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**ECONOMIES INTERNAL AND EXTERNAL,
INCREASING RETURNS AND GROWTH:
THE SEMINAL CONTRIBUTION OF ALFRED
MARSHALL REVISITED**

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Economies internal and external , increasing returns and growth: the seminal contribution of Alfred Marshall revisited.

by Francesco Forte

0. INTRODUCTION

0.1.PURPOSE OF THE RESEARCH¹

Marshall's seminal contribution to the dynamic theory of increasing returns as engine of economic growth *via* economies of scale and time internal and external returns it is almost forgotten in the economic literature. Yet a revisit of the complex architecture of this Marshallian theoretical building appears stimulating in this epoch to deepen the knowledge of the dynamic interaction of factors that may generate sustained long run growth with low inflation as happened in the prolonged expansion of US in the '90 of the XX century. This revisit may be useful to remodel the policies for growth in areas with economic sclerosis as the European Union.

0.2. PLAN OF THE PAPER

The first section shall examine Marshall basic theorem of increasing *versus* decreasing and constant return industries where he, by a consumers' surplus analysis, suggests that, in pure theory, bounties for the first financed with income taxes or taxes on decreasing return industries would enhance social welfare. A presentation of the policy proposition derived by Marshall himself and of some other that could follow

¹ An earlier version of this paper was prepared in the academic year 1960-61 while I was associate professor of economics in the Department of Economics of the University of Virginia . It benefited of discussions with Ronald Coase then professor of economics there who was much sympathetic with this work of mine. I presented its (then unwritten) conclusions - i. e. that, under increasing return, an expansionary policy may not cause inflation while a monetary deflation may cause price rises –in a seminar before leaving Virginia Dept. of Economics in the summer of 1961. And at that time James Buchanan did appear quite perplex about my conclusions because I was not much impressed by my presentation of the increasing returns theory as in spite on my emphasis on division of labour as a cause of them as in Allyn Young development . Later on, in the '90 I had the pleasure of meeting a James Buchanan completely involved in the increasing returns point of view in economics, who gifted me of his new book on the return to increasing return, quite well recalling my fanaticism about them . Since then I had in mind to go through the manuscript of that unfinished paper but ,for various reasons ,I delayed until now. The new version differs from the old one mostly because the various parts have been reorganised and shortened and because I could take care of the literature that did develop from the '60 on this topic. As for the conclusions, then unwritten, I see now much broader inferences from the (Marshallian and postmarshallian) increasing returns theory as for the dimension and content of the public finances both on the revenue and on the expenditure side , for the reorientation of fiscal policy and for the development of models of economic growth including increasing return-oriented institutions.

A particular thank is due to Silvia Fedeli who undertook the painful task of typing on the computer the Virginian manuscript written in small characters with footnotes in minuscule dimension on old (yellow) pages ; and reproduced in a nice computerised version the hand written diagrams filled in these pages in a bonsai wise. Without this aid it is likely that I did not dare to work out this new version of the paper. Professor Fedeli has also discussed with me the paper in this version. Faults are only mine.

shall conclude the section. In the second we shall show that the overlook of producers' surpluses, purposely done by Marshall, does not infirm his demonstration, given the fact that the rents of specialised human factors and of industrial and commercial firms, under competition, are mostly quasi rents disappearing in the long run. And "rents of nature" are present also in increasing return industries. In the third section we shall show that considering the income effects relevant in a general equilibrium, Marshall analysis is reinforced. Reflection on it leads to think on the role of monetary policy. Section fourth shall be devoted to scale and time increasing returns internal to the firms or internalised by them by contracts of outsourcing with specialised suppliers showing that they are more pronounced in a flexible economic system and that no tendency to monopolisation, under Marshallian conditions, needs to arise. Section fifth shall examine external economies of scale and time, under perfect and imperfect competition. Unlike in some current interpretations, these Marshallian increasing returns are perfectly compatible with competitive long run situations. It shall also be shown that their consideration falsifies the Ricardian law of comparative advantage as an objective long run law. All these economies may be very important also for the aggregation of small and medium enterprises in industrial districts. Thus even if it is true that Marshall assumed firms' increasing returns to scale, it is not true that increasing returns necessarily require big firms. Emphasis must be put, in any event, on the dynamic interaction of all these economies in a general equilibrium approach to fully appreciate the meaning of the Marshallian contribution to the explanation of causes and shortfall of economic growth and this shall be done in section six. Here after simple Paretian and Hicksian presentations of Marshall theorem, we shall focus on the dynamics of interaction of reciprocal externalities and its prisoners' dilemma implications. Section seven shall draw some general policy conclusion emphasising the fiscal and monetary policy "samaritan" dilemmas.

