

THE DIVISION OF LABOUR AND MICROECONOMIC THEORY

by

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This note is by no means destined to be an exhaustive treatment of the division of labour as found in economic theory. For example, the author is not concerned with its role in models of economic growth. Nor does he attempt to deal with the international division of labour which is supposed to rest on the theory of comparative advantage. In fact, the scope of the note is confined to an examination of the concept of division of labour as employed in microeconomic theory having a closed economy as its background.

Even within the restricted sphere of microeconomic theory it is not at all clear what the full implications of the division of labour may be. It is true that economists do have a pretty good idea of the impact of the division of labour within a firm on its own cost curves. It is, however, uncertain how exactly the division of labour operates among firms within the same industry and among industries within the same economy. Efforts have been

made notably by Joan Robinson and Stigler to provide an answer, and this note will make a modest attempt to assess its significance.

Modern thinking on the division of labour has been stimulated by Adam Smith's famous principle that the division of labour is limited by the extent of the market.¹ Within the context of a firm this principle is understood in the sense that the further specialization of labour and machinery is made possible by the increase in its scale of operation.² The advantages gained therefrom boil down to an increase in output per unit of input or a reduction in production cost per unit of output. In other words, the economies reaped from the further specialization of labour and machinery form part of the more general category of internal economies resulting from the division of labour as well as from such other factors as indivisibility and technological refine-

1. Wealth of Nations, ch. 3.

2. George J. Stigler: *The Division of Labour Is Limited by the Extent of the Market*, The Journal of Political Economy, June 1951, p. 185; John F. Due and Robert W. Clower: *Intermediate Economic Analysis*, 4th edition, 1961, pp. 138-139.

ments.³ In graphical terms, the division of labour partly helps to explain the nature of a firm's U-shaped average cost curve both in the short and in the long run.

It is recognized, of course, that the division of labour has an important role to play not only within a firm but also in the relationship among firms in the same industry and among industries in the same economy. In this connection the other broad category of economies, comprising external economies, is usually brought in. These comprise in the advantages reaped by all the firms in an industry as the total output of the industry increases. Such examples as have been given traditionally appear to be of two kinds. On the one hand, they are advantages derived by firms and industries without their having to undergo structural changes. One can think of the following consequences of such growth in the size

of the industry, namely, the unconscious development of a pool of skilled labour on which each firm can draw and the benefit derived by neighbouring mines when a particular mine drains its workings of water.⁴ On the other hand, there are advantages which can be reaped only when firms and industries undergo structural changes. As an industry grows one can think of the component firms' shedding some of their activities to auxiliary firms or industries with the result that their unit cost is lowered. Such activities may be transportation, research or machinery production.⁵ It is in the latter type of external economies that the division of labour has a crucial role to play, and it is here that the contribution of Joan Robinson and Stigler deserves a serious scrutiny.

Joan Robinson speaks of vertical disintegration as the division of an industry into a series of processes each

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3. Joan Robinson : *The Economics of Imperfect Competition*, 1945, pp. 333-336 ; George Leland Bach: *Economics*, 3rd edition, 1960, p. 333 ; Alfred W. Stonier and Douglas C. Hague; *A Text-book of Economic Theory*, 2nd edition, 1957, p. 112.
 4. Paul A. Samuelson, *Economics*, 5th edition, 1961, pp. 474-475; Joan Robinson, *op. cit.*, pp. 340-341 ; Alfred Stonier and Douglas C. Hague, *op. cit.*, pp. 138-139; Howard S. Ellis and William Fellner : *External Economies and Diseconomies, American Economic Review*, 1943 reprinted in A.E.A.'s *Readings in Price Theory*, 1953, p. 255.
 5. Paul A. Samuelson, *op. cit.*, pp. 474-475; Joan Robinson, *op. cit.*, pp. 340-341; F. Zeuthen : *Economic Theory and Method*, 1955, p. 123.

of which is carried on by separate firms⁶ or, in other words, the specialization of firms in component sections of an industry. The British cotton industry where each firm in a section is devoted to a single one of such processes as spinning, weaving, bleaching and dyeing is cited as one example of vertical disintegration. It is admitted, of course, that the possibilities of such disintegration depend on the nature of the end-product. For instance, they are greater in the case of a complicated product like a motor car than in the case of cotton goods.

Stigler gives further precision to this by analyzing a firm's activities

into a number of distinct operations or functions.⁷ How many functions a firm engages in depends, as Joan Robinson maintains, on how complicated the end-product is. Stigler is able to relate the cost of each function to the rate of output of the final product by making two assumptions, namely, that the cost of each function depends on the rate of output of that function alone and that the rate of output of each function bears a constant proportion to the rate of output of the final product. Figure 1⁷ relates the average cost of each function to the rate of the final product and to the average cost of the final product.

