as a generalised measure of the "competitiveness" of the home economy.

The determination of equilibrium in this model is illustrated in Figure 4. The schedule LL is the same as in Figure 3; the new feature of this diagram is that p is no longer exogenous but must adjust to equate domestic supply and demand of non-traded goods. The curve NN is the locus of (w,p) combinations which ensure this, and its equation is:

$$(2) \qquad X^N(w/p) = c^N[p,z(p)],$$

where z denotes real national income in terms of traded goods. This curve must be upward-sloping. A rise in p alone gives rise to excess supply of the non-traded good, while an increase in w is needed to discourage its production and restore equilibrium. In addition, this schedule must be more steeply sloped than a ray from the origin as shown: an equiproportionate increase in w and p leaves production of the non-traded good unchanged but reduces demand for it, so giving rise to excess supply.[5] The last feature of the diagram worthy of comment is that the arrows indicate the direction of movement when the economy is out of equilibrium. Thus, the vertical arrows reflect the assumption that the wage rate falls when the labour market is in a state of unemployment (at points above LL) and conversely when it is in a state of excess demand for labour; while the horizontal arrows show that p is bid up by excess demand for the non-traded good (i.e., at points to the left of the curve NN) and bid down by excess supply. It is clear that the equilibrium at a' is globally stable under these assumed adjustment mechanisms.[6]

Now, consider the effect of an exogenous shock to the equilibrium depicted in Figure 4. For concreteness, we focus on a particular shock, an increase in computerisation in the traded goods sector, which is assumed to take the form of labour-saving technological progress. (Readers should attempt to work out the implications of different shocks for themselves.) Since this shock represents real growth in the economy, it increases the

demand for the non-traded good at any given wage and price; since supply is not directly affected the region of excess demand for the non-traded good in the diagram expands and so the NN locus shifts rightwards as shown in Figure 5. The second effect of the shock is to reduce the economy-wide demand for labour at any given w and p, so shifting the LL curve downwards to L'L' as shown. Once again, the transition from the initial equilibrium a' to the new equilibrium b' may take many forms, and the diagram illustrates one of these: the real exchange rate is assumed to adjust rapidly to eliminate incipient disequilibrium in the non-traded good market while the wage rate is assumed to be downwardly sticky (in terms of traded goods) but equalised at all times across the two sectors. Under these assumptions the shock we have considered generates an example of real exchange rate "overshooting": p first rises by more that its equilibrium change, as excess demand for the non-traded good drives the short-run equilibrium from a' to h'. Over time, the resulting unemployment leads to a gradual downward drift in the wage and the economy gradually converges along the N'N' schedule towards the new full equilibrium point b'. It may be checked that many other configurations for the time path of p and w are possible, depending on the nature of the exogenous shock and on the combination of adjustment mechanisms assumed.

To sum up, we have concentrated in this section on different patterns of adjustment in the labour market, both with and without endogenous changes in relative goods prices. This focus has drawn attention to a number of important phenomena which are likely to manifest themselves in any real-world adjustment process. Nevertheless, we have obviously ignored or glossed over a number of important aspects of short-run adjustment, especially monetary considerations and the disequilibrium feedbacks from one market to another. In addition, we have adopted a strictly short-run framework by assuming that only labour is mobile between sectors and that the aggregate supplies of all factors are fixed. In the next two sections, we attempt to relax these assumptions.

III. *MEDIUM-RUN ADJUSTMENT:RESOURCE REALLOCATION*

The key feature to which the last section has drawn attention is that adjustment does not simply happen: in a competitive economy it takes place because any exogenous shock changes the incentives to adjust facing factor owners and entrepreneurs. However, it is not only suppliers of labour services who face such incentives: capital owners face them too, and in this section we consider a simple model which attempts to capture this additional feature of the adjustment process. The model in question is the one most commonly found in international trade textbooks: the two-sector two-factor version of the Heckscher-Ohlin model. The additional feature assumed here is that only one of the factors - labour - is assumed to be mobile in the short run whereas the other - capital - adjusts slowly over time. The short-run equilibrium of this model is therefore identical to the specific-factors model of the last section and so the initial equilibrium can be depicted in the upper panel of Figure 6, this panel being identical to Figure 2. (Note that for simplicity we return now to the case where both goods are traded at exogenously given prices, and we also ignore the transitional labour-market disequilibrium issues considered in the last section.) The lower panel of Figure 6 is an Edgeworth-Bowley box, whose dimensions correspond to the country's factor endowments. By measuring labour along the vertical axis of the box, it can be placed directly below the upper panel, allowing us to trace out both the short-run and long-run consequences of any exogenous shock. Point a in the upper panel corresponds to point A in the lower, and the latter lies on the contract curve, indicating that the initial equilibrium is one in which both labour and capital are allocated in such a way that they receive the same return in each sector. Note finally that the contract curve lies above the diagonal of the box, reflecting the arbitrary assumption that X is the relatively capital-intensive sector.

Consider now a fall in the relative price of good Y. As in Figure 2, the new short-run equilibrium is represented by point b in the upper panel of Figure 6. As already noted, we ignore the alternative processes discussed in the last section by which labour is

bid away from sector Y to sector X, even though in practice adjustments in the labour and capital markets are likely to occur simultaneously.[7] Assuming therefore that the move from a to b is instantaneous, this corresponds to a move in the lower panel from A to B. The allocation of capital between the two sectors is fixed in the short run and so point B lies on the same horizontal line as A. Clearly this cannot be a new long-run equilibrium, since it lies off the contract curve. In economic terms, the fall in the real wage facing producers in sector X has increased the return to capital in that sector, whereas the rise in the wage rate relative to the price of good Y has lowered the return to capital there. Hence, there is now an incentive for capital to move out of sector Y into sector X.

What effect will the resulting capital flows have on the wage rate? The easiest way to answer this is to consider the consequences of supposing that the wage does not change. In that case, because of fixed goods prices, the real product wage and therefore optimal factor proportions remain unchanged in both sectors. Sector X therefore expands along the ray Q_XB and sector Y contracts along the ray Q_YB. The net outcome is the emergence of unemployment of labour and so, to ensure continuing labour market equilibrium, the wage rate must fall. What is happening here is a phenomenon which the Heckscher-Ohlin model (despite its many limitations) is ideally suited to illustrate: the adjustment of the economy to a change in relative goods prices necessitates a change in industry mix. The expansion of the relatively capital-intensive sector at the expense of the labour-intensive sector Y lowers the aggregate demand for labour in the economy and hence puts downward pressure on the wage rate.

