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*CAMBRIDGE ECONOMIC HANDBOOKS.—VIII.*  
GENERAL EDITOR: J. M. KEYNES, M.A. C.B.

**INTERNATIONAL ECONOMICS**

# INTERNATIONAL ECONOMICS

BY

**R. F. HARROD**

M.A.

STUDENT OF CHRIST CHURCH, OXFORD

WITH AN INTRODUCTION BY

**J. M. KEYNES**

M.A., C.B.

FELLOW OF KING'S COLLEGE, CAMBRIDGE



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## INTRODUCTION TO THE SERIES

THE Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions. It is not difficult in the sense in which mathematical and scientific techniques are difficult; but the fact that its modes of expression are much less precise than these, renders decidedly difficult the task of conveying it correctly to the minds of learners.

Before Adam Smith this apparatus of thought scarcely existed. Between his time and this it has been steadily enlarged and improved. Nor is there any branch of knowledge in the formation of which Englishmen can claim a more predominant part. This Series, however, is not directed towards making original contributions to economic science. Its object is to expound its elements in a lucid, accurate, and illuminating way, so that the number of those who can begin to think for themselves may be increased. It is intended to convey to the ordinary reader and to the uninitiated student some conception of the general principles of thought which economists now apply to economic problems. The writers have been more anxious to avoid obscure forms of expression than difficult ideas. Most of the omissions of matter often treated in textbooks are intentional; for as a subject develops, it is important, especially in

books meant to be introductory, to discard the marks of the chrysalid stage before thought had wings.

Even on matters of principle there is not yet a complete unanimity of opinion amongst professional students of the subject. Immediately after the war daily economic events were of such a slashing character as to divert attention from theoretical complexities. But to-day, economic science has recovered its wind. Traditional treatments and traditional solutions are being questioned, improved, and revised. In the end this activity of research should clear up controversy. But for the moment controversy and doubt are increased. The writers of this series must apologise to the general reader and to the beginner if many parts of their subject have not yet reached to a degree of certainty and lucidity which would make them easy and straightforward reading.

J. M. KEYNES

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## APPENDIX

THE principles on which the calculations in Chapter II are based may be explained as follows :

When the output of one commodity, B, is increased in England by an amount Q, it is assumed that the output of A is reduced in England by an amount equal to  $\frac{Q}{r}$ , where  $r$  is the rate at which B is exchanged for A in the new state of affairs.  $r$  is the cost of producing A divided by the cost of producing B and is referred to throughout Chapter II as "the ratio."

If the cost gradient of A is equal to that of B (simplest assumption), and if an increase in the output of B by Q leads to a rise in the cost of B by an amount  $q$ , when the output of A is decreased by  $\frac{Q}{r}$  its cost falls by  $\frac{q}{r}$

If the initial ratio of costs in England is represented by 1 : 1 (=1), the new relation of costs is expressed by the following equation :

$$\frac{1 - \frac{q}{r}}{1 + q} = r \dots \dots \dots (1)$$

From this it follows that

$$q = \frac{(r)(1-r)}{r^2 + 1}$$

If the cost gradients of sources in England are equal to those abroad, and a given amount of output is transferred from England to the outer world, a change in the English cost of a given amount is accompanied by a change in the foreign cost of that amount multiplied by  $n$ , where  $n$  is a fraction showing the ratio of England's initial output to the initial foreign output (=the number of sources in England divided by the number abroad).

If the initial ratio of the foreign cost of A to that of B is  $1 : p$ , the relation of foreign costs which accompanies the state of affairs represented in (1) above is expressed by the following equation :

$$\frac{1+n}{p-nq} = r \quad (*) \dots\dots\dots (2)$$

From this it follows that

$$q = \frac{(r)(pr-1)}{n(r^2+1)}$$

From equations (1) and (2) it may be deduced that

$$r = \frac{1+n}{p+n} \dots\dots\dots (3)$$

*Example :* Suppose trade is opened when costs at home are  $1 : 1$  and costs abroad  $1 : 2$  and  $n = \frac{1}{10}$  (cf. Table X, p. 29).

$$r = \frac{1 + \frac{1}{10}}{2 + \frac{1}{10}} = \frac{1\frac{1}{10}}{2\frac{1}{10}} = 1 : 1\frac{1}{9}$$

$$\begin{aligned} \text{and by (1), } q &= \frac{(\frac{1}{10} \times \frac{1}{9})}{(\frac{1}{10})^2 + 1} \\ &= \frac{1\frac{1}{90}}{1\frac{1}{100}} = 106 \dots\dots \end{aligned}$$

\* If cost elasticity instead of cost gradient were used, the left-hand denominator would run  $p(1-nq)$ .