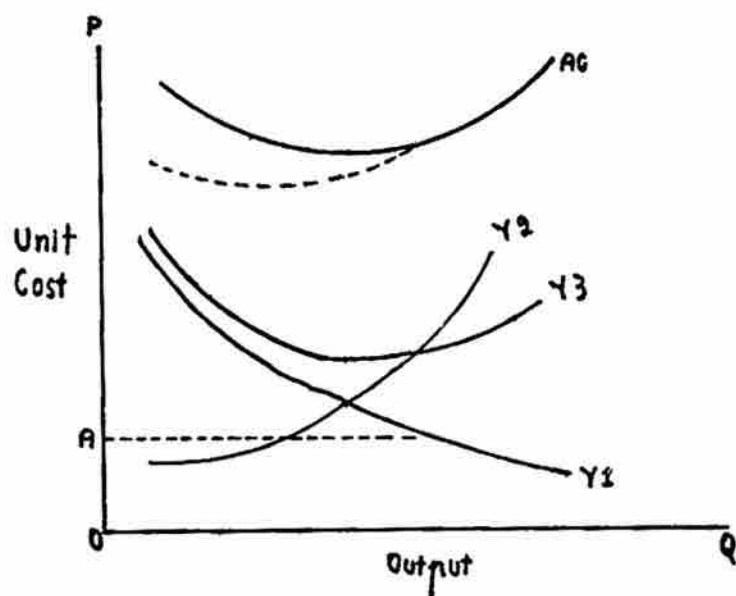


Figure 1

6. *Op. cit.*, pp. 338-340

7. *Op. cit.*, 1951, pp. 187-188; *The Theory of Price*, revised edition, 1952, pp. 145-146.

The firm in question is supposed to engage in three processes: processing raw materials (Y1), assembling the product (Y2) and selling the product (Y3). The average cost of each function is shown separately, and summation of the costs of various functions results in the average cost of the firm (AC). Though Stigler puts it differently, the average cost of each function conforms fairly closely to the conventional U-shaped average cost curve. In view of the possibility of internal economies (that is to say, internal to each function) it could be of no other shape. Y2 is U-shaped if it is also drawn for a smaller output and so is Y1 if it is extended to cover a higher output.⁸

With Stigler's working tools the impact of vertical disintegration on the firm's average cost curve can be studied. Y1 is obviously in a suboptimum position but the firm is prevented from exploiting it any further due to the pressure of Y2 and Y3 on its average cost (AC). With an expansion in the output of the industry, however, it becomes worthwhile for the firm to abandon Y1 altogether and for a new firm to take it up as its specialized line. The original firm will now buy Y1 from the auxiliary firm at price OA which should in fact correspond to

the long-run optimum position of Y1. When it does this, the average cost of the firm falls to the broken curve. Thus the original firm profits from the division of labour among firms in the same industry. Indeed, as the size of the original industry expands, the number of auxiliary firms may so increase that an auxiliary industry is developed.⁹ The advantages of vertical disintegration will reach their limits when, as Zeuthen puts it,¹⁰ an optimum size obtains in all fields. Of course, such limits can be pushed further by the expansion of the original industry and hence an increase in the demand for auxiliary services.

It is illuminating to have learnt from Stigler the nature of the shift of the AC curve as firms and industries become more and more specialized, through the process of vertical disintegration. However, the standard textbooks on economics view the impact of external economies on the AC curve differently: as an industry expands, it is assumed that external economies will cause a simple downward shift of the whole AC curve.¹¹ Of course, it may well be the case that economies due to vertical disintegration constitute an exceptional case.

8. But Stigler (*Op. cit.*, 1951, p. 187) does not rule out the possibility that the average cost of some functions may rise first and then fall. It is not known, however, on what basis this can be maintained.

9. Stigler, *op. cit.*, 1951., p. 188.

10. *Op. cit.*, p. 123.

11. See for instance John F. Due and Robert W. Clower, *op. cit.*, pp. 178-179.

Joan Robinson also speaks of lateral disintegration by which is meant the process by which multi-product firms gradually specialize in a narrower range of products until eventually each is only producing only a single product.¹² The economies due to this are more difficult to visualize than those due to vertical disintegration. Lateral disintegration is a source either of internal or of external economies. Though Joan Robinson has little to say on this, something follows from her reference to Pigou who finds the

British cotton industry larger and more specialized than the German one.¹³

As a source of internal economies, lateral disintegration can be depicted with the help of Figure 1 provided that AC is overlooked and that Y1, Y2 and Y3 represent the average cost curves of different products. As the market expands, the firm may drop products Y2 and Y3, retaining Y1 whose output can be pushed to an optimum position, thus achieving internal economies of operation. The situation can also be portrayed with the aid of Figure 2.