As capital reallocates, both curves in the upper panel shift rightwards. In the lower panel, the economy moves along a path from B towards a new long-run equilibrium at point C, as shown. This new equilibrium is precisely that predicted by the textbook Heckscher-Ohlin model. The fall in the relative price of the relatively labour-intensive good induces an expansion of the relatively capital-intensive sector, as a result of which

both sectors become more labour-intensive and the real wage falls in terms of both goods. However, this does not necessarily mean that workers lose from the change, since the real wage in terms of good Y rises in the short run. In order to ascertain the full impact of the shock on workers' welfare, it is necessary to calculate the present value of the stream of future wage rates. A sufficiently high discount rate (so that workers place less weight on the long-run fall in their real wage) and a sufficiently high weighting for good Y in their consumption bundle (so that their real wage actually rises in the short run) could leave them better off as a result of the shock.

IV. LONGER-RUN ADJUSTMENT: CHANGES IN INDUSTRIAL STRUCTURE

The analysis of the last section allowed for complete adjustment of factor markets but continued to assume that the aggregate supplies of both labour and capital were fixed. This makes it inappropriate for the study of long-run adjustment. However, attempts by economists to model formally the process of long-run growth have not met with great success. One of the least plausible features of the many models of economic growth developed in the 1960s is their view of long-run equilibrium as a steady process whereby the economy reproduces itself with no change in economic structure. By contrast, in the real world the processes of growth and structural change appear to be intimately connected, with each phase of growth dominated by a number of "leading sectors" coexisting with stagnant or declining ones. Fortunately, the small open economy assumption allows us to construct a simple and interesting model where this phenomenon can be illustrated.

The model to be considered is based on Jones (1974). It assumes that the economy has two factors of production, labour and capital, and has access to technology for producing any number of a variety of goods which are traded with the rest of the world at fixed prices. In a competitive equilibrium, such an economy will in fact produce at most

two goods,[8] possibly exporting both in exchange for imports of all the other commodities it consumes.

To fix ideas, assume that there are at most three goods which the economy could profitably produce. The relationship between the domestic wage-rental ratio and the degree of capital intensity in the production of each of these goods is shown by the three dashed curves labelled X_1, X_2 and X_3 in Figure 7. (For simplicity, we assume that there are no factor-intensity reversals: at all factor price ratios, the ranking of sectors by factor intensity is the same, with sector 1 the least capital-intensive and sector 3 the most.) Which of the three goods will actually be produced by this economy depends on world prices and on its factor endowments. For any given aggregate factor endowment ratio, world prices determine an optimal pattern of specialisation and the locus of such patterns is shown by the solid line abcdef in Figure 7.[9] Thus, if the economy's capital-labour ratio is less than k^B, only the labour-intensive commodity X_1 is profitable to produce; for endowment ratios between k^B and k^C it pays to diversify and produce both X_1 and X_2, and so on: specialisation in X_2 along cd, both X_2 and X_3 produced along de and specialisation in X_3 for capital-labour ratios greater than k^E.

Figure 7 shows the alternative production patterns corresponding to different factor endowment ratios. To close the model it is necessary to examine how this ratio is determined and this is illustrated in Figure 8. Essentially, this is the same diagram as that used to illustrate the Solow-Swann one-sector growth model, familiar from every intermediate macroeconomics textbook, with the solid curve showing the value of national output (y) per head attainable with different capital-labour ratios. The new feature of the diagram is that the assumption of fixed world commodity prices allows us to aggregate the different goods produced by the economy into a single composite output. Thus, the solid curve is actually the outer envelope of the production functions for the three sectors. It is expressed in intensive form giving national output per head as a function of capital input per head. The different segments of the solid curve correspond exactly to the same

alternating phases of specialisation and diversification illustrated in Figure 7, as the labelling of the borderline capital-labour ratios makes clear.

Just as in the standard Solow-Swann model, the location of the steady-state equilibrium is determined by the interaction of savings behaviour and population growth (assumed to take place at an exogenous rate). For simplicity we assume that savings are a constant proportion of aggregate income. This gives rise to a supply of savings schedule labelled s in the diagram, which is a downwards displacement of the solid national output schedule. Steady-state equilibrium occurs at point H where this savings schedule intersects the line labelled nk, n being the rate of population growth. At this point the supply of savings which is forthcoming leads to a rate of growth in the capital stock which is just sufficient to provide employment for the new entrants to the labour force with no change in the aggregate capital-labour ratio.

Now, to illustrate the workings of the model, we consider Figure 9, which brings together the salient features of the two preceding diagrams. The initial steady-state equilibrium is at the capital-labour ratio k^H, where the economy produces both X_1 and X_2. Consider now a disturbance to this equilibrium; to keep the diagram simple, we assume a once-for-all fall in the population growth rate from n to n'. This implies that at the initial capital-labour ratio k^H the economy is accumulating capital faster that the labour force is growing. Hence the capital-labour ratio must rise over time. If markets operate smoothly and competitively, both X_1 and X_2 continue to be produced for a period until the aggregate capital-labour ratio rises above k^C and sector 1 is competed out of existence. A phase of specialisation in X_2 is then followed by production of both X_2 and X_3 until the new steady-state equilibrium with a capital-labour ratio of k^J is attained. Of course, in practice the short-run and medium-run phenomena considered in Sections II and III are likely to play a role. Even without government intervention sector 1 is likely to remain in operation after the capital-labour ratio rises above k^C. Indeed, it is quite likely that all three goods will be produced simultaneously for a period, until pressures towards specialisation assert themselves.

V. POLICIES TOWARDS THE ADJUSTMENT PROCESS

The passing reference to government activity at the end of the last section raises a number of issues which have been ignored until now. In discussing government policies towards the adjustment process, much needless confusion (and much unjustified criticism of the relevance of economic advice) is generated by the failure to distinguish two separate strands of argument: on the one hand, what should be done by a government seeking to maximise the welfare of its citizens (however that welfare is defined), and, on the other hand, what actions are most likely to emerge from the interplay of different lobbies and interest groups both inside and outside the government machine. The answers to these two questions bring us into the realm of welfare economics and political economy respectively and space precludes a detailed discussion of either. (Further discussion of many of these issues may be found in other chapters of this volume.) However, some basic points may be made here.

