



Some Fallacies in the Interpretation of Social Cost

F. H. Knight

The Quarterly Journal of Economics, Vol. 38, No. 4 (Aug., 1924), 582-606.

Stable URL:

<http://links.jstor.org/sici?sici=0033-5533%28192408%2938%3A4%3C582%3ASFITIO%3E2.0.CO%3B2-6>

The Quarterly Journal of Economics is currently published by The MIT Press.

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/mitpress.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is an independent not-for-profit organization dedicated to creating and preserving a digital archive of scholarly journals. For more information regarding JSTOR, please contact jstor-info@umich.edu.

SOME FALLACIES IN THE INTERPRETATION OF SOCIAL COST

SUMMARY

Arguments for social interference developed by Pigou and Graham illustrate common misinterpretations of the meaning of cost and its variation with output, 582. — I. The private owner of a natural opportunity secures maximum return from it by charging that rent which halts the application of investment at the point which is socially most advantageous, 584. — II. The notion of decreasing cost is a fallacy; competitive price fixation under decreasing cost or increasing returns an impossible situation, 592. — III. The law of comparative advantage in international trade is fundamentally sound, 599. — Importation a method of using resources to produce the imported good, and will be employed under competitive conditions only when more efficient than a direct method, 603. — The competitive system has important defects, but they lie outside the mechanical theory of exchange relations, 605.

IN two recent articles in this Journal,¹ Professor F. D. Graham of Princeton University has developed an ingenious argument to prove that the classical theory of comparative cost as a demonstration of the economic advantage of trade between nations is "all wrong." He contends that a protective tariff may, after all, be a wise national policy in that it may enable the nation which adopts it to secure a larger product from its resources than would be secured if free trade were permitted. It is the opinion of the present writer, and the contention of this paper, that it is Professor Graham's argument which is fallacious, tho the way in which the classical theory has been formulated in many instances leaves much to be desired. The matter is of the greater importance because the most important argument, from the standpoint of general theory, in Professor A. C.

1. February 1923, November 1923.

Pigou's monumental work on *The Economics of Welfare*² is, as I shall also try to show, marred by the same, or a very similar, fallacy.

If economic theory is interpreted as a critique of the competitive system of organization, its first and most general problem is that of determining whether the fundamental tendencies of free contractual relations under competitive control lead to the maximum production of value as measured in price terms. The problems of the validity of the price measure of "real value," and of the distribution of the value produced, are larger but subsequent problems, and belong to ethics as much as to economics; while the detailed comparison of the theoretical tendencies of perfect competition with the facts of any actual competitive society lie in the field of applied economics rather than that of theory. The theory of international or inter-regional trade is a special case under the more general problem, whether "society" can increase the production of exchange value by interfering with free bargaining relations: the case, namely, of bargains between its own members and members of some other society possessing a distinct body of productive resources. The peculiarity of international trade as compared with domestic lies in the immobility of population viewed as labor power. Natural resources are immobile even within a country, and capital goods enter into international commerce in the same way as goods ready for consumption.

2. The Macmillan Co., 1918. This paper was written and submitted to the editor of the Quarterly Journal before the appearance of the March number of the Economic Journal. In that number, Professor D. H. Robertson has an article covering some of the same ground and treating it with his usual analytic penetration and stylistic brilliancy. Moreover, in a rejoinder appended to that article, Professor Pigou admits the particular error in his analysis and states that it is to be eradicated in a forthcoming revised edition of his book. It seems inadvisable to recast and enlarge the present paper so as to include a discussion of Professor Robertson's argument, which is notably divergent from that presented herewith. I trust it will not be thought presumptuous to print without change the few pages which in some sense cover ground already covered by Professor Robertson.

Both Professor Graham and Professor Pigou reason to the conclusion that freedom of trade between regions may reduce the production of wealth in one or even both; and Professor Pigou extends essentially the same logic to cover the relations between different industries, irrespective of regional separation. The contention is that individual profit-seeking leads to an excessive investment of resources in industries of increasing cost (decreasing returns), part of which would yield more product if transferred by social action in some form to industries of constant or decreasing cost. The fallacy to be exposed is a misinterpretation of the relation between social cost and *entrepreneur's* cost. It will be convenient to take up first Professor Pigou's argument, which presents the more general problem.

I

In Professor Pigou's study the argument that free enterprise leads to excessive investment in industries having relatively upward-sloping cost curves is developed with the aid of a concrete example, the case of two roads.³ Suppose that between two points there are two highways, one of which is broad enough to accommodate without crowding all the traffic which may care to use it, but is poorly graded and surfaced, while the other is a much better road but narrow and quite limited in capacity.⁴ If a large number of trucks operate between the two termini and are free to choose either of the

3. *Economics of Welfare*, p. 194.

