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The Pure Theory of Taxation: II

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THE PURE THEORY OF TAXATION

II.¹

MONOPOLY,² the branch of the subject we have now reached, presents a bifurcation peculiar to itself. There is an essential difference between (a_1) the cases in which we are concerned with only one monopolist, and (a_2) those in which two or more monopolists enter. The first subdivision presents ramifications parallel to those which have been traced in the case of competition. The first of these varieties is obtained by combining the just now defined attribute a_1 with the attributes which form the first members of cross divisions enunciated in the first article: namely, B prevalence of the law of decreasing returns, C immobility of capital and labour, D taxation of margin (*e.g.* specific or *ad valorem*, or in kind).

a_1 BCD. The simplest case under this head is obtained from the case which was first discussed under the heading ABCD, namely a simple market, by supposing one side of the market to be as it were solidified into a monopoly. We have thus the typical case discussed by Cournot: a single monopolist dealing with a body of customers competing with each other, at the same price for all the customers. As demonstrated by Cournot,³ the

¹ See the preceding number of ECONOMIC JOURNAL, p. 46.

² The taxation of monopolists and monopolised goods, which is the subject of this article, is not to be confounded with the taxation by monopoly which is practised by several modern governments. The pure theory of the latter form of taxation is simply the pure theory of monopoly in general—a subject which I have attempted to handle in the *Giornale degli Economisti* for 1897. The taxation of monopoly and the taxation by monopoly are connected by a certain analogy, which, as indicated by Messrs. Auspitz and Lieben (*Theorie*, p. 427 and context), exists between monopoly and taxation in general. In ordinary taxation government alters, in taxation by monopoly it makes, prices in its own interest—or rather at its own discretion, as Government need not be perfectly self-interested (*see* Marshall on “Compromise Benefit,” *Principles of Economics*, Book V. ch. xiii.).

³ *Principes Mathématiques*, chs. v and vi.

Professor Seligman appears to be under the impression that the only reason advanced by Cournot for the phenomenon that a tax on a monopolised article may raise the price to an extent greater than the amount of the tax was that the price paid by the consumer must include not only the tax but also interest on the sum

effect of a specific tax on the product will be to raise its price to an extent which may be either greater than, equal to, or less than the amount of the tax "selon les circonstances."¹ To which it may be added, I think, that it will probably be less, at least for the case of decreasing returns.² In general the addition to the price will be a substantial proportion of the tax.

What is said by many popular writers, and even by some distinguished economists, that a tax (of the kind now under consideration) will not affect the consumer, for that the monopolist has already done his worst, is true only in two special cases. (1) Where it is not in the power of the monopolist to increase or limit his output at will, he will very generally have to bear the whole tax. Cournot has noticed the case of the monopolist who is unable to increase his output.³ The converse exception may be illustrated by an owner of urban land, if prevented by public opinion from keeping it out of the market. (2) The second exception is where the monopolist is a sole *buyer*, and the supply of the article bought is perfectly inelastic: for instance, a combination of tenants dealing with landlords incapable of combining. But in general the addition to the price will not be zero. I am unable to follow Professor Seligman when he asserts the contrary.⁴

advanced in order to pay the tax and the profits of middlemen (*Shifting and Incidence*, p. 156). "This theory," says Professor Seligman, "which Cournot invested with elaborate apparatus of mathematical diagrams is, however, nothing but the accepted doctrine of Adam Smith, Ricardo, and Mill" (*Ibid.* p. 157; *Cp.* p. 159, par. 1). But it will be evident to anyone who studies Cournot's theory of monopoly (*Principes Mathématiques*, p. 78, referred to by Mr. Seligman) that Cournot rests the phenomenon in question, in the case of monopoly, upon a principle other than the accepted doctrine of Adam Smith. Cournot in the passage referred to, has "invested with mathematical apparatus" the law of taxation stated in our text; which is so far from being the accepted doctrine of Adam Smith that it has escaped even Mr. Seligman.

I do not deny that Cournot has also employed the "accepted doctrine;" whether mistakenly, as Mr. Seligman holds, will depend on the validity of "the old doctrine of normal or natural profits" (Seligman, p. 158 and *cp.* p. 145), a subject on which I am not called upon in this connexion to express an opinion (*cp. ante*, p. 59).

¹ *Principes Mathématiques*, p. 77.