Consider first the normative question of what optimal intervention towards the adjustment process should be. The essential principles of optimal intervention are no different from those which apply in static cases. Provided markets are competitive and free of "distortions", the resulting equilibrium will be Pareto-efficient. If, in addition, the government respects individual preferences as manifested in market behaviour and lump-sum taxes and transfers are available to redistribute income as desired, then no interference with the market mechanism is warranted. A rationale for intervention is introduced once departures from this idealised state of affairs are admitted, whether in the form of market distortions (such as externalities, non-competitive behaviour or increasing returns to scale), paternalism (e.g., the pursuit of "non-economic objectives" which individuals left to themselves would not seek), or the unavailability of lump-sum taxes and transfers.

This catalogue is so all-embracing that it might be thought to justify intervention in almost all circumstances. However, even if this is the case, recent work on the theory of optimal policy has added the important qualification that departures from the textbook

ideal do not of themselves justify intervention of any kind but only of whatever form is the most efficient to combat the specific market failure in question. The general principle is that intervention will be more efficacious the closer it is to the source of the distortion. One immediate implication of this principle is that many arguments for intervention are not justifications for protection in the conventional sense of restrictions to trade, but rather justifications for subsidies or taxes targeted on particular industries or markets.

In considering optimal intervention towards dynamic adjustment in the economy, new features arise in the case of each of the justifications for intervention discussed above. For example, various kinds of distortions are often alleged to be especially significant in a dynamic context. One of these, that of wage stickiness which gives rise to transitional unemployment, has already been mentioned. Another is the alleged "irreversibility" problem, often used to justify the prohibition of "dumping" by foreign producers: because of imperfect capital markets or other market failures it may not be possible for domestic producers to ride out a temporary disruption to their markets without assistance. As for the requirement of a coincidence of preferences between the state and private individuals, in a dynamic context this has the additional implication that the private and social rates of discount must be equal. Thus intervention is often defended on the grounds that the present generation pays inadequate attention to the interests of future generations. Intervention would also be justified if individual participants, though sharing the state's valuation of future events, had imperfect information or irrational expectations concerning them. Finally, issues of distribution are especially acute in the context of adjustment, since almost all changes are likely to lead to short-run losses for some groups, and attempts to protect their incomes by distortionary means are likely to slow up the adjustment process itself.

The last point just made leads naturally to a move from considerations of optimal intervention to those of political economy. For, it is often the case that workers about to be displaced from declining industries are relatively well paid and are not necessarily

the most deserving targets for special assistance. Nevertheless, they are likely to have a strong claim on such assistance because their plight is geographically concentrated and therefore highly visible. Compensatory payments made to such groups are often easy to justify on political grounds; by contrast, there are fewer votes to be won from the losses to consumers who are prevented from enjoying cheaper imports or to prospective employees not hired by the new firms which would have set up if no intervention had been undertaken in the first place.

In general, inter-party competition in democratic political systems may be expected to give rise to a number of undesirable tendencies in the context of granting adjustment to declining industries. One just mentioned is a likely bias towards action of a visible kind rather than inaction where the resulting benefits are likely to remain intangible for the immediate future. A second is a tendency towards protecting the existing incomes of individual groups at the expense of improving the potential income of all.[10] Thirdly is a tendency to exaggerate the importance of non-economic considerations in deciding whether assistance should be provided: strategic importance is often used to justify continued support for loss-making oil refineries, national airlines, etc. Finally, a feature which is by no means peculiar to democratic systems is the tendency for bureaucracies to pursue their own self-interest. This leads among other features to a tendency for agencies and assistance programmes to outlive the circumstances which justified their establishment in the first place.

In the light of these points, it might be thought remarkable that liberal trading arrangements have survived at all. The fact that they have reflects to a large extent a widespread awareness of the need to establish "rules of the game" which limit the ability of all participating countries to resort to protectionist measures under the guise of adjustment assistance. In this context, the General Agreement on Tariffs and Trade (GATT) has been very successful in limiting the degree of intervention in recent years. The economist may regret that his or her role has thereby been diminished and that of

the arbitrator and trade lawyer enhanced. Nevertheless it cannot be denied that the willingnesss of governments to voluntarily restrict their own freedom to limit trade has been a major stimulus to worldwide economic growth in the post-war era.

VI. CONCLUSION

This chapter has merely scratched the surface of the issues which arise in discussing the question of adjustment in an open economy. For the most part we have concentrated on illustrating the implications for adjustment of a number of different models. However, it is important not to be misled by the mode of analysis adopted. In considering each model we have started from an initial equilibrium which is assumed to be disturbed by an exogenous shock, the consequences of which are traced out until they become negligible and a new equilibrium is reached. By contrast, in the real world, the economy is constantly being buffetted by new shocks, before the consequences of earlier ones have had time to work themselves out. Moreover, as we have stressed at a number of points, the mechanisms highlighted by each individual model will almost always coexist in the real world. Thus, the transitional unemployment discussed in Section II will typically coincide with the intersectoral resource flows considered in Section III; and these in turn will be difficult to distinguish from changes in the aggregate capital stock with the consequences outlined in Section IV. The simultaneity of these adjustments makes it impossible simply to apply naively any one of the models we have presented to a given situation. Rather, it suggests that, in trying to understand any real-world sequence of events, the lessons of each of the models should be kept in mind.

VII. SUGGESTIONS FOR FURTHER READING

The building blocks used in this chapter can be found in most standard textbooks on international trade theory, such as Caves and Jones (1981) and Ethier (1983). Normative issues are discussed in Corden (1974) and more advanced material along with extensive

further references may be found in Jones and Kenen (1984). However, the reader should be warned that many standard expositions tend to focus on the comparative statics properties of individual models with less emphasis on their implications for the process of adjustment from one equilibrium to another.

The particular models outlined in this chapter are drawn mainly from the following: Section II - Jones (1971) and Neary (1980); Section III - Neary (1978); and Section IV - Jones (1974); further details and extensions may be found in those references. Further reading on particular issues not covered in detail in this chapter may be found in Bhagwati (1982) (on adjustment to import competition), Ethier (1983) (on dumping) and Corden and Neary (1982) (on adjustment to the exploitation of natural resource discoveries). Finally, two relatively difficult but rewarding papers which use optimal control techniques to calculate the time path of adjustment with and without government intervention are Lapan (1976) and Mussa (1978).

FOOTNOTES

[1] I am very grateful to W.M. Corden, D. Greenaway and B.M. Walsh for helpful comments on an earlier draft.