4. For simplicity, no account is taken of costs involved in *constructing* the two roads. The aim is to study the effects of the two types of "cost" — that which represents a consumption of productive power which might have been put to some other use, and pure rent or the payment for situation and opportunity. The assumption adopted is the simplest way of making the separation. The conclusion will not be changed if various types of cost are taken into account, so long as one of the roads has a definite situation advantage while the investment in the other can be repeated to any desirable extent with equivalent results in other locations.

two routes, they will tend to distribute themselves between the roads in such proportions that the cost per unit of transportation, or effective result per unit of investment, will be the same for every truck on both routes. As more trucks use the narrower and better road, congestion develops, until at a certain point it becomes equally profitable to use the broader but poorer highway. The congestion and interference resulting from the addition of any particular truck to the stream of traffic on the narrow but good road affects in the same way the cost and output of all the trucks using that road. It is evident that if, after equilibrium is established, a few trucks should be arbitrarily transferred to the broad road, the reduction in cost, or increase in output, to those remaining on the narrow road would be a clear gain to the traffic as a whole. The trucks so transferred would incur no loss, for any one of them on the narrow road is a marginal truck, subject to the same relation between cost and output as any truck using the broad road. Yet whenever there is a difference in the cost, to an additional truck, of using the two roads, the driver of any truck has an incentive to use the narrow road, until the advantage is reduced to zero for all the trucks. Thus, as the author contends, individual freedom results in a bad distribution of investment between industries of constant and industries of increasing cost.

In such a case social interference seems to be clearly justified. If the government should levy a small tax on each truck using the narrow road, the tax would be considered by the trucker as an element in his cost, and would cause the number of trucks on the narrow road to be reduced to the point where the *ordinary cost, plus the tax*, became equal to the cost on the broad road, assumed to be left tax free. The tax could be so adjusted that the number of trucks on the narrow road would be

such as to secure the maximum efficiency in the use of the two roads taken together. The revenue obtained from such a tax would be a clear gain to the society, since no individual truck would incur higher costs than if no tax had been levied.

It is implied that the same argument holds good over the whole field of investment wherever investment is free to choose between uses subject to cost curves of different slope. Take, for example, two farms, one of superior quality, the other marginal or free land. Would not labor and capital go to the better farm, until the product per man became equal to the product to be obtained from the marginal land? If so, it is clear that the total product of all the labor and capital could be increased, as in the case of the roads, by transferring some of it from the superior to the inferior farm. This application of the reasoning will probably suggest the fallacy to any one familiar with conventional economic theory. The statement does in fact indicate what would happen *if no one owned the superior farm*. But under private appropriation and self-seeking exploitation of the land the course of events is very different. It is in fact the social function of ownership to prevent this excessive investment in superior situations.

Professor Pigou's logic in regard to the roads is, as logic, quite unexceptionable. Its weakness is one frequently met with in economic theorizing, namely that the assumptions diverge in essential respects from the facts of real economic situations.⁵ The most essential feature of competitive conditions is reversed, the feature namely, of the private ownership of the factors practically significant for production. If the roads are

5. For the edification of the advocates of "inductive economics" it may be observed that the "facts" are not in dispute; that what is needed in the case is not more refined observation or the gathering of "statistics," but simply correct theorizing. There is, of course, also a large field in which the crucial facts are *not* obvious.

assumed to be subject to private appropriation and exploitation, precisely the ideal situation which would be established by the imaginary tax will be brought about through the operation of ordinary economic motives. The owner of the broad road could not under effective competition charge anything for its use. If an agency of production is not subject to diminishing returns, and cannot be monopolized, there is, in fact, no incentive to its appropriation, and it will remain a free good. But the owner of the narrow road can charge for its use a toll representing its "superiority" over the free road, in accordance with the theory of rent, which is as old as Ricardian economics. An application of the familiar reasoning to this case will show that the toll will exactly equal the ideal tax above considered, — tho the application may need to be more careful and complete than that made by many of the expositors of the classical theory.

