

Arthur Pigou (1877-1959)

Arthur Pigou is widely credited with developing the idea of externalities in economics, though the concept is present in his teacher and predecessor Alfred Marshall. Pigou's specific contributions to the topic are twofold. 1) He relates externalities to the production process. Positive externalities will be underproduced because there's no way to monetize them; negative externalities will be overproduced since they transfer part of the true cost of production onto others. 2) He identifies government taxation as the best remedy to bridge the gap between what he calls the social and private net products. A carbon tax would force oil producers, for example, to pay the fully loaded social costs of a barrel of oil, which is much more than its private cost. Such taxes are often called "Pigouvian taxes".

Pigou made major contributions to welfare economics. His concept of externalities is also very important in environmental economics.

*We read selections from Chapter IX of Pigou's major work, *The Economics of Welfare*, which he published in 1920.*

Pigou: *Economics of Welfare*, Chapter IX

DIVERGENCES BETWEEN MARGINAL SOCIAL NET PRODUCT AND MARGINAL PRIVATE NET PRODUCT

1. In general industrialists are interested, not in the social, but only in the private, net product of their operations. Subject to what was said in Chapter V. about costs of movement, self-interest will tend to bring about equality in the values of the marginal private net products of resources invested in different ways. But it will not tend to bring about equality in the values of the marginal social net products except when marginal private net product and marginal social net product are identical. When there is a divergence between these two sorts of marginal net products, self-interest will not, therefore, tend to make the national dividend a maximum; and, consequently, certain specific acts of interference with normal economic processes may be expected, not to diminish, but to increase the dividend. It thus becomes important to inquire in what conditions the values of the social net product and the private net product of any given (r th) increment of investment in an industry are liable to diverge from one another in either direction. There are certain general sorts of divergence that are found even under conditions of simple competition, certain additional sorts that may be introduced under conditions of monopolistic competition, and yet others that may be introduced under conditions of bilateral monopoly...

3. The source of the general divergences between the values of marginal social and marginal private net product that occur under simple competition is the fact that, in some occupations, a part of the product of a unit of resources consists of something, which, instead of coming in the first instance to the person who invests the unit, comes instead, in the first instance (*i.e.* prior to sale if sale takes place), as a positive or negative item, to other people. These other people may fall into any one of three principal groups: (1) the owners of durable instruments of production, of which the investor is a tenant; (2) persons who are not producers of the commodity in which the investor is investing; (3) persons who are producers of this commodity. The divergences between the values of social and private net product that are liable to arise in respect of this last class of persons will be discussed separately in Chapter XI. In the present chapter attention is confined to the other two classes of divergence.

[In passages from Paragraphs 4-7, Pigou considers the externalities which arise when tenants use means of production, such as land, which they lease from an owner. The tenant is incentivized in this arrangement to maximize the product of the land even at the cost of the land's future production capability. As I read this, I kept thinking about applying this analysis to the planet as a whole, where the conflict is not between landlord and tenant, but between current generations and future generations. Do you think Pigou's example is relevant to the way we leave the planet to those not yet born?]

4. Let us consider first the class connected with the separation between tenancy and ownership of certain durable instruments of production. The extent to which the actual owners of durable instruments leave the work of maintaining and improving them to temporary occupiers varies, of course, in different industries, and is largely determined by considerations of technical convenience. It also depends in part upon tradition and custom, and is further liable to vary in different places with the comparative wealth of the owners and the occupiers. It appears, for example, that in Ireland, owing to the poverty of many landlords, the kinds of expenditure on land which they leave wholly to their tenants are more numerous than in England. Details thus vary, but there can be no doubt that over a wide field some part of the investment designed to improve durable instruments of production is often made by persons other than their owners. Whenever this happens, some divergence between the private and the social net product of this investment is liable to occur, and is larger or smaller in extent according to the terms of the contract between lessor and lessee. These terms we have now to consider.