[2] The convenience of these curves as a shorthand device for representing demand patterns outweighs their well-known disadvantages. However, especially in drawing welfare conclusions from shifts between these curves, we should continually keep in mind that they completely gloss over many important questions, by assuming that problems of optimal income distribution within the country have been solved.

[3] In other words, a rise in p has a less than magnified effect on the wage rate in the specific-factors model. (See Jones (1971).) To see this, consider the effects of an equal increase in w and p (i.e., a movement outwards along a ray from the origin in Figure 3). Output of Y is unchanged but sector X faces a higher real wage. Sector X employers therefore reduce employment so giving rise to excess supply of labour.

[4] Point m' lies on the same ray from the origin as a', representing an unchanged real wage in sector Y.

[5] The total derivative of c^N with respect to p is $c^N_p + c^N_z z_p$. The term z_p is the output of the non-traded good which must equal the demand for that good. Hence, by the Slutsky equation, the total derivative equals the compensated price derivative of demand, which must be negative.

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[6] The careful reader will note that the discussion of Figures 4 and 5 glosses over a number of issues which are stressed in recent writings on Keynesian (or "disequilibrium") macroeconomics. Although not usually thought of as pertaining to international trade theory, these issues should be taken into consideration in a complete discussion of short-run adjustment. However, for reasons of space I have ignored these complications in the text, and the story is not seriously affected as a result. Dixit (1978) and Neary (1980 and 1982) discuss these issues further in models very similar to the present one.

[7] Neary (1982) illustrates some of the issues which arise in this case. It is shown there that, if wages are slow to adjust, capital reallocation which is privately profitable may nevertheless induce temporary phases of immiseration (i.e., falls in aggregate real income).

[8] The reason for this may be deduced from any textbook exposition of the Heckscher-Ohlin model. The production of more than two commodities imposes more than two constraints on the admissible values of the wage rate and the return to capital; as a result, factor prices are overdetermined provided the technologies for producing the three goods are independent of one another.

[9] The article by Jones (1974) shows exactly how this locus is determined. See also Caves and Jones (1981), Section 7.2.

[10] Corden (1974) has called this a "conservative social welfare function": no change is acceptable if it is likely to hurt any significant group, even though all groups might gain from the cumulative effects of a number of such changes.

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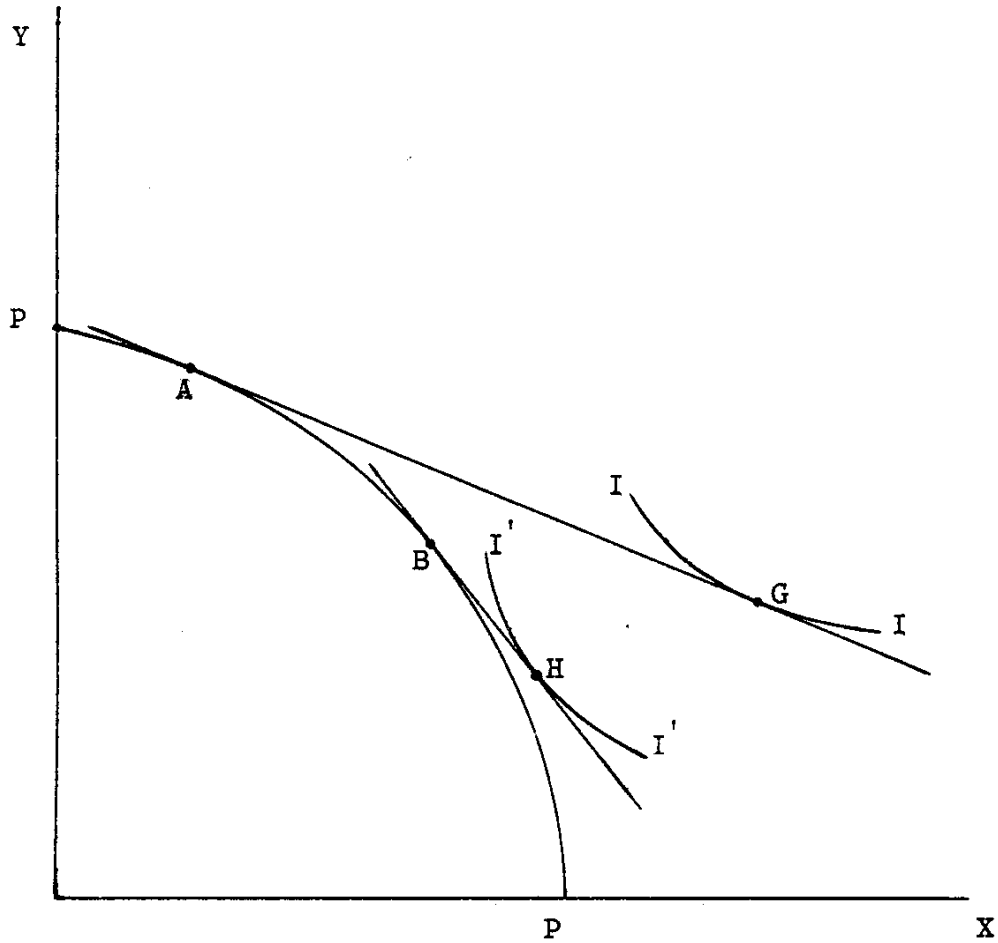