The owner of a superior opportunity for investment can set the charge for its use at any amount not greater than the excess of the product of the first unit of investment above what that unit could produce on the free opportunity. Under this charge investment will flow into the superior road up to the point where congestion and diminishing returns set in. (It is better in such a simple case to use the notion of diminishing returns than to use that of diminishing costs, since in the large the practical objective is to maximize the product of given resources and not to minimize the expenditure of resources in producing a given product.) By reducing the charge, the owner will increase the amount of traffic using his road (or in general the amount of investment of labor and capital in any opportunity). But obviously the owner of the road will not set the charge so low that the last truck which uses the road secures a return in ex-

cess of the amount which it adds to the total product of the road (that is, of all the trucks which use it). This is clearer if we think of the owner of the road hiring the trucks instead of their hiring the use of the road. The effect is the same either way; it is still the same if some third party hires the use of both. The toll or rent will be so adjusted that *added* product of the last truck which uses the narrow road is just equal to what it could produce on the broad road. No truck will pay a higher charge, and it is not to the interest of the owner of the road to accept a lower fee. And this adjustment is exactly that which maximizes the total product of both roads.

The argument may be made clearer by the use of simple diagrams.⁶

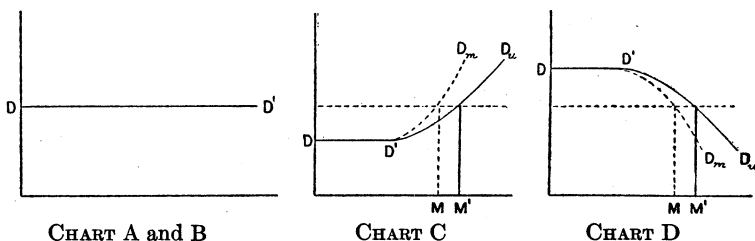


Chart A and B represents the case of constant cost or constant returns, the cost of successive units of output or the return from successive units of investment on the broad road. In Chart C, the curve $DD'D_u$ is a *cost* curve for the narrow road, showing the cost of successive units of output. It starts at a lower level than the cost on the broad road, but at a certain point D' , congestion sets in and increasing cost appears. Curve $DD'D_m$ is a curve of *marginal* costs on the narrow road, as Professor Pigou uses the term marginal cost; the marginal cost of the n th unit of product is the difference

6. Cf. Pigou, *op. cit.*, Appendix iii, pp. 931-938.

between the total cost of producing n units and the total cost of producing $n + 1$ units. When costs begin to increase, the marginal cost will increase more rapidly than the cost of the added unit, since the production of each additional unit raises the cost of the earlier units to a level with that of the new unit. It must be observed that the cost of the additional unit is always the same as the cost per unit of the whole supply produced; much economic analysis is vitiated by a spurious separation of these two conceptions of cost.

Chart D represents the same facts as Chart C, but in terms of the product of successive units of investment instead of the cost of successive units of output, that is, as curves of "diminishing returns" instead of "increasing costs." The output begins at a higher level than on the broad road, but at the point D' , which corresponds to the point of the same designation on Chart C, the return from investment begins to fall off. The curve $D'D_u$ shows the actual product of the added unit of investment, and the curve $D'D_m$ its marginal product, its addition to the total. The latter decreases more rapidly, because the application of the additional unit reduces the yield of the earlier ones to equality with its own. The argument is the same, but stated in inverse or reciprocal form. As indicated, the viewpoint of Chart D is to be preferred, and it may be surmised that, if Professor Pigou had put his argument in this form, he would probably have avoided the error into which he was very likely misled by measuring efficiency in terms of cost of output instead of output of resources.⁷

The owner of the road will adjust his toll so that the

7. It may be noted that Robertson makes the opposite contention, that the concepts of increasing and decreasing costs are to be preferred to those of decreasing and increasing returns. *Loc. cit.*, p. 17. He gives no argument for this position. It seems to me that this is the entrepreneur's point of view, while that of either the investor or society is the inverse one advocated in the text above, and is distinctly to be preferred for general analysis.

traffic will take his road out to the point M in Chart C or D. It will *not*, under conditions of profit-seeking exploitation, be continued to M', as argued by Professor Pigou. The actual output is the same as the "ideal" output, but it is the "ideal" output which is wrongly defined in Pigou's treatment (p. 937). Evidently, the adjustment is correct when the *marginal* product of the last unit of investment on the superior road is equal to the product of a similar unit on the free road. Confusion arises in translating this condition into terms of cost and selling price of product. Selling price will be determined by cost on the free road, or at least these two will be equal, however the causal relation is conceived. That is, the *money* cost of any unit of product is the value of the investment which is necessary to produce it on the free opportunity, where cost is constant, or, in general, at an opportunity margin where rent does not enter. Comparison of the two viewpoints shown by our Charts C and D above shows that under competitive conditions the application of investment to the superior opportunity will be stopped at the point where *marginal real cost* (cost in terms of the transferable investment) is equal to real cost on the free opportunity. When equal additions to investment make equal additions to output, equal units of output have the same cost. But the condition of equilibrium cannot be stated in terms of money cost and money selling price of product on the superior opportunity, *because these would be equal however the investment might be distributed*, whatever rent were charged, or whether the opportunity were appropriated and exploited at all. The condition of equilibrium is that the rent on the superior opportunity is maximized as an aggregate. The rent per unit of output is a variable portion of a total unit cost which is fixed.