5. The social net product of an assigned dose of investment being given, the private net product will fall short of it by an especially large amount under a system which merely provides for the return of the instrument to the owner at the end of the lease in the

condition in which the instrument then happens to be. Under this arrangement the private net product of any n th increment of investment falls short of the social net product by nearly the whole of the deferred benefit which would be conferred upon the instrument. It need not fall short of it by quite the whole of this deferred benefit, because a tenant, who is known to leave hired instruments in good condition, is likely to obtain them more easily and on better terms than one who is known not to do this. So far, careful tenancy yields an element of private, as well as of social, net product. Since, however, separate contracts are often made at considerable intervals of time, this qualification is not especially important. Passing it over, therefore, we notice that, since the effects of investment in improving and maintaining instruments generally exhaust themselves after a while, the contraction of private net product below social net product, which the form of tenancy just described brings about, is not likely to be considerable in the earlier years of a long lease. In the later years of such a lease, however, and during the whole period of a short lease, it may be very considerable. Indeed, it is often found that, towards the close of his tenancy, a farmer, in the natural and undisguised endeavour to get back as much of his capital as possible, takes so much out of the land that, for some years afterwards, the yield is markedly reduced.

6. The form of tenancy just described is illustrated by that primitive type of contract between landlord and tenant, in which nothing is said about the condition of the land at the end of the lease...

7. The deficiency of the private, as compared with the social, net product of any n th increment of investment, which arises in connection with what I have called the primitive type of tenancy contracts, can be mitigated in various degrees by compensation schemes. These may conveniently be illustrated from the recent history of land tenure. Arrangements can be made for compensating tenants, when they leave their holdings, for whatever injury or benefit they may have caused to the land. Negative compensation for injury is practically everywhere provided for in the terms of the leases. In its simplest form it consists in monetary penalties for failure on the part of tenants to return their land to the owner in "tenantable repair..."

[This section is the classic treatment of externalities for which Pigou is well-known. This second type is distinct from the first type--related to tenancy-- since no contractual terms can address the difference between private and social costs, since those affected by such externalities are not party to any contracts. Self-interest will not generate the required solution, but will rather only produce the problem. The appeal to an invisible hand fails completely in this case. Hence, the imposition of taxes by the government is required.]

10. I now turn to the second class of divergence between social and private net product which was distinguished in § 3. Here the essence of the matter is that one person A, in the course of rendering some service, for which payment is made, to a second person B, incidentally also renders services or disservices to other persons (not producers of like services), of such a sort that payment cannot be exacted from the benefited parties or compensation enforced on behalf of the injured parties. If we were to be pedantically loyal to the definition of the national dividend given in Chapter III. of Part I., it would be necessary to distinguish further between industries in which the uncompensated benefit or burden respectively is and is not one that can be readily brought into relation with the measuring rod of money. This distinction, however, would be of formal rather than of real importance, and would obscure rather than illuminate the main issues. I shall, therefore, in the examples I am about to give, deliberately pass it over.

Among these examples we may set out first a number of instances in which marginal private net product falls short of marginal social net product, because incidental services are performed to third parties from whom it is technically difficult to exact payment. Thus, as Sidgwick observes, "it may easily happen that the benefits of a well-placed light-house must be largely enjoyed by ships on which no toll could be conveniently levied." Again, uncompensated services are rendered when resources are invested in private parks in cities; for these, even though the public is not admitted to them, improve the air of the neighbourhood. The same thing is true—though here allowance should be made for a detriment elsewhere—of resources invested in roads and tramways that increase the value of the adjoining land—except, indeed, where a special betterment rate, corresponding to the improvements they enjoy, is levied on the owners of this land. It is true, in like manner, of resources devoted to afforestation, since the beneficial effect on climate often extends beyond the borders of the estates owned by the person responsible for the forest. It is true also of resources invested in lamps erected at the doors of private houses, for these necessarily throw light also on the streets. It is true of resources devoted to the prevention of smoke from factory chimneys: for this smoke in large towns inflicts a heavy uncharged loss on the community, in injury to buildings and vegetables, expenses for washing clothes and cleaning rooms, expenses for the provision of extra artificial light, and in many other ways. Lastly and most important of all, it is true of resources devoted alike to the fundamental problems of scientific research, out of which, in unexpected ways, discoveries of high practical utility often grow, and also to the perfecting of inventions and improvements in industrial processes. These latter are often of such a nature that they can neither be patented nor kept secret, and, therefore, the whole of the extra reward, which they at first bring to their inventor, is very quickly transferred from him to the general public in the form of reduced prices. The patent laws aim, in effect, at bringing marginal private net product and marginal social net product more closely together. By offering the prospect of reward for certain types of invention they do not, indeed, appreciably stimulate inventive activity, which

is, for the most part, spontaneous, but they do direct it into channels of general usefulness...