Figure 1: Adjustment to a Deterioration in the Terms of Trade

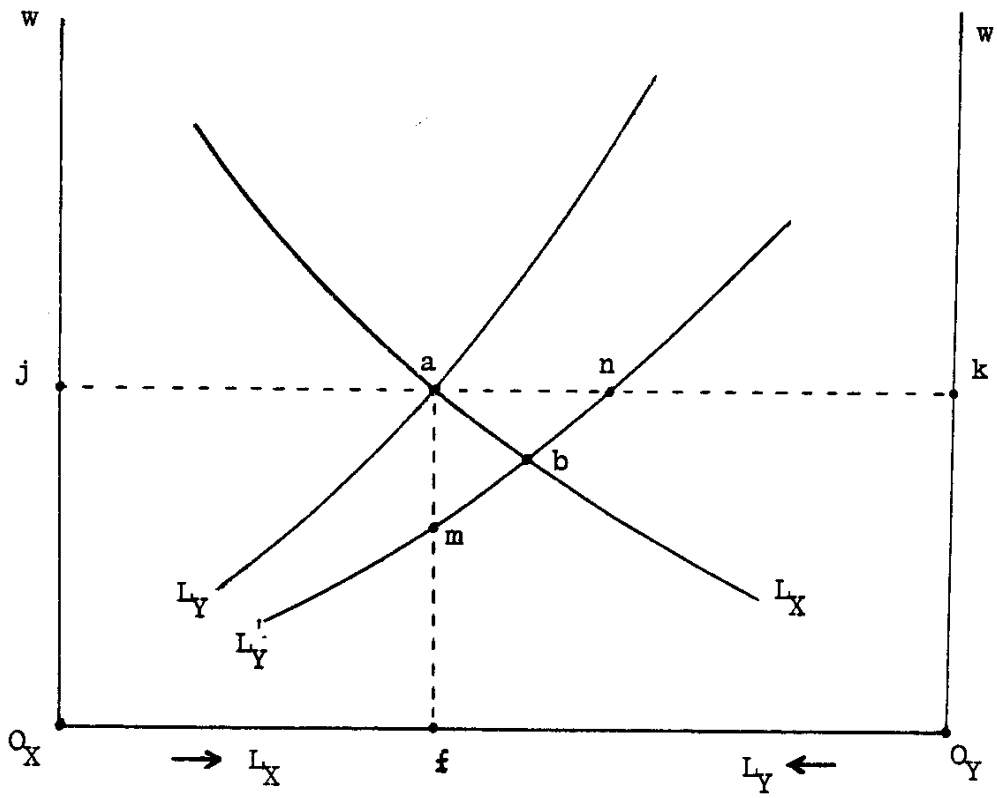

Figure 2: Short-Run Labour-Market Disequilibrium

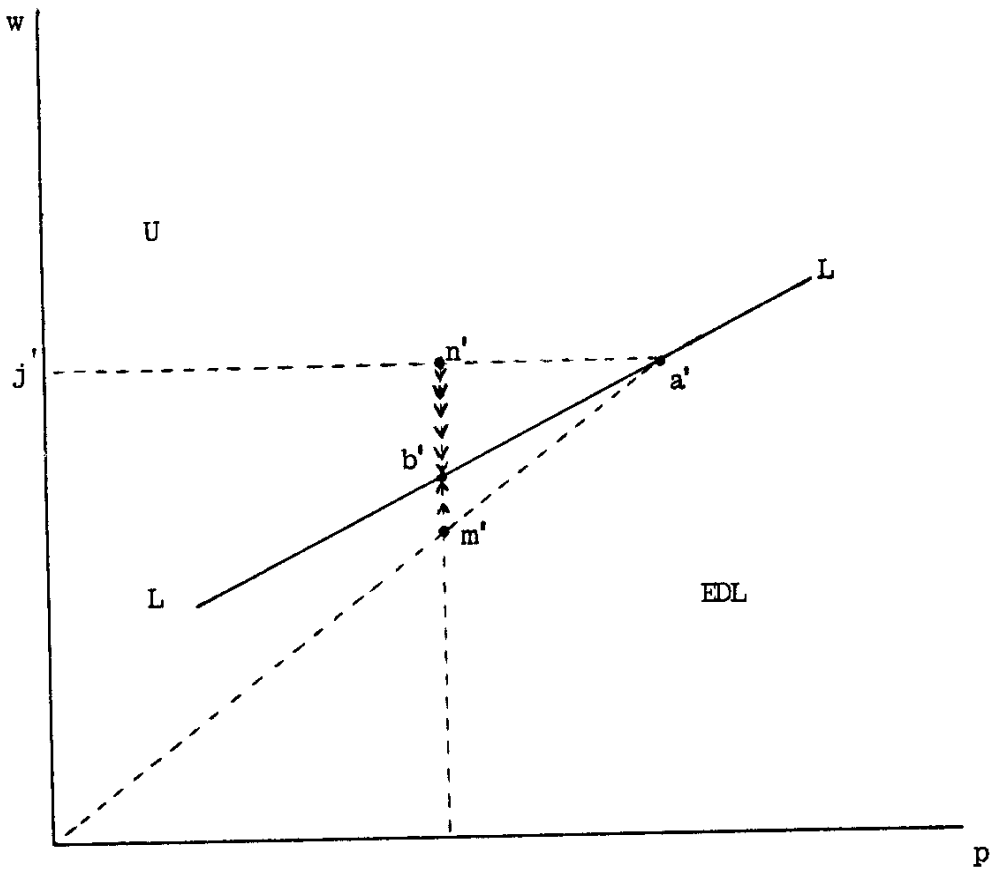

Figure 3: Short-Run Labour-Market Disequilibrium in Wage-Price Space