² As proved by Cournot (*Principes Mathématiques*, Art. 31) the increase of price due to a small tax u per unit of commodity is of the form $u \times A \div (2A + B + C)$ where A is always negative; B is negative when the law of decreasing returns prevails (and positive in the converse case); of C nothing is known in general, either as to its sign or magnitude, except that the expression $(2A + B + C)$ must be always negative. In such a case, I submit, we are justified in regarding it as probable that A will be (in absolute quantity) less than $2A + B + C$, and therefore the addition to the price less than u —at any rate when B is of the same sign as A , as in the present section.

³ *Principes Mathématiques*, last paragraph of ch. v.; first paragraph of Art. 39.

⁴ Professor Seligman says (*op. cit.* p. 160), "If the tax is small and the demand apt to fall off a great deal with increased price, the monopolist will be likely to find it profitable to bear the tax himself." Upon which I observe: (1) the monopolist is

These theorems may be extended from a specific to an *ad valorem* tax. The demonstration is given by Cournot in a passage already referred to (*Principes Mathématiques*, p. 78 *et. seq.*).

Professor Seligman does not accept the parallelism of the two marginal taxes, but on the contrary maintains that "a tax on monopoly gross receipts can never be shifted"; and he makes a mighty distinction between a tax on "gross product" and "gross receipt."¹ He argues thus:—

"Let us suppose that the monopolist has been selling 1,000² articles at \$1, giving him gross receipts of \$10,000, receipts which form his maximum monopoly revenue. Now a tax of ten per cent. is imposed on gross receipts. Let us assume that the monopolist will attempt to add the whole or any part of the tax to the price and charge any sum between \$1.01 and \$1.10. Now at any of these prices he will not get quite \$10,000 gross receipts, and certainly not more than \$10,000, for otherwise he would have advanced the price already before the tax. Suppose, to give him the benefit of the doubt, that he now sells \$9,990 worth. Since he must pay \$99.90 tax,³ this would leave him only \$9,890.10, while if he continues to charge only \$1 he would still have \$10,000 - 100 = \$9,900. Thus it will be profitable for the producer to bear the whole burden himself. The tax cannot be shifted to the consumer either in whole or in part."

"Most writers," adds Professor Seligman in a note, "including Marshall, overlook this."

The plausibility of this reasoning arises from the accident that the author has selected a case in which (before the tax) the gross receipts are identical with the net receipts. He compares the \$9,900 with the \$9,890 as profits, leaving out of sight cost of production. But he would have found in general that \$9,900 *minus* the cost of producing the 10,000 articles would be less than \$9,890 *minus* the cost of producing that smaller number of

not likely to find it profitable to bear the whole tax himself, except in one of the exceptional cases above specified, neither of which is here contemplated, as the context of the passage just quoted shows; (2) the monopolist is particularly unlikely to bear the (whole) tax himself in the case specified by Professor Seligman; for he is likely to bear less of the tax, the more, *ceteris paribus*, "the demand is apt to fall off with increased price." For the addition to the price paid by the consumer is of the form (*cp.* the last but one note, and the reference to Cournot there made)

$$u \times A \div (2A + B + C)$$

where A (the $F'(p)$ of Cournot) is the measure of the rate at which the demand falls off with increased price. Accordingly the larger A is, B + C being constant—in other words, the more the demand falls off with increased price, *ceteris paribus*—the larger is the share of the tax borne by the consumer, and therefore the smaller the share which the monopolist will find it profitable to bear.

Shifting and Incidence, p. 162.

² *Sic*; apparently a misprint for 10,000. But see the next note.

³ That is, supposing the tax to be not *ten* per cent. as at first stated, but *one* per cent. This venial inaccuracy of figures does not explain or excuse the imperfection of the reasoning.

articles which can be sold at the advanced price.¹ I have endeavoured to give a simplified version of Cournot's reasoning in a note.²

It is interesting—and to those who take pains in order to avoid mistakes in abstract theory, almost discouraging—to observe how the distinguished publicist rights himself when he comes to practice. When the practical question arises whether corporation taxes should be levied on gross or on net receipts, he restates the theory, which, according to the view here taken, is untenable. "In the case of pure monopolies it makes," he repeats, "no difference, in so far as the result on the consumer is concerned."