0.3. MAIN REFERENCES TO MARSHALL' "PRINCIPLES OF ECONOMICS"

Marshall deals with the theorem here considered in Chapters XII and XIII of Book V of the Principles² respectively entitled "*Equilibrium of normal demand and supply continued, with reference to the law of increasing returns*" and "*Theory of changes of normal demand and supply in relation to the doctrine of maximum satisfaction*" and Appendix H "*Limitations of the use of statical assumptions in regard to increasing returns*". The 20 pages of these two chapters and the 8 of the Appendix cover the matter with an analysis which appears unusually compact. An extreme attention is, for consequence, necessary, in order to understand fully and correctly the depth of Marshall's contribution. Furthermore these pages cannot be properly understood unless in the context of the general Marshallian theory, in which increasing returns are pervasive: and, in this perspective, particular reference should be made to Chapters XIII of Book IV *Conclusions. Correlation of the tendencies to increasing and to diminishing returns* and to seven Chapters of Book V, devoted to the *dynamic* of supply in its long run equilibrium with the *dynamic* of demand: i.e. Chapter III, *Equilibrium of normal demand and supply*, Chapter IV *The investment and distribution of resources* Chapter V *Equilibrium of normal demand and supply, continued, with reference*

² All the references shall be to the Eight edition unless differently expressly stated.

to long and short periods, Chapter VIII Marginal costs in relation to values. General Principles, Chapter IX Marginal costs in relation to values. General Principles, Chapter X Marginal costs in relation to agricultural values and Chapter XI Marginal costs in relation to urban values.

SECTION I.

THE BASIC THEOREM AND POLICY PROPOSITION

1.1. MARSHALL'S WELFARE THEOREM ON INCREASING RETURNS

The foundation of the Marshallian analysis of the dynamics of increasing returns is its "maximum welfare theorem" presented at about two thirds of Chapter XIII in the middle of §6 as follows: "...occasionally it is stated, and very often it is implied that a position of equilibrium of demand and supply is one of maximum aggregate satisfaction in the full sense of the term: that is, that an increase of production beyond the equilibrium level would directly (i.e., independently of the difficulties of arranging for it, and of any indirect evils it might cause) diminish the aggregate satisfaction of both parties. The doctrine so interpreted is not universally true"³..."...the doctrine of maximum satisfaction assumes that every fall in the price which producers receive for the commodity, involves a corresponding loss to them; and this is not true of a fall in price which result from improvements in industrial organisation. When a commodity obeys the law of increasing returns, an increase in its production beyond equilibrium point may cause the supply price to fall much; and though the demand price for the increased amount may be reduced even more, so that the production would result in some loss to the producers, yet this loss may be very much less than the money value of the gain to the purchaser which is represented by the increase of consumer's surplus⁴

1.2. THE SCOPE OF MARSHALL'S WELFARE THEOREM

The theorem it is developed mainly through a partial equilibrium analysis employing the consumer's and producers' surplus technique. It seems interesting to follow, step by step, Marshall demonstration. This shall help in restating the meaning of Marshall's contribution, praised by economists as Edgeworth,⁵ but often misunderstood by economists.⁶ His demonstration focuses on the effect on consumers' surplus of a

³ Here Marshall considers shortly the possibilities of increasing welfare connected with the redistribution of wealth, between consumers and producers. He, however, dismisses the point, leaving it for "future consideration", in order to concentrate on the production problem alone.

⁴ See Ch. XIII of Book V, & 5 p.472.

⁵ EDGEWORTH (1924) attached great value to this Marshall contribution as a scientific rigorous proof "that *laissez faire*, the maximum advantage attained by unrestricted competition is not necessarily the greatest possible advantage attainable". KEYNES (1924) similarly maintained that "Marshall's proof that *laissez faire* breaks down *theoretically* and not merely practically, regarded as a principle of maximum social advantage, was of great philosophical importance", (*Alfred Marshall 1842-1924*, Economic Journal, 1924, p.352)

⁶ Among the misunderstandings of the Marshallian analysis it may be quoted P.A.SAMUELSON,(1947) *Foundations of Economic Analysis*, Cambridge, Mass. Harvard Univ. Press, where this economist maintains that Marshall did not arrived to entirely wrong conclusions merely for "wrong reasons". Samuelson asserts that Marshall made an incorrect use of the consumers' surplus tool, because inappropriately left out the producers' surplus. This, as we shall see, is not true. Only a superficial reading of Marshall's text may lead to this conclusion. J. OORT(1958)

rise or a diminution of costs, when constant, increasing or decreasing returns *in the long run* prevail.⁷ For Marshall “the two tendencies toward increasing and diminishing return press constantly against one another”, and increasing return industries are those where the first tendency overcomes the other⁸ As for diminishing returns, Marshall considers mostly agricultural commodities. Industrial firms, in the *long run*, mostly obey to the law of constant or of increasing returns, depending on the importance of the *long run* “scarce factors” as those related to the soil, in their production

1.3. EFFECTS OF TAX OR BOUNTY UNDER CONSTANT RETURN⁹

For brevity of language a tax proportional to quantity produced, is “taken as representative of those changes which may cause a general increase” and a bounty of the same type, “as representative of those which may cause general diminution in the normal supply price ... of the commodity”. By these two simplified fiscal measures, Marshall presents his basic theorem

a) The consumer’s surplus shall be diminished by the tax “by more than the gross receipt of the State” because “on that part of the consumption of the commodity which is maintained for the consumer loses what the state receives: and on that part of the consumption which is destroyed by the rise in price, the consumer’s surplus is destroyed; and of course there is no payment for it to the state” One can see this result in Fig.1.II Oh is consumption after the increase in the supply curve due to the tax. hH is the