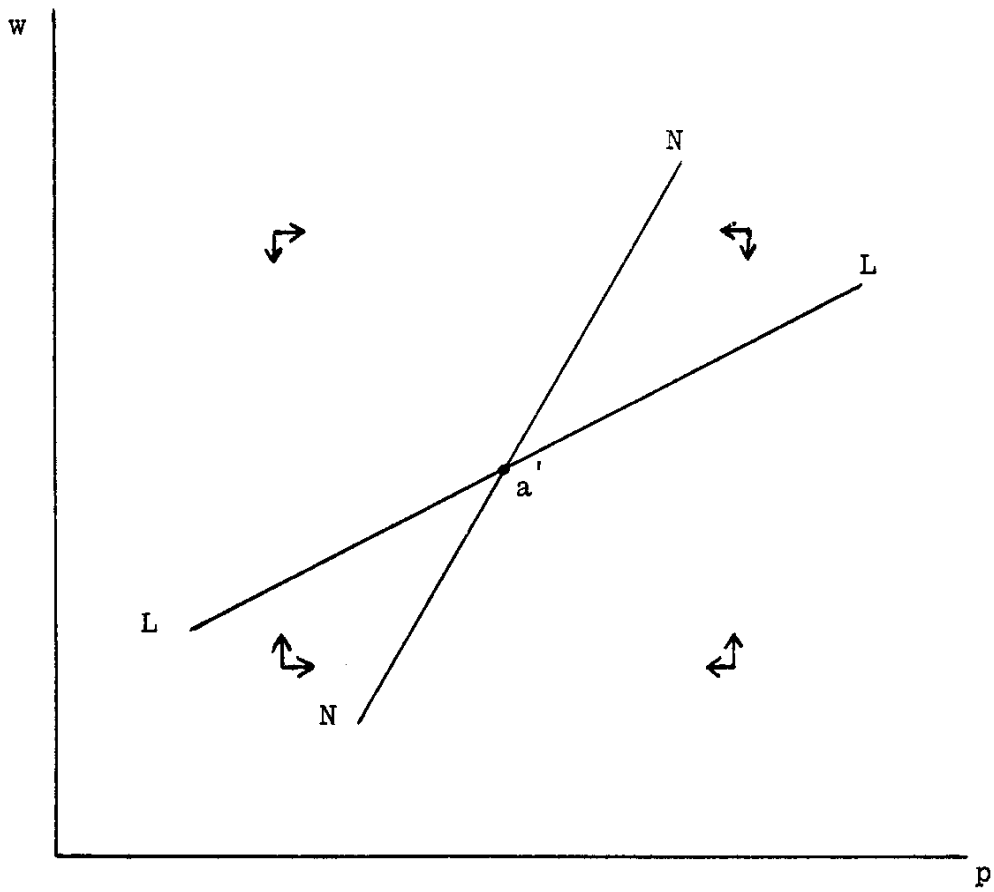

Figure 4: Simultaneous Adjustment of Wages and Prices

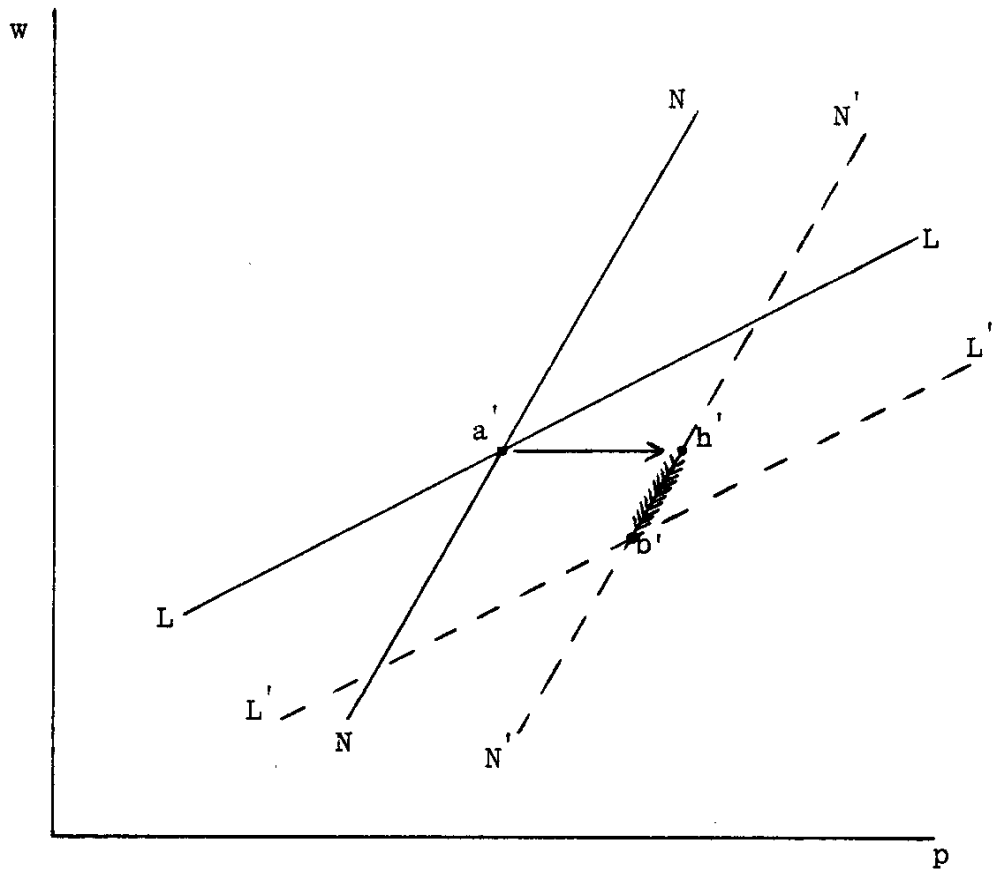

Figure 5: Real Exchange Rate Overshooting as a result of Computerisation in the Traded Goods Sector