¹ Compare Professor A. Graziani, *Istituzioni di Scienza delle Finanze* (1897), p. 337. He seems to regard Professor Seligman's theory as true "in general." I think it is true only in the particular case in which the total expense of production is constant—not diminishing with a diminution in the amount produced.

² Before the tax, the monopolist will have fixed the price which renders his net profits a *maximum*. He may be supposed to begin tentatively with a very low price, and to go on raising the price as long as the increment of net profit which corresponds to a rise of price continues positive. He will stop just at the point at which that increment ceases to be positive and begins to be negative. That is the required position of maximum. A rise of price above that point is attended with a fall in *gross* receipts. For, by hypothesis, the rise of price is attended with a fall in net receipts; and net receipts equal gross receipts *minus* total cost; and total cost decreases with the rise of price, since total cost diminishes with the diminution of the quantity supplied, and that quantity diminishes with the rise of price. If, then, gross receipts minus total cost diminishes while the subtrahend total cost diminishes, much more must gross receipts diminish.

After the tax, the quantity which the monopolist seeks to maximise is the net profits in the same sense as before (that is, gross receipts minus total cost) *minus* the amount of the tax, a certain percentage of gross receipts. This quantity will not be a maximum at the point before determined. For if the price be raised above that point, the increment of the quantity to be maximised (net profits *minus* tax) will be 0 minus increment of the amount abstracted by the tax. But the increment of the amount abstracted is negative, since when the price is raised the gross receipts are diminished (as shown in the last paragraph), and therefore the tax which is a fixed percentage of the gross returns is diminished. It will be the interest then of the monopolist to raise the price beyond the old maximum point up to a new limit: at which the loss in respect of net profits (gross receipts *minus* total cost, which diminishes as the price is raised above the old maximum point) is just compensated by the gain in respect of the diminution of the tax. The new price therefore will be higher than the old.

A scruple may be felt whether, as the price is raised above the old maximum point the loss will overtake the gain, as the reasoning requires. The answer is that the loss (attending the increase of price above the old maximum point) is proportional to the *square* of the increment of the price, while the gain is simply proportional, it being supposed that the tax is small (*Cp. ante*, p. 55, note 1, last paragraph). Whence in general there is a determinate value for the increase of the new price above the old, such that the gain of the monopolist—the net receipts *minus* the tax—should be a maximum.

The mathematical reader will not expect the accuracy of a purist in this popular version; the general reader will perhaps be disappointed in his expectation of simplicity. I don't know that much has been effected by this cumbrous simplification, except to show the great superiority of the genuine mathematical method.

Yet this inaccurate premiss does not much affect his practical conclusion.¹

Cournot's reasoning may be extended to any (small) marginal tax, provided that the aggregate tax increases with the amount supplied.²

Throughout all the cases which have so far been considered, there prevails what may be called the general rule, both for competition and monopoly, that both parties suffer more or less from a tax. It remains to point out that in monopoly, as in competition, there are exceptions to this rule. The monopolist, indeed, always suffers, but his customers may be benefited in certain cases.

There is first a peculiar tax in kind noticed by Cournot with respect to monopoly, and described in our former article with respect to competition: "the abstraction of a certain portion of the exports in kind, to be disposed of in a manner not affecting the market under consideration."³

The case of several commodities presents a second class of exceptions, even more paradoxical in a *régime* of monopoly than in that of competition. If a monopolist supply two commodities for which the demand is *correlated*, that is either "rival" or "complementary," then a tax on one commodity may benefit the consumers of both.⁴ To fix the ideas, let there be a railway, like our Midland, with two classes of passengers, first class and third

¹ *Shifting and Incidence*, p. 168.

² As pointed out by Professor Marshall in the passage to which Professor Seligman refers when he says that "most writers, including Marshall (*Principles*, 460) [See p. 462, 1st ed. note, par. 1, p. 538, 3rd. ed.] and Pantaleoni (*Traslazione*, 76) overlook this, and confuse a tax on gross receipts with a tax on sales or amount produced."

If the views, here stated summarily, and more explicitly in my article on *The Pure Theory of Monopoly* (*Giornale degli Economisti*, 1897), are correct, there is not the slightest confusion or mistake to be attributed to either of the authors thus disparagingly referred to by Professor Seligman. It is to be regretted that his intellectual sympathy is not always proportioned to his learning.