Extension of the foregoing argument to the general case of land rent involves no difficulties and will not be carried out in detail. The point is that any opportunity, whether or not it represents a previous investment of any sort, is a productive factor if there is sufficient demand for its use to carry into the stage of diminishing returns the application to it of transferable investment. The charge made by a private owner for the use of such an opportunity serves the socially useful purpose of limiting the application of investment to the point where *marginal* product instead of product per unit is equal to the product of investment in free (rentless) opportunities; and under competitive conditions this charge will be fixed at the level which does make marginal products equal, and thus maximizes productivity on the whole.⁸

It is pertinent to add that in real life, the original "appropriation" of such opportunities by private owners involves investment in exploration, in detailed investigation and appraisal by trial and error of the findings, in development work of many kinds necessary to secure and market a product — besides the cost of buying off or killing or driving off previous claimants.

8. It is a theoretically interesting fact that the rent on an opportunity which maximizes the return to its owner and brings about the socially correct investment in it is its "marginal product," in the same sense as used to describe the competitive remuneration of other productive factors transferable from one use to another or ultimately derived from labor and waiting. It is exactly the amount by which the product of the whole competitive system would be reduced if the opportunity were held out of use or destroyed, and the investment which would be combined with it were put to the next best possible use. This point is brought out in Professor Young's chapter on Rent in Ely's *Outlines of Economics* (pp. 409, 410 in the fourth edition). Professor Young also pointed out the essential fallacy in Professor Pigou's argument, in a review of the latter's earlier work on *Wealth and Welfare* (*Quarterly Journal of Economics*, August 1913).

The relation between "investment" and "opportunity" is an interesting question, by no means so simple as it is commonly assumed to be. In the writer's view there is little basis for the common distinction in this regard between "natural resources" and labor or capital. The qualities of real significance for economic theory are the conditions of supply and the degree of fluidity or its opposite, specialization to a particular use. In a critical examination neither attribute forms a basis for erecting natural agents into a separate class.

Under competitive conditions, again, investment in such activities of "appropriation" would not yield a greater return than investment in any other field. These activities are indeed subject to a large "aleatory element"; they are much affected by luck. But there is no evidence proving either that the luck element is greater than in other activities relating to economic progress, or that in fact the average reward has been greater than that which might have been had from conservative investments.

II

While Professor Pigou constantly refers to industries of decreasing cost, or increasing returns, the principles at issue do not necessarily imply more than a *difference* in the way in which efficiency varies with size from one industry to another. Some of Professor Graham's reasoning in regard to international trade and international value depends upon decreasing cost as such. It seems advisable, before taking up his argument concretely, to devote a few paragraphs to this conception, which the writer believes to involve serious fallacies, and to the meaning of cost and its variation.

Valuation is an aspect of conscious choice. Apart from a necessity of choosing, values have no meaning or existence. Valuation is a comparison of values. A single value, existing in isolation, can no more be imagined than can a single force without some other force opposed to it as a "reaction" to its "action." Value is in fact the complete analogue of force in the interpretation of human activity, and in a behavioristic formulation is identical with force—which is to say, it is an instrumental idea, metaphysically non-existent. Fundamentally, then, the cost of any value is simply the value that is given up when it is chosen; it is

just the reaction or resistance to choice which makes it choice. Ordinarily we speak of cost as a consumption of "resources" of some kind, but everyone recognizes that resources have no value in themselves; that they simply represent the products which could have been had by their use in some other direction than the one chosen.