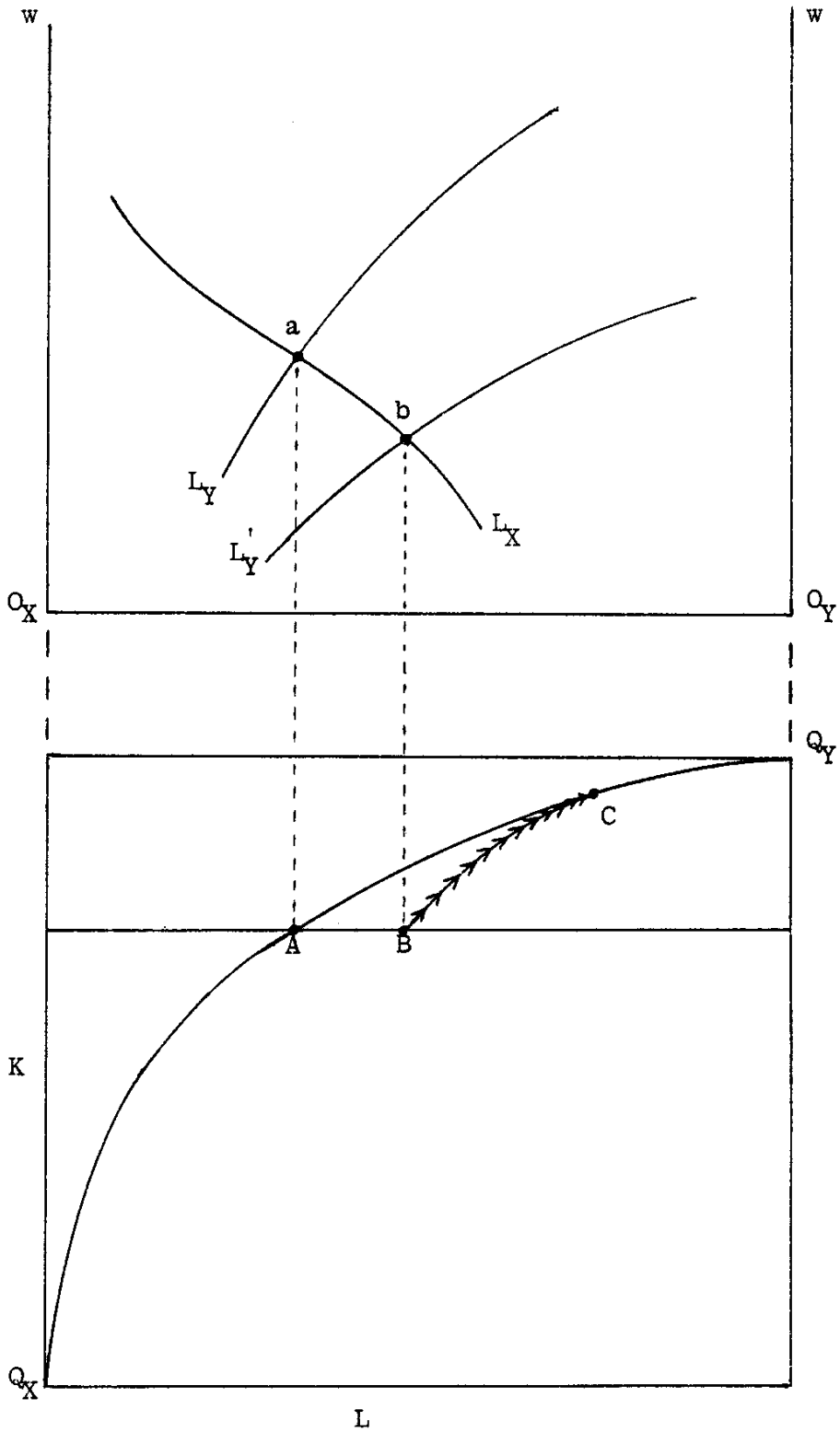

Figure 6: Intersectoral Capital Reallocation

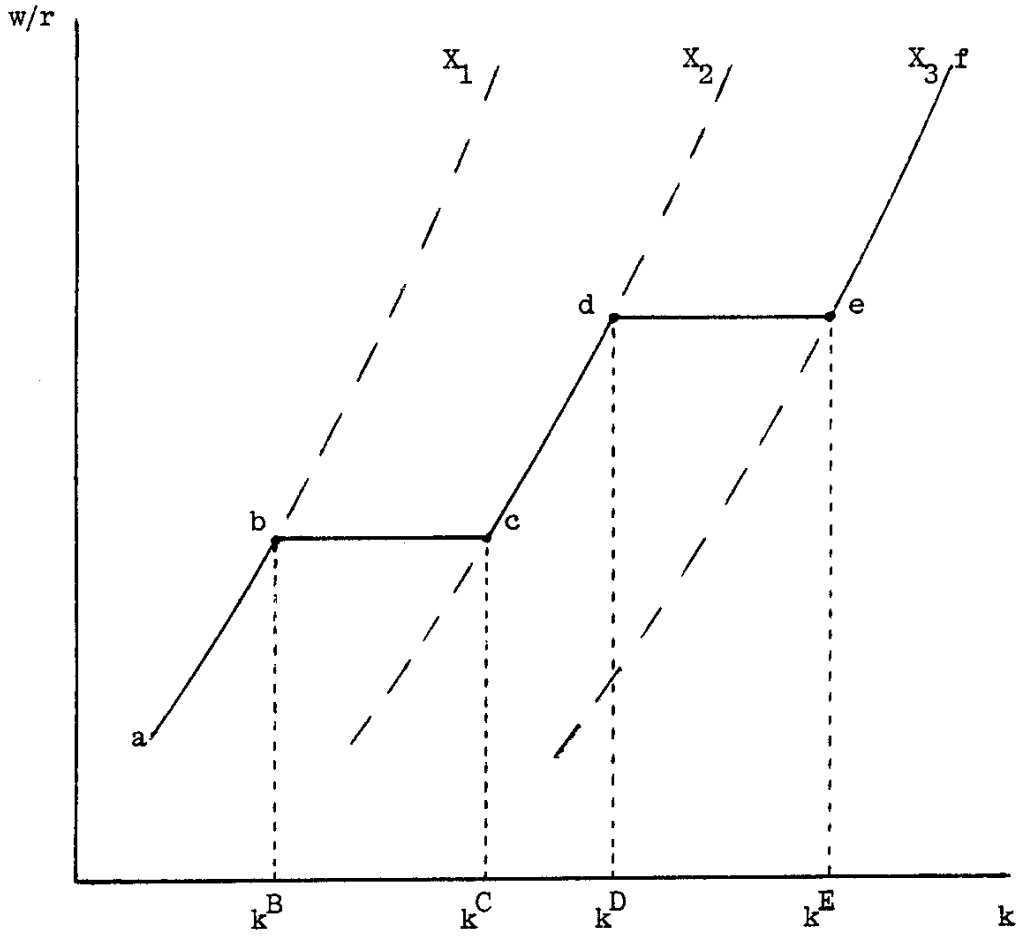

Figure 7: Equilibrium Production Patterns for a Small Country in a Three-Commodity World