³ *Ante*, p. 53. This kind of tax is presupposed in Colonel Barone's theorem respecting a contribution proportional to the quantity; forming the fourth theorem of his *Teoria Matematica dell' Imposta* (*Giornale degli Economisti*, March, 1894), p. 207.

⁴ In the case of *rival* demand, the theorem makes no postulate about the cost of production. Either the law of increasing or decreasing (marginal) cost may prevail. There may even be no cost, two "mineral springs" controlled by a monopolist (*cp.* Cournot and Marshall) supplying without human effort two waters which may, to some extent, act as substitutes for each other. Or the (total) cost may be constant, not changing with that change in the amounts produced which is consequent on the tax; as it is allowable, though not necessary, to suppose in our example of first and third class accommodation. In the case of *complementary* demand, it must be postulated that production is *correlated* in a certain manner.

class. Let there be imposed a small tax of say 2 or 3 per cent. *ad valorem* on the gross receipts of the first class passenger traffic; or there being, as in fact, a tax already, let there be superimposed a small additional tax; I say the consequence of the new tax on first class tickets may be to benefit passengers by lowering the fares of both kinds, both the third class and also the first class.

A mathematical demonstration of this theorem has been offered elsewhere.¹ The reader who has seen how difficult it is to state in ordinary language the proof of the simple proposition that a tax on a monopolised article tends to raise its price, (above p. 229, note ²) will not expect here a full statement of the more complicated argument relating to two commodities. He may be put on the track of the investigation by the following hints.

Let x and y be respectively the first and third class fares (per mile or other unit) before the tax. After the tax let us suppose the directorate of the railway to alter the fares one at a time; and first the first class fares.² By the theory above stated, the first class fares will be raised in consequence of the tax (the third class being for the time fixed,) say to x_1 . There will result a diversion from first class traffic, a rise in the demand for third class accommodation. There might be expected then a rise of third class fares in sympathy with the rise in the price of the rival accommodation; for when the demand for an article is raised it is probable ³ that its price will rise, *ceteris paribus*. But other things are not the same here. For, while the purchasers are now disposed to give more for third class accommodation, the sellers are more ready to offer third class accommodation now that it has an advantage over the first class in not being taxed. Thus the change in the third class fare will be the resultant of two tendencies, one making for a rise, the other for a fall. There is nothing to show that the latter tendency may not preponderate. Accordingly, the new y , say y_1 , may be less than the old one. This low third class fare will tend—by the sort of sympathy between the prices of substitutes which has just been noticed—

¹ See *Giornale degli Economisti*, 1887. In that article I give an explicit example of a possible curve, or rather numerical law, of demand for first and third class accommodation, such that if a tax of 2 or 3 per cent. is put on first class tickets, it will be the interest of the management to lower *both* fares.

² Of course I do not suppose so delicate an adjustment—such a frictionless movement towards the position of maximum profit—to be realised in the concrete management of an English railway. But I think that it may be of scientific interest to establish the theoretic possibility of the paradox enounced in the text.

³ Though in a *régime* of monopoly, not necessary, as stated below, p. 234.

to drag down the first class fare, when we come to the third step, which consists in determining the first class fare, x_2 , which is most profitable to the monopolist; the third class fare being fixed at y_1 . It is probable then that x_2 will be less than x_1 . And there is nothing to show that it may not possibly be less even than x . There is nothing to show that the series of subsequent steps will not converge to a system of two fares each of which is lower than the original one.¹

The preceding theorem illustrates a general characteristic of monopoly, that the laws of incidence relating to that *régime* resemble, but are less exact than, those relating to a *régime* of competition.² To take another example from the case of *correla-*

¹ An acute friend has objected: If it is advantageous to the monopolist to lower prices after the imposition of the tax, why is it not before? I reply: Because the conditions of maximum profit are altered by the tax. Let x be the price of first class accommodation, and y that of third class accommodation, before the tax; and let the corresponding quantities demanded be D_1 and D_2 . After the tax, let x' and y' be the prices, D'_1 and D'_2 the corresponding quantities. Then the profit of the monopolist is $D_1x + D_2y$ before the tax, after the tax $\frac{1}{2}\frac{3}{8}D'_1x' + D'_2y'$; if, to fix the ideas, we suppose the tax to be 5 per cent. *ad valorem* (on the proceeds of first class tickets), and for simplicity we abstract expenses of production (*cp.* above, p. 230, note). There is no inconsistency in supposing that it is neither the interest of the monopolist to change the fares from x and y to x' and y' before the tax, nor from x' and y' to x and y after the tax; x being greater than x' , and y than y' . It is necessary only that $D_1x + D_2y$ should be greater than $D'_1x' + D'_2y'$, and also $\frac{1}{2}\frac{3}{8}D'_1x' + D'_2y'$ greater than $\frac{1}{2}\frac{3}{8}D_1x + D_2y$; or that we should have at the same time