The notion of cost suffers greatly in logical clearness from confusion with the vague and ambiguous term "pain." In the broad true sense every cost is a pain, and the two are identical. Little or nothing can be made of the distinction between pain and the sacrifice of pleasure, or between pleasure and escape from pain. The subject cannot be gone into here from the point of view of psychology; it is enough to point out that the way in which a particular person regards a particular sacrifice depends mainly upon the direction of *change* in the affective tone of his consciousness or upon the established level of expectations. The essential thing is that the pleasure-pain character of a value is irrelevant, that the universal meaning of cost is the sacrifice of a value-alternative. This is just as true of the "irksomeness" of labor, as of a payment of money. The irksomeness of digging a ditch reflects the value of the loafing or playing which might be done instead. And there is no significant difference between this irksomeness or pain and that of using the proceeds of the sale of a liberty bond to pay a doctor's bill when it might have been used to procure a fortnight's vacation.⁹

9. Besides confusion with the notion of pain, which has at last obtained in psychology a definite meaning independent of unpleasantness, the notion of cost encounters in economics another source of obscurity. This is in the relation between those values which do not pass through the market and receive prices and those which do. The "loafing" which underlies the irksomeness of labor is such a value, and there is a tendency to associate the notion of cost with these non-pecuniary values. In this connection it should be noted that not merely labor but all types of productive service are subject to the competition of uses which yield their satisfactions directly and not through the channel of a marketable product. Thus land is used for lawns as well as for fields, and examples could be multiplied at will.

The natural and common rule in choice is necessarily that of increasing cost. In the exchange of one good for another at a fixed ratio, the further the exchange is carried, the more "utility" is given up and the less is secured. This is merely the law of diminishing utility. It is only when one commodity is given up in order that another may be produced by the use of the common and divertible productive energy that we ordinarily think of the variation of cost. If two commodities are produced by a single homogeneous productive factor, there is no variation of cost as successive portions of one are given up to procure more of the other by shifting that factor—except in the sense of increasing utility cost as met with in the case of exchange. Ordinarily, however, new considerations enter, as a matter of fact. If we wish to produce more wheat by producing less corn, we find that the further the shift of production is carried, the more *bushels* of corn (as well as corn value) have to be given up to produce a *bushel* of wheat (and still more for a given amount of wheat value). This is the economic principle of increasing cost (decreasing returns) as generally understood, reduced to its lowest terms and freed from ambiguity.

When costs are measured in value terms and product in physical units there are two sorts of reasons for increasing cost, one reflecting value changes and the other technological changes. The first would be operative if all productive resources were perfectly homogeneous and perfectly fluid. But this is not, in general, the case, and technological changes supervene which work in the same direction and add to the increase which would otherwise take place in the cost of a unit of the product which is being produced in larger volume. Principal among these technological changes is the fact that some of the resources used to produce the commodity

being sacrificed are not useful in the production of that whose output is being increased, and in consequence the resources which are transferred are used in progressively larger proportions in the second industry and in smaller proportions in the first, in combination with certain other resources which are specialized to the two industries respectively. The consequent reduction in the physical productive effect of the transferred factors is what is meant by diminishing returns in one of the many narrower uses of that highly ambiguous expression. Another technological cause still further aggravating the tendency to increasing costs arises from the fact that productive factors are not really homogeneous or uniform in quality. As productive power is transferred from corn to wheat, it will be found that the concrete men, acres, and implements transferred are those progressively more suitable for corn-growing and less suitable for wheat. Thus each unit suffers a progressively greater reduction in its value in terms of units of either commodity, or it takes more units to represent in the wheat industry the value of a single unit in the corn industry, and value costs of wheat mount still higher for this third reason.

All three changes so far noted clearly involve increasing cost in the real sense, the amount of value¹ outlay or sacrifice necessary to produce an additional physical unit of the commodity whose production is increased. In addition to these we have to consider two further possible sources of increased cost. The first is that, when an additional unit of, say, wheat is produced, and the factors transferable from other industries to wheat are raised in price, the quantities of these factors already used to produce wheat will rise in price along with those

1. Value as used in this discussion means "real" value, relative significance or utility. No assertion as to exchange value or price is implied.

added to the industry. Should all this increase in cost be charged up to the production of the last unit of wheat produced, which causes it to appear? In a sense, this is in truth a social cost of this last unit. Yet the transfer of productive energy will not take place unless there has been a shift in the market estimate of wheat in comparison with competing commodities such as to justify it. That is, as the exchange system measures values, making all units of the same good equal in value, the increase in the total value of the wheat must be greater than the decrease in the value of the output of competing commodities. (A discrepancy — *in either direction* — may result from considering the potential significances of infra-marginal units commonly designated as consumers' surplus.) The second additional possible source of increased cost is the increased payments which will be made for the specialized factors used in producing wheat,² the cost elements which are of the nature of rent or surplus. These payments evidently do not represent social costs at all, but redistributions of product merely. Such redistributions may be "good," or "bad," depending on the moral position, according to some standard, of the owners of the two classes of factors respectively.