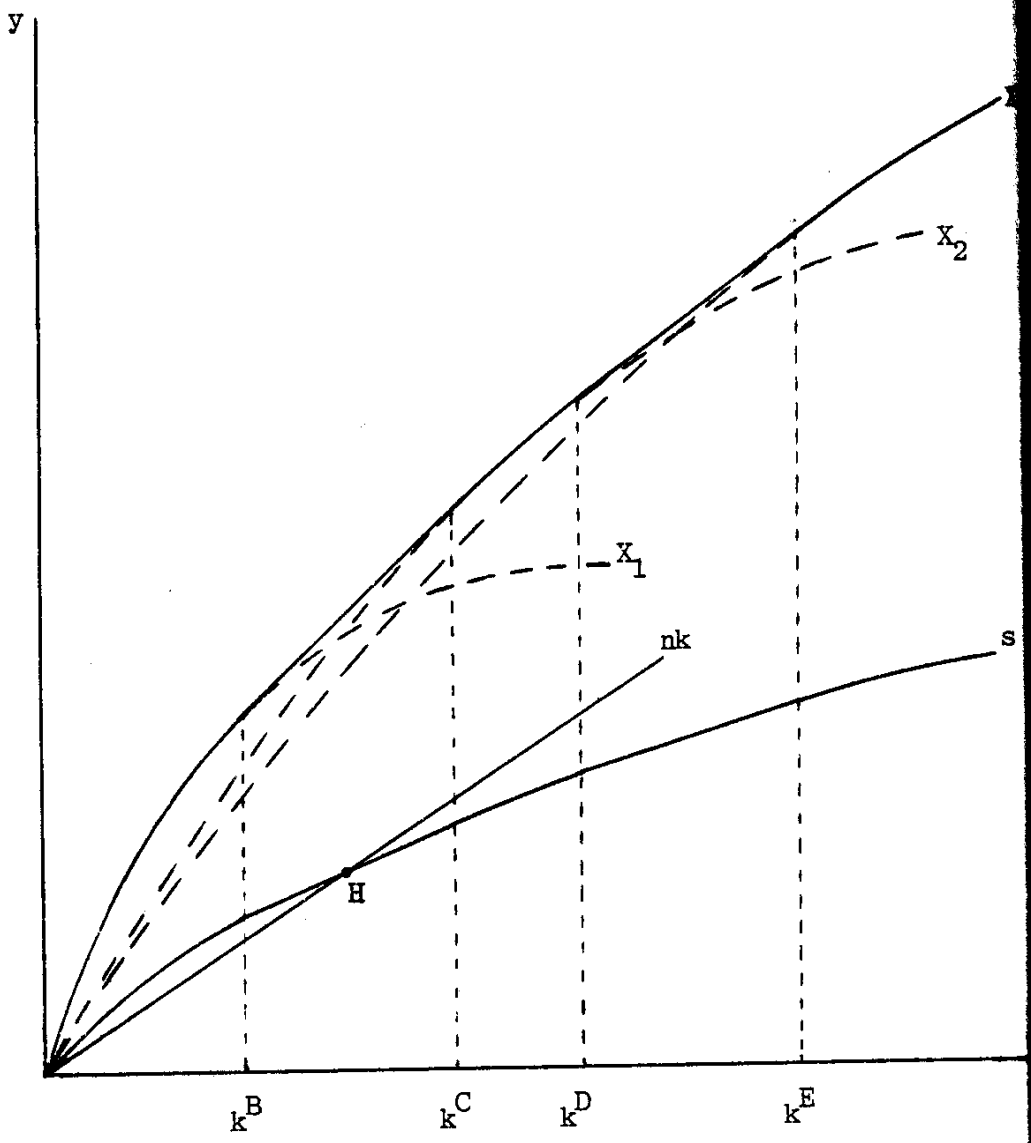

Figure 8: Determination of Steady-State Capital-Labour Ratio

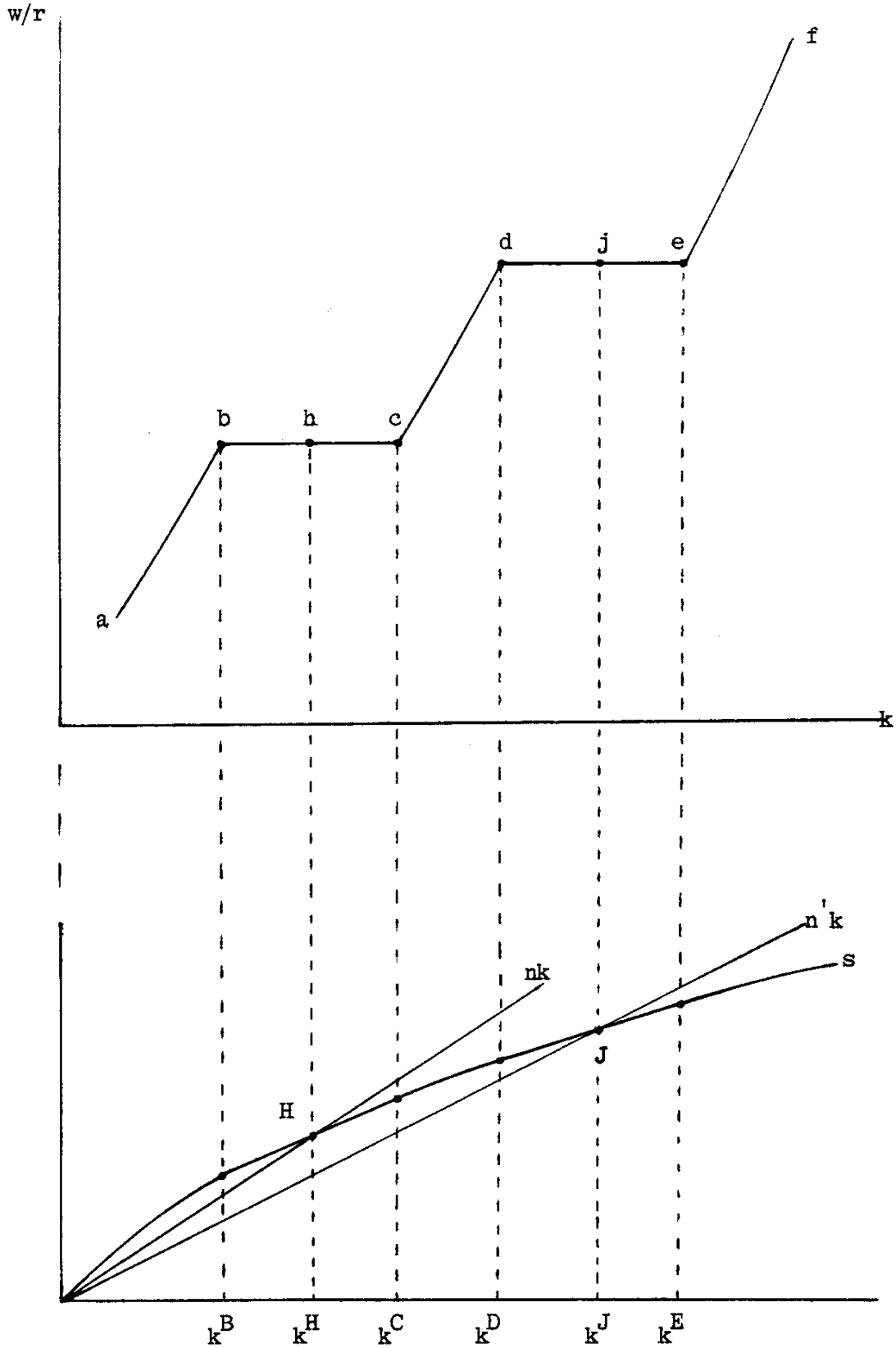

Figure 9: Effect on Industrial Structure of a Fall in Population Growth Rate from n to n'

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