$(D'_2y' - D_2y)$ less than $(D_1x - D'_1x')$, and $(D'_2y' - D_2y)$ greater than $\frac{1}{2}\frac{3}{8}(D_1x - D'_1x')$. It is not surprising that of two quantities which are known not to be widely different (the tax being small), one should be greater than nineteen twentieths, and less than the whole, of the other, provided that the quantities are *positive*. Now it is probable that $D_1x - D'_1x'$ is positive, if x is greater than x' , as D_1 is probably greater than D'_1 (the monopolist reducing his offer of the taxed commodity). Nor is it improbable that $D'_2y' - D_2y$ should be positive; nor inconsistent with the supposition that y' is less than y .

The objector may still insist: If Dx is greater than $D'x'$, why not raise x' to x , leaving y' what it is? To which I reply that the proceeds of the first class traffic will no longer be Dx in that case, but $x \times$ first class accommodation demanded at the prices x (first class) and y' (third class), say $x \times \Delta$. Now Δ may fall off so rapidly, as the first class fare is raised from x' to x , owing to the counter attractions of the third class (at the price y') that the monopolist will lose more by the decrease in the demand for first class than he gains by that increased demand for the third class which he at the same time causes.

² This greater latitude is explained by the circumstance that in monopoly, unlike competition, the producer [or, *mutatis mutandis*, the monopolist buyer] must take account of the change in demand price caused by variation in the amount of product which he may offer (*Cf.* Marshall, *Principle of Economics*, p. 802, part II., 3rd ed.). If β be that amount and p the price (*ibid.*), the marginal cost is equated in competition to $p\Delta\beta$, but in monopoly $p\Delta\beta + \beta\Delta p$. Accordingly, in determining the variation in the position of equilibrium due to a (small) tax (*Cf.* Cournot, *Principes Mathématiques*, ch. vi.), whereas in competition the highest order of differential (of p with respect to β , taking β as the independent variable) which we need take

tion. We have seen that when production only is correlated, "it being supposed that the demand for one commodity is independent of the demand for the other," in a *régime* of competition (1) a tax upon two rival products will raise the price of the taxed one, and lower the price of the untaxed one; (2) a tax on one of two complementary products will raise the price of both.¹

Now let the correlated production be in the hands of a monopolist, the demands as before being uncorrelated. Then (1), as before, a tax upon one of two rival products will raise the price of the taxed one; but it will not, as before, necessarily—it will only probably—lower the price of the untaxed one. Also (2) as before, a tax on one of two complementary products will certainly raise the price of the taxed one, but will only probably raise the price of the untaxed one.

For example in a *régime* of monopoly it is probable, though not so certain as in a *régime* of competition, that a tax on malt would tend to lower the price of wheat in a country dependent on a limited area for its supply of both products; assuming that the production was not (otherwise) correlated. Contrariwise if the products are *complementary* in respect of the rotation of crops, as the Malt Tax Committee of 1862 suppose. "The effect of the malt tax," they say, "is to interfere with the due rotation of crops,"² and therefore presumably to cause wheat to be grown in more unfavourable conditions, at a higher price.

Some peculiar cases of rival production are constituted by the property that in monopoly identical objects may be sold at different prices: for instance seats for men or women at a theatre. If instead of the theatre tax which is now levied in Italy there were imposed a tax on men's tickets only, the ladies would be likely to gain not only in exemption from the tax, but also in having less to pay for their tickets. That is supposing the demand for one kind of ticket to be independent of the demand for the other kind. *A fortiori* if, as it is natural to suppose, the demands are *complementary*.³ For it is probable in monopoly, as it is normally account of, is of the form $\frac{dp}{d\beta}$ in monopoly we have also to take account of differentials

of the form $\frac{d_2p}{d\beta}$. The sign of the former is given by the law of diminishing utility. But the sign of the latter is not usually a *datum*.