Decreasing cost (or increasing returns) is alleged to result in several ways, which can be dealt with but briefly. The most important is the technological economy of large-scale production. When the output of a commodity is increased, the cost of the productive services used to produce it will be higher; but this increase in their cost per unit may, it is held, be more than offset by economies in utilization, made possible by larger-scale operations, which increase the amount of product

2. The fallacy of identifying specialized factors with natural agents and transferable factors with labor and capital has been referred to above. It will not be elaborated in this paper.

obtained from given quantities of materials and resources consumed.³ But technological economies arise from increasing the size of the productive unit, not from increasing the total output of the industry as a whole. The possibility of realizing such economies — by the distribution of “overhead,” or more elaborate division of labor, or use of machinery — tends to bring about an increase in the *scale* of production, but this may happen independently of any change in the output of the industry. If competition is effective, the size of the productive unit will tend to grow until *either* no further economies are obtainable, *or* there is only one establishment left and the industry is a monopoly. When all establishments have been brought to the most efficient size, variation in total output is a matter of changing their *number*, in which no technical economies are involved.

The rejoinder to the above argument is the doctrine of “external economies,” which surely rests upon a misconception. Economies may be “external” to a particular establishment or technical production unit, but they are not external to the industry if they affect its efficiency. The portion of the productive process carried on in a particular unit is an accidental consideration. External economies in one business unit are internal economies in some other, within the industry. Any branch or stage in the creation of a product which offers continuously a chance for technical economies with increase in the scale of operations must eventuate either in monopoly or in leaving the tendency behind and establishing the normal relation of increasing cost with increasing size. If the organization unit is not small

3. Professor Graham says (p. 203, note) that decreasing cost is an “aspect of the law of proportionality.” This is a form of statement frequently met with, but rests on a misconception sufficiently refuted in the text. It is true only accidentally, if it is true in any general sense at all, that a more elaborate technology is associated with a change in the proportions of the factors.

in comparison with the industry as a whole, a totally different law must be applied to the relation between output, cost, and price.

Two other alleged sources of decreasing cost are the stimulation of demand and the stimulation of invention. Neither can properly be regarded as an effect of increasing output, other things being equal. Producing a commodity and distributing it at a loss might result in developing a taste for it, but would be no different in principle from any other method of spending money to produce this result. Inventions tend to enlarge the scale of production rather than large-scale production to cause inventions. It is true that an increase in demand from some outside cause may stimulate invention, but the action takes place through first making the industry highly profitable. The result is not uniform or dependable, nor is it due to increased production as such.

These brief statements form a mere summary of the argument that, with reference to long-run tendencies under given general conditions, increasing the output of a commodity must increase its cost of production unless the industry is, or becomes, a monopoly. They also indicate the nature of the relation between social cost and entrepreneur's money cost. Under competition, transferable resources are distributed among alternative uses in such a way as to yield equal marginal⁴ value product everywhere, which is the arrangement that maximizes production, as measured by value, on the whole. Non-transferable resources secure "rents" which equalize money costs to all producers and for all units of product under the foregoing condition; or, better, the rents bring about that allocation of resources which maximizes production, under the condition that money costs are equalized.

4. "Differential" is the term in use in other sciences for the idea commonly referred to as a marginal unit in economics.

A further major fallacy in value theory which suffuses Professor Graham's argument will be pointed out in general terms before proceeding with detailed criticism. The reference is to the notorious "law of reciprocal demand." This so-called law, that the prices of commodities exchanged internationally are so adjusted that a country's exports pay for its imports, is at best a truism. To say that what one gives in exchange pays for what one gets is merely a statement of the fact that one is exchanged for the other. What calls for explanation in the case is the process which fixes *how much* of one thing will be parted with, and *how much* of the other received in return.

III

We are now ready to take up concretely the proposed refutation of the law of comparative advantage. Professor Graham begins by assuming two countries, which he calls A and B, but which it appears simpler to designate as England and America respectively. Suppose then that in England

10 days' labor produces 40 units of wheat
 10 days' labor produces 40 watches;

in America

10 days' labor produces 40 units of wheat
 10 days' labor produces 30 watches.

America has a comparative advantage in wheat, England in watches.⁵ According to the accepted theory, trade at any ratio intermediate between the two cost

5. The use of labor as equivalent to productive power, or the treatment of labor as the only factor which may be transferred from one industry to the other, is a simplification likely to mislead the unwary, but it will not be criticized here. It is of interest to note, however, that historically the whole doctrine of comparative cost was a prop for a labor cost theory of value.

ratios will be of advantage to both countries. Our author assumes it to begin at the ration of 35 watches for 40 units of wheat. Then, for each ten days' labor devoted to producing wheat and exchanging for watches, America can get 35 watches instead of the 30 which could be produced by using the same labor in producing the watches. England, for each ten days' labor devoted to producing watches and exchanging for wheat can secure $\frac{40}{35} \times 40 (= 45\frac{5}{7})$ units of wheat, instead of the 40 units which could be directly produced with the same labor.