13. It is plain that divergences between private and social net product of the kinds we have so far been considering cannot, like divergences due to tenancy laws, be mitigated by a modification of the contractual relation between any two contracting parties, because the divergence arises out of a service or disservice rendered to persons other than the contracting parties. It is, however, possible for the State, if it so chooses, to remove the divergence in any field by "extraordinary encouragements" or "extraordinary restraints" upon investments in that field. The most obvious forms which these encouragements and restraints may assume are, of course, those of bounties and taxes. Broad illustrations of the policy of intervention in both its negative and positive aspects are easily provided.

The private net product of any unit of investment is unduly large relatively to the social net product in the businesses of producing and distributing alcoholic drinks. Consequently, in nearly all countries, special taxes are placed upon these businesses. Marshall was in favour of treating in the same way resources devoted to the erection of buildings in crowded areas. He suggested, to a witness before the Royal Commission on Labour, "that every person putting up a house [*i.e. a public house or pub*] in a district that has got as closely populated as is good should be compelled to contribute towards providing free playgrounds." The principle is susceptible of general application. It is employed, though in a very incomplete and partial manner, in the British levy of a petrol duty and a motor-car licence tax upon the users of motor cars, the proceeds of which are devoted to the service of the roads. It is employed again in an ingenious way in the National Insurance Act. When the sickness rate in any district is exceptionally high, provision is made for throwing the consequent abnormal expenses upon employers, local authorities or water companies, if the high rate can be shown to be due to neglect or carelessness on the part of any of these bodies...

It should be added that sometimes, when the inter-relations of the various private persons affected are highly complex, the Government may find it necessary to exercise some means of authoritative control in addition to providing a bounty. Thus it is coming to be recognised as an axiom of government that, in every town, power must be held by some authority to limit the quantity of building permitted to a given area, to restrict the height to which houses may be carried—for the erection of barrack dwellings may cause great overcrowding of area even though there is no overcrowding of rooms—and generally to control the building activities of individuals. It is as idle to expect a well-planned town to result from the independent activities of isolated speculators as it

would be to expect a satisfactory picture to result if each separate square inch were painted by an independent artist. No "invisible hand" can be relied on to produce a good arrangement of the whole from a combination of separate treatments of the parts. It is, therefore, necessary that an authority of wider reach should intervene and should tackle the collective problems of beauty, of air and of light, as those other collective problems of gas and water have been tackled...

[Almost as if anticipating Coase, Pigou rejects the idea that private bargaining will suffice to correct for the costs of negative externalities. Workers don't have equal bargaining power with their employers, who are incentivized to "squeeze" their workers even at the cost of improving their own efficiency.]

16. Of bargaining proper there is little that need be said. It is obvious that intelligence and resources devoted to this purpose, whether on one side or on the other, and whether successful or unsuccessful, yield no net product to the community as a whole. According to Professor Carver, a considerable part of the energies of business men is devoted to, and a considerable part of their earnings arise out of, activities of this kind. These activities are wasted. They contribute to private, but not to social, net product. But this conclusion does not exhaust the subject. It is often pointed out that, where their clients, be they customers or workpeople, can be squeezed, employers tend to expend their energy in accomplishing this, rather than in improving the organisation of their factories. When they act thus, the social net product even of the earliest dose of resources devoted to bargaining may be, not merely zero, but negative. Whenever that happens, no tax that yields a revenue, though it may effect an improvement, can provide a complete remedy. For that absolute prohibition is required. But absolute prohibition of bargaining is hardly feasible except where prices and conditions of sale are imposed upon private industry by some organ of State authority.

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