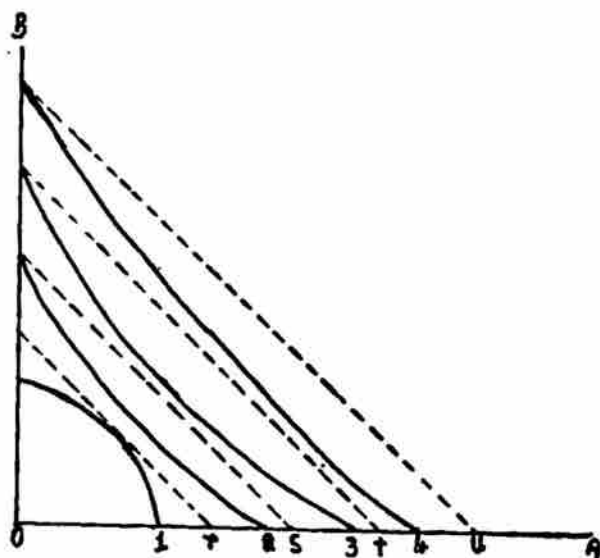


Figure 2

In Figure 2 product A is measured horizontally and product B vertically. The broken parallel lines represent

different combinations of A and B that would bring in the same revenue. The other curves represent different com-

12. *Op. cit.*, pp. 338-340.

13. A.C. Pigou : *Economics of Welfare*, 4th edition, 1932, p. 221.

binations of A and B that the firm can produce at a given cost. So long as the firm's output of both products remains within the limits imposed by transformation curve 1 both A and B can be produced together with profit, the point of tangency with the iso-revenue line determining the best-revenue combination at this level of output. However, with an expansion of market demand, combinations on 1 prove inadequate, and it becomes necessary to move to 2. But on 2 the best revenue can be obtained only when B alone is produced, since transformation curve 2 meets the highest iso-revenue curve on the B axis. The same is true of combinations on 3,4 and so forth. The change in the shape of the transformation curve is quite possible if, at a higher level of output, A and B can be produced in the same firm with difficulties.¹⁴

Another possibility is that lateral disintegration may lower the average cost curve. In Figure 1 if AC is overlooked and Y1, Y2 and Y3 are

the average cost curves of a multi-product firm, Y1 may be retained as the only product after lateral disintegration has taken place. At the same time, concentration on one single product may well lead to a downward movement of curve Y1 in the manner described by standard textbooks on economics and referred to above. This is likely to be the case particularly when the firm had difficulties in combining the various products before lateral disintegration.¹⁵ Yet, the economies thus achieved cannot properly be called external, since they originate from the firm's internal reorganization.

Of course, both effects may be involved in lateral disintegration at once; for it is possible that as the firm is trying to reach an optimum position on Y1 after abandonment of the other products the whole curve may shift downwards. In other words, lateral disintegration can cause movement along as well as of the average cost curve of the retained product.

14. This analysis borrows heavily from Tibor Scitovsky: *Welfare and Competition*, 1952 pp. 134-140.

15. Of course, if it is assumed, as is done in the case of vertical disintegration, that the average cost curves Y1, Y2 and Y3 are independent of each other, this effect may be negligible. One wonders, however, if this is not a drastic assumption to make in the case of lateral disintegration.

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ผู้เขียน

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เนื้อเรื่อง

การแบ่งงานกันทำตามความถนัดของคนงานแต่ละคน และอุปกรณ์แต่ละชนิด นับเป็นหลักสำคัญยิ่งในทางเศรษฐศาสตร์ นับแต่ แอดัม สมิธ ได้ตั้งหลักไว้ว่า การแบ่งงานกันทำมีขอบเขตอยู่ที่ตลาดเป็นต้นมา ก็เกิดมีผู้สนใจในหลักนี้เป็นพิเศษ แต่ความสนใจส่วนใหญ่่มักจะพุ่งเล็งไปในทางการประหยัด อันเกิดจากการแบ่งงานกันทำภายในหน่วยการผลิตเอง ส่วนประโยชน์ที่จะได้จากการแบ่งงานกันทำภายนอกหน่วยการผลิต คือ การแบ่งงานกันทำระหว่างหน่วยการผลิตในอุตสาหกรรมเดียวกัน และระหว่างอุตสาหกรรมต่างกันนั้น ก็ยังเป็นเรื่องที่คลุมเคลืออยู่

บทความนี้พยายามให้ความกระจ่าง ในเรื่องการแบ่งงานกันทำภายนอกหน่วยการผลิต โดยนำหลักการประหยัดภายนอกที่รู้จักกันในหมู่นักเศรษฐศาสตร์มาเป็นเครื่องประกอบการพิจารณา นักเศรษฐศาสตร์ ๒ ท่าน คือ สตีเกลอร์ และ โจน รอบินสัน ผู้ได้เสนอข้อคิดบางประการในเรื่องนี้ ได้รับการพิจารณาเป็นพิเศษ ข้อสรุปก็คือ ว่าการแบ่งงานกันทำมีขอบเขตกว้างขวาง ถึงแม้จะพิจารณาเพียงทฤษฎีการผลิตก็ตาม