So far, well and good for the theory. But at this point Professor Graham's blows begin to fall. Assuming that wheat-growing is an industry of increasing, and watch-making one of decreasing costs, it will come to pass, as the two countries progressively specialize, that the cost of both commodities is decreased for England and increased for America. It clearly follows, first, that if the process goes on long enough, America will begin to lose, and just as clearly, from the assumptions of the article, that the process will go on forever! For the further it is carried, the greater becomes England's comparative advantage in the production of watches and the greater becomes America's comparative advantage in the production of wheat. Yet this conclusion must arouse a suspicion that there is something wrong in Denmark.

First, in accordance with the argument above, drop the assumption of decreasing cost as a permanent condition in the watch-making industry; then the two cost ratios in the two countries must come together instead of separating as the specialization of productive efforts progresses. Under any assumption whatever, *either* this must happen, *or else* one country must entirely cease to produce one of the commodities. In the first event, the exchange ratio will be the common cost ratio

of the two countries (transportation costs being neglected, as usual in these discussions). If the second result ensues, — that one country abandons one of the industries, — *the exchange ratio will be the cost ratio in the country which still produces both commodities* (assuming, always, that monopoly is absent). Professor Graham “assumes” that the comparative advantage has become progressively greater as the result of specialization and then “assumes” (page 210) that, with the cost ratio in one country half what it is in the other, the market price may be established at any ratio between the two. In reality the only possible result under the cost conditions he states would be that America would stop producing watches at once and would exchange wheat for watches at the ratio of 40 for 40 (the cost ratio in England), thus making a *gain* of 20 watches on each ten days’ labor so employed as compared with using it to produce the watches in America.

Next, the author proposes to consider the effect of interpreting his cost figures as representing marginal cost instead of cost per unit. He gets no further, however, than to average up the marginal with assumed inframarginal costs, which amounts merely to a slight change in the numbers assumed for cost per unit. He nowhere gives an explicit statement of what he means by cost, and must be suspected of not having clearly faced the difficulties and ambiguities in the notion, as brought out in the argument of the first and second parts of this paper. Certainly it will not do to recognize a possible permanent difference under competition in the money cost of different units of a supply, or in their marginal real cost. The money costs which represent real costs differ in different situations, but the rent element always equalizes them, or produces *coincidence* between equality of money cost, which would result in any case, and equal-

ity of marginal real cost, which is the social desideratum. Value and cost are like action and reaction, axiomatically equal, and as in an exchange system the value of all similar units must be equal, so must their costs.

In the writer's opinion this also is socially and morally correct. We do not, and should not, value the first slice of bread more highly than the last, nor systematically value anything at more or less than its necessary cost. As between units of supply consumed by different persons, the case is different, because different persons do not come into the market with equal exchange power in the form of productive capacity. But the question is one of ethics, entirely outside the field of exchange as a mechanical problem. The famous surpluses have the same kind of significance as potential energy in physics. They relate to possible changes in fundamental conditions, but have nothing to do with the conditions of equilibrium in any particular situation. With reference to relations among actual magnitudes, cost curves and utility curves should always be interpreted to mean that, as supply varies, the cost, or utility, of every unit changes in the manner shown by the curve.

Marginal money cost, in the sense in which it is used by Professor Pigou, is meaningless with relation to competitive conditions. It is true that under monopoly the supply is so adjusted that the contribution of the last unit to total selling price (marginal demand price) is equal to the addition to total cost incurred in consequence of producing it (marginal supply price); but this is a mere equivalent of the statement that the difference between total cost and total selling price is made a maximum. Professor Graham seems to use the expression marginal cost to mean the particular money expense of producing the last unit of supply; but, as already stated, there cannot in the long run under competitive

conditions be a difference between the cost of this unit and that of any other, or the cost per unit of producing the whole supply.

Professor Graham's article makes use at several points of the effects of different elasticities of demand for different goods, especially as between agricultural products and manufactures. He fails to recognize that, with reference to large and inclusive groups of commodities, demand, which is an exchange *ratio*, is merely a different view of a production ratio, and hence of a cost ratio. In discussing the sale of a single commodity in a complicated economic society and with reference to small changes, it is permissible to treat money as an absolute; but in reducing all exchange to barter between two classes of goods, this procedure is quite inadmissible.