¹ *Ante*, p. 54, par. 2, where, by a misprint, or *lapsus plumæ*, the predicates of the two propositions have been transposed.

² Parly. Papers, 1868, 420. Cp. *Evidence*, 1867: Qs. 2616, 2952, 3023, 3305.

³ The young man who treats his lady friends to tickets, and the paterfamilias who provides for mixed parties, would be disposed *ceteris paribus* to give more for men's tickets if ladies' tickets were lowered, or more for ladies' tickets if men's tickets were lowered.

true in competition, that "a tax on one of two complementary commodities [*i.e.* "for which the demand is correlated"] will raise the price of the taxed one, and lower the price of the one which is not taxed."¹

Following an order similar to that of the corresponding section in competition, we shall now leave correlation out of sight, and go on to consider the general case in which a monopolist deals with two or more competitive groups. For example, we might imagine one of our islands A, B, C,² to be now held by a monopolist. As before, we shall find that it is not indifferent whether a certain tax is levied on transactions between A and B, or on transactions between B and C. If, as before, we suppose the materials supplied by C to be constant in quantity and independent of human effort, we have now three cases, according as A (the consumers), B (the manufacturers), C (the landlords), form a monopoly. In the first case a tax on the product will prejudice both parties, not only in general as in competition, but always—correlation of supply or demand not being now supposed. For the circumstance which forms an exception in competition, the inelasticity of the consumer's³ demand, cannot occur in monopoly.⁴ In the second case a tax on the goods produced by the monopolist B will not prejudice C; for the monopolist will have already done his worst.⁵ In the third case a tax on the product will, on the general supposition that the demand of the consumers is not perfectly inelastic, prejudice the landlord in general in monopoly as in competition; but not in monopoly always. For, though in consequence of the tax the demand on the part of the (competitive) producers in B for the (monopolised) article supplied by C falls, yet it does not follow that the price of C will fall. For it is one of the irregularities of monopoly as compared with competition that a rise [or fall] in the demand for a monopolised article is not necessarily, but only probably, attended with a rise [or fall] in its price.⁶

¹ *Ante*, p. 54, note 4.

² *Ante*, p. 56.

³ *Ante*, p. 56.

⁴ This may be elegantly exhibited by the curves which Messrs. Auspitz and Lieben have employed to illustrate the case in which the monopolist is a sole buyer.

⁵ Above, p. 227.

⁶ Suppose that the demand for the monopolised commodity increases in the sense that the average consumer "will buy more of it than he would before at the same price, and that he will buy as much of it as before at a higher price" (*Principles of Economics*, Book III. chap. iii. § 4, 3rd ed). Then the demand-curve will be shifted outwards, as in Professor Marshall's figures 26, 27, 28 (*Ibid.*, p. 520). The *Monopoly revenue curve*, (*Ibid.*, 534) will accordingly be modified. The new q_3 will be on a *constant revenue curve* (*Ibid.*), which is further "out," or away from

This survey of marginal taxes of monopolised articles may conclude with the reflection that the consequence of such taxes appear to be in general more unpredictable in monopoly than in competition.

a₁Bcd. That taxation upon the profits of a monopolist cannot be shifted is universally acknowledged. It may be observed that this is true not only as stated in the books of a capitation tax consisting of a lump sum, and an *ad valorem* tax directly proportionate to profits, but also of a *progressive* tax on profits (the proportional contribution increasing with the amount).¹ Of course the alteration of the monopolist's revenue may produce, as in the case of competition,² an indirect result on the margins of work and saving.

a₁Bc. To attribute mobility to monopoly may appear a contradiction in terms. The designation may however be appropriate to a certain mixed case intermediate between monopoly and competition when there is fulfilled one condition of perfect competition, mobility of labour and capital, but not the other condition, outlay up to the margin of profitability.³

Crossing Mont Blanc from Italy into France, at a little mountain inn which is perched high above Chamouni I had some refreshment in the charge for which one item was a franc for a slice of bread. I don't suppose that this franc had any exact correspondence with the marginal efforts and sacrifices requisite to produce bread and carry it up to that height. It might have been so if several of the Chamouni bakers had erected each a shop or booth on the rock and competed with each other. Supposing this to be impracticable under the circumstances, it might still be open to any citizen of Chamouni to start a rival auberge, if it appeared that the proprietor of the existing one was making

the axis than the corresponding old curve. But there is nothing to prove that the new L_{q_1} , is greater than the old one; the displacement of the demand curve may be such that—whatever the shape of the “supply-curve”—the new L_{q_1} , is less than the old one.