Consequently costs relations will be as follows :

	In England.	Abroad.
A	$\{1 - (.196.) (\frac{1}{10})\}x$	$\{1 + (.196.) (\frac{1}{10})\}y$
B	$\{1 + (.196...)\}x$	$\{2 - (.196...)(\frac{1}{10})\}y$
i.e.		
	In England.	Abroad.
A	$.625...x$	$1.037...y$
B	$1.196...x$	$1.980...y$

If cost gradients in England are not equal to those abroad, let  $g$  stand for the average English gradient divided by the average foreign gradient over the relevant range.\* Then a foreign change in costs of  $nq$  would be accompanied by an English change of  $gq$ , etc. The cost relations would be represented by the equations :

$$\frac{1 - g\frac{q}{r}}{1 + gq} = \frac{1 + n\frac{q}{r}}{p - nq} = r$$

It follows that

$$r = \frac{g + n}{gp + n}$$

*Example :* if  $p=5$ ,  $n=\frac{1}{10}$  and  $g=2$  (cf. Table XII, p. 32)

$$r = \frac{2 + \frac{1}{10}}{10 + \frac{1}{10}} = \frac{21}{101} = 1 : 4\frac{1}{4}$$

$$q = \frac{(r)(1-r)}{g(r^2+1)} = \frac{(\frac{21}{101})(\frac{80}{101})}{2(\frac{21}{101})^2+1} = \frac{1680}{21284} = .079...$$

\* Demand considerations may be neglected by supposing that each demand gradient is proportional to its appropriate cost gradient

Cost relations will be as follows :

	In England.	Abroad.
A	$\{1 - (.079 \dots) (2) (\frac{1}{2} \frac{0}{1})\} x$	$\{1 + (.079 \dots) (\frac{1}{10}) (\frac{1}{2} \frac{0}{1})\} y$
B	$\{1 + (.079 \dots) (2)\} x$	$\{5 - (.079 \dots) (\frac{1}{10})\} y$

i.e.

	In England.	Abroad.
A	$.24 \dots x$	$1.038 \dots y$
B	$1.158 \dots x$	$4.992 \dots y$

### QUESTIONS ON THE APPENDIX

[The demand gradient is assumed to be proportional to the cost gradient in each case.]

1. If the foreign output is initially twenty times the size of the home output, the pre-trade home cost ratio 1 : 1 and the pre-trade foreign cost ratio 1 : 4, and the cost gradients of sources equal at home and abroad, what will the new equilibrium ratio be ?

2. If the foreign output is initially four times the size of the home output, the pre-trade ratio of the cost of producing A to that of producing B at home 1 : 1 and the corresponding pre-trade foreign ratio 1 : 3, and the cost gradients of sources equal at home and abroad, what will the home and foreign costs of A and B be in the new equilibrium position ? (Assume that the pre-trade costs are expressed as  $x$  and  $x$  at home and  $y$  and  $3y$ , abroad.)

Estimate the cost of procuring A by importation as a fraction of the cost of making it at home before the opening of trade, assuming that the cost gradients are straight lines.

3. In which circumstances would a country gain more from the opening of foreign trade in two commodities, whose home cost ratio was initially 1 : 1 and whose foreign cost ratio was initially 1 : 3, (i) if foreign output was initially twenty times the size of home output and home cost gradients half as steep

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as foreign cost gradients on the average over the relevant range, or (ii) if foreign output was initially fifteen times the size of home outputs and cost gradients at home and abroad both equal to the foreign cost gradients supposed in the first alternative ?

**ANSWERS**

1.  $1 : 3\frac{1}{2}$

2.            At Home.            Abroad.

Cost of A  $\frac{1}{3}x$              $1\frac{1}{3}y$

Cost of B  $1\frac{1}{3}x$              $2\frac{2}{3}y$

(Ratio  $1 : 2\frac{1}{2}$ .)

$\frac{1}{3}\frac{1}{3}$ .

3. The former. (The ratio is more favour in (ii) by  $\frac{4}{15}$ ths. But the amount of the foreign commodity purchased on the first alternative is about one and a half times as much as on the second.)

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