Moreover, consideration of the actual course of events when trade is opened up will show that elasticity of demand has little to do with the special theory of international trade or international value. Each country continues to specialize in the commodities in which it has a comparative advantage, until there is no gain to be secured from further specialization; that is, until it will cost as much to secure the next unit of the imported good by exchange as it will to produce it within the country. Now at a certain point, a country will obtain as much of the imported good as it would have produced for itself under an equilibrium adjustment within itself if foreign trade had been prohibited; and in consequence of the saving of productive power effected by the trade, a part of the resources which in its absence would be used to produce that commodity will be left to be disposed of. *Beyond this point*, that is, in the disposition of the saved productive power, elasticities of demand come into operation. This fund of saved productive power will not all be used to produce either of the com-

modities concerned in the exchange with the foreign nation, but will be distributed over the whole field of production in accordance with the ordinary laws of supply and demand.

The foregoing paragraphs are believed to cover the main points in the writings criticized which involve fallacies in the interpretation of cost and so come under the title of this paper. The entire argument of Professor Graham's second article falls to the ground, as he has stated it, as soon as the principles of cost are applied to the determination of international values instead of "assuming" the latter. Many further points in his first article are especially inviting to criticism, but fall outside the scope of the present paper. It suffices for the solution of the essential problem of international trade to recognize that the production of one good to exchange for another is an *alternative method of producing* the second commodity. Under competitive conditions, productive resources will not be used in this indirect process of production unless the yield is greater than that obtained by the use of the direct method. The task of economic analysis is to show why the profit-seeking motive impels the private producer to put resources to the use which brings the largest yield. Now to the entrepreneur producers of wheat and watches, in a case like that used in the illustration, the choice is not a question of comparative advantage, but of absolute profit or loss. If ten days' labor will produce a quantity of wheat which can be exchanged for more than 40 watches, then that amount of labor will be *worth more* than 40 watches, and the business enterprise which uses it to produce the watches will simply lose money. It is an example of the common fallacy of thinking in terms of physical efficiency, whereas efficiency is in the nature of the case a relation between value magnitudes.

That free enterprise is not a perfectly ideal system of social organization is a proposition not to be gainsaid, and nothing is further from the aims of the present writer than to set up the contention that it is. But in his opinion the weaknesses and failures of the system lie outside the field of the mechanics of exchange under the theoretical conditions of perfect competition. It is probable that *all* efforts to prove a continued bias in the workings of competition as such, along the lines followed by Professors Pigou and Graham, are doomed to failure. Under certain theoretical conditions, more or less consciously and definitely assumed in general by economic theorists, the system would be ideal. The correct form of the problem of general criticism referred to at the outset of this paper is, therefore, that of bringing these lurking assumptions above the threshold into the realm of the explicit and of contrasting them with the facts of life — the conditions under which competitive dealings are actually carried on.⁶

When the problem is attacked from this point of view, the critic finds himself moving among considerations very different from the logical quantitative relations of such discussions as the foregoing. Human beings are not "individuals," to begin with; a large majority of them are not even legally competent to contract. The values of life are not, in the main, reducible to satisfactions obtained from the consumption of exchangeable goods and services. Such desires as people have for goods and services are not their own in any original sense, but are the product of social influence of innumerable kinds and of every moral grade, largely manufactured by the competitive system itself. The productive capacities in their own persons and in

6. The great bulk of the critical material in Professor Pigou's *Wealth and Welfare* is of this character.

owned external things which form the ultimate stock in trade of the human being are derived from an uncertain mixture of conscientious effort, inheritance, pure luck, and outright force and fraud. He cannot be well or truly informed regarding the markets for the productive power he possesses, and the information which he gets has a way of coming to him after the time when it would be of use. The business organizations which are the directing divinities of the system are but groups of ignorant and frail beings like the individuals with whom they deal. (In the perfectly ideal order of theory the problem of management would be non-existent!) The system as a whole is dependent upon an outside organization, an authoritarian state, made up also of ignorant and frail human beings, to provide a setting in which it can operate at all. Besides watching over the dependent and non-contracting, the state must define and protect property rights, enforce contract and prevent non-contractual (compulsory) transactions, maintain a circulating medium, and most especially prevent that collusion and monopoly, the antithesis of competition, into which competitive relations constantly tend to gravitate. It is in the field indicated by this summary list of postulates, rather than in that of the mechanics of exchange relations, that we must work out the ultimate critique of free enterprise.

F. H. KNIGHT.

THE UNIVERSITY OF IOWA.