The rationale of this uncertainty, as well as others which have been noticed, is to be found in the same “dominant fact in the theory of Monopoly” (above, p. 232, note). In competition we are concerned only with the rise in the amount demanded at each price, the *variation* of Cournot's function $F(p)$, say $\delta F(p)$. If this is positive, the price must rise, the law of decreasing returns prevailing. In monopoly we have also to look to the sign of $\frac{d}{dp} \delta F(p)$, which is not usually given.

¹ See article in *Giornale degli Economisti*.

² *Ante*, p. 57. The effect of such a tax on the margin of production is exhibited by Colonel Barone in the second theorem of *Teoria Matematica dell' Imposta* (*Giornale degli Economisti*), 1894.

³ *Ante*, p. 59.

more than ordinary profits (account being taken of all the hardships incident to the business). In such a case we have "industrial" without "commercial" competition. The case is perhaps common where there is a large establishment and a comparatively small number of customers.

As Professor Walras has well observed, these conditions are realised much more often than is supposed—

"tel fabricant de chocolat, qui vend son chocolat 3 francs la livre quand il le débite sous le nom modeste de 'chocolat superfin' enveloppé simplement de papier glacé le vendra 4 francs la livre à la condition de le parfumer à la vanille et de le débiter sous le nom de 'chocolat des princes,' enveloppé de papier doré. Il en est de même des différentes places d'un théâtre, dont les différents prix ne sont nullement proportionnels au frais de production de ces places."¹

In such cases the incidence of taxation will partly obey the law of monopoly and partly that of competition. For marginal taxes not large enough to overcome the friction which resists mobility, it should seem that the law is rather that of monopoly than of commercial competition, our aBCD rather than our ABCD. One difference would be that, where the demand of the consumer is very urgent, the tax would fall on the producer to a greater extent than might be expected in a *régime* of perfect competition.² In general the consequences of the tax become more unpredictable in virtue of the property under consideration; a difference which is perhaps aggravated by the circumstance that the case is apt to be one of joint production.³

a₁b. The law of "increasing returns" does not constitute such an important subdivision of monopoly as of competition. There is no difficulty in the case of monopoly⁴ in understanding how production should stop short in the full career of the law of increasing returns, the diminution of the cost being more than counterbalanced by the falling off of demand.⁵ The principal

¹ *Économie Politique Pure*, p. 416; *cp.* Schönberg's *Handbuch*; Article by F. Neumann, especially ii. 3; Acworth, *Railways and Traders*, ch. iv. So Hermann (*Untersuchungen*, ch. vi. p. 419, ed. 1870) of a shopkeeper who uses smuggled wares along with wares which have paid duty: "Stellen sich die preise höher als die schmuggelpreise tiefer als die preise der verzollten waare." It is not easy to see how this can be, unless the shopkeeper enjoys some of the properties of a monopolist. Professor Marshall points out that the "dominant fact in the theory of monopolies" (*Cp.* above, p. 232) "is dominant also in the case of any producer who has a limited trade connection which he cannot quickly enlarge."

² Above, p. 228, note.

³ Above, p. 232.

⁴ *Ante*, p. 69.

⁵ Regarding the action of increasing returns as essentially different in the case of monopoly and competition, I cannot quite accept Professor Seligman's statement with respect to a (specific) tax on a monopolised article. "Of course the same

difference between the case of increasing and decreasing cost, is, I think, that the price is apt to be raised—will be raised *ceteris paribus*—to a greater extent in the case of decreasing than in that of increasing cost.¹

a₂. The remaining branch is the shortest, yet not perhaps the least fruitful with regard to general economic theory, which rather than finance is here cultivated. Where two or more monopolists take part in a system of bargains there are no laws of incidence, for there are none of value. It has long been recognised that the bargain between two monopolists² is indeterminate; it is now submitted that a system of bargains in which two or more monopolists deal, not directly with each other, but with one or more competitive groups, is also indeterminate. Suppose, for instance, a miller dealing with two monopolists, one the owner of the ground, the other of the water-power—as in an example put by Professor Marshall,³ the only writer, so far as I know, who has given a hint of this theory. Let there be a number of such millers in competition with each other; and let the ground rent and the water rent be subject to revision from time to time, *e.g.* every year. The monopolists might go on for ever shifting the rents, making moves against each other like two chess-players when on each side there survives only the king with one or two inferior pieces.

The theorem may have some bearing on a system which is regarded by some as the ideal of the economic future, that each industry should be consolidated into a “Trust” or combination. Such a system would be characterised by instability, by fluctuations of prices such as now occur in railway wars, but more prolonged; for in so far as the combatants, like the two landlords in the example given, are not direct competitors, the combat seems

qualifications are to be introduced as before [in a *régime* of competition] according as the monopoly industry obeys the law of the constant diminishing or increasing returns” (*Shifting and Incidence*, p. 161). Not “of course” surely.

¹ I am compelled to differ from Professor Graziani (*Istituzioni delle Finanze*, p. 338) on this point. As already pointed out (above, p. 228) the imposition of a tax u per unit of commodity is in general of the form $u \times A \div (2A + B + C)$; where A is always negative, B is negative or positive according as the law of decreasing or increasing returns prevails; nothing is known of the sign of C —it represents the element of chance in the theory of monopoly (above, p. 232, note 2). Accordingly, *ceteris paribus*, A and C being constant, the increase of price is *greater* when the law of increasing returns prevails.

² Sidgwick, *Pol. Econ.* Book II., ch. x., § 3; Jevons, *State in relation to Labour*, p. 154; Böhm-Bawerk, *Positive Theory of Capital*, Book IV., ch. ii.; cp. *Mathematical Psychics*, pp. 21, *et seq.* by the present writer.

³ *Principles of Economics*, Book v. ch. 10.

less likely to be terminated by either the ruin of one party or the amalgamation of the two. That consummation may be more apt to occur when the two monopolists supply, not complementary articles, like land and water-power, but rival commodities. But even in this case the proposition that value is between certain limits—over a certain range of price—indeterminate may well be of considerable theoretical importance.¹

For further discussion of this and other subjects touched upon here, I once more refer to the contemporary article on the Pure Theory of Monopoly in the *Giornale degli Economisti*.

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¹ The case of wayleaves on mines to which Professor Marshall directs attention (*loc. cit.*) may illustrate the general principle, or rather absence of principle. It appears from evidence given before the Commission on Mining Royalties that it is not always possible to make the negotiation for royalty and wayleave concurrent (Q. 590). The lessee who, having sunk much capital on a mine, wants to take up an adjoining mine "deals with a halter round his neck" (Q. 561); he has been "got into a cleft stick" (Q. 673; *cp.* Q. 5690). There is also much evidence that "the royalty is reduced by the rate of wayleave paid" (Q. 13,151). "A lower royalty is taken than would be if not subject to wayleave" (Q. 1933; *cp.* Qs. 13,218, 11,306, 13,151, 13,749, &c.). Let us imagine these transactions to be effected successively, as thus: The first step is to take a lease of a coal field for a certain period. The second step is to take a wayleave or some other subsidiary privilege. The terms exacted for this privilege being onerous, the third step would be on a revision of the first lease to lower the rent for the coal field. The fourth step, it may be supposed, would be on a revision of the other lease to still further raise the wayleave. But this result is not certain; or not certain to continue as the series of steps is prolonged. It may become the interest of the owner of the subsidiary privilege to lower his terms in order to encourage the industry, wayleave being a charge of so much per ton. The principal landlord may retort by raising his terms; and the see-saw may go on *ad infinitum*. The lessee would not necessarily be worse off than if he had to deal (for both coal field and subsidiary privileges) with a single monopolist—except so far as the instability of value is harassing to industry.

Of course I do not suppose such a prolonged series of steps as I have described to occur in the concrete. But I think it is a legitimate fiction in order to bring out the contrast that, whereas in a *régime* of competition a series thus continued theoretically tends to a definite position of equilibrium (as illustrated *e.g.* by Professor Walras in his *Économie Politique Pure*), in a *régime* of monopoly there does not exist, even theoretically, a determinate position of equilibrium.

* * I am sorry that the statement of Professor Carver's views on taxation, in my former article, should have been marred by the misprint of 'prices' for 'forces.' (p. 70, note, last line but one.).