Decreasing costs as a problem of welfare economics, Amsterdam, North Holland, p.157, maintains that Marshall argument for subsidies to increasing return industries is wrong for reasons related to an alleged wrong conception of the role of marginal costs in the supply curves. At a first sight this criticism may appear justified, considering standard supply curves in a static, narrow frame. However Marshall’s supply curves, as one can without any doubt grasp reading Appendix H, are different. Limitations of the Marshallian analysis exist because of the nature of partial equilibrium analysis. Marshall was aware of this as wrote (in Appendix H, §3 last sentence) “The unsatisfactory character of these results is partly due to the imperfection of our analytical methods, and may conceivably be much diminished in a later age by the gradual improvement of our scientific machinery”.. The sharp criticism of P. SRAFFA, (1925-26) *Relazioni tra costo e quantita’ prodotte*, Annali di economia II, 1925-6; ID. (1926) *The law of returns under competitive conditions*, Economic Journal, 36, (further developed by V. TRAVAGLINI, *Punti controversi nella teoria del costo crescente* Roma la Speranza), however seems exaggerated because, as one shall see, one may generalise Marshall’ reasoning in a general equilibrium dynamic frame, without substantial damages to the basic theorem. See, for instance, A. YOUNG, (1928) *Increasing Returns and Economic Progress*, Economic Journal, n.152, December, G. STIGLER (1951), *The Division of Labor is Limited by the Extent of the Market*, Journal of Political Economy, n.59, June.

⁷ This analysis is prepared by an analysis of the effects on consumers’ surplus of an increase in demand, for commodities obeying, respectively, the law of constant, diminishing and increasing returns. As first year public finance students well known, an increase in the demand curve, in the long run, is identical, in its effects, to a diminution of cost curve of the same amount as for the shifting of an excise or of an *ad valorem* tax. The same holds *mutatis mutandis*, for a bounty *ad valorem* or proportional to the quantities purchased or supplied.

The point of view of the effects of shifts of demand instead of supply acquires interest when protective duties rather than subsidies are considered Marshall’s analysis of the effects on consumers’ surplus of variations of demand (See Chapter XIII of Book V, §2, p. 463-4) it is followed (§ 2, p.465) by a theoretical proposition in favour of “protection to nascent industries” strongly limited, as for the political and practical difficulties of correct application.

⁸ Namely where “improved organisations tends to... override any increased resistance which nature may offer to raised increased amounts of row produce”... “the low increasing returns may be worded thus:- An increase of labour and capital leads generally to improved organisation, which increases the efficiency of the work of labour and capital” through external and internal economies. See Book IV chapter XIII §2, p.318-319.

⁹ §4, p.467.

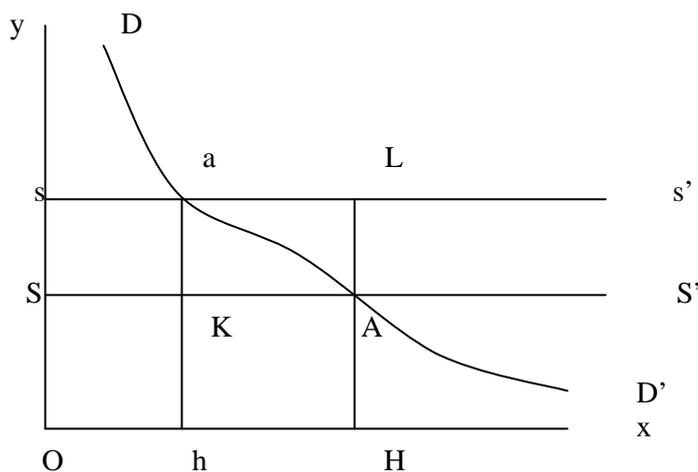
reduction of consumption caused by the tax $SsKa$ is the loss of consumers surplus to which corresponds a receipt of the Treasury; aKA the additional loss of consumers' surplus.¹⁰

b) "Conversely, the gain of consumer surplus caused by a bounty is less than the bounty itself", because "on that part of the consumption which existed before the bounty, consumer surplus is increased by just the amount of the bounty; while on the new consumption that is caused by the bounty, the gain of consumer surplus is less than the bounty". In Fig 1 II, a bounty lowers the supply curve from ss' to SS' . Oh is the consumption before the bounty, hH is the new consumption brought by the bounty; sak is the gain of consumer surplus with the counterpart in the bounty; aKA the additional consumer surplus and $aLKA > aKA$ the bounty on that new consumption.

1.4. EFFECTS OF TAX OR BOUNTY UNDER DIMINISHING RETURNS¹¹

a) The tax *may* produce a loss of consumer surplus smaller than the total gross receipts to the state and will do so if "the law of diminishing return acts so sharply

Fig 1.I



¹⁰ Fig.1.I, reproduces (with minor changes) the constant cost supply curve before and after introducing the tax and the subsidy of Fig. 30 of footnote 1, on. 467 of the "Principles". In the case of the tax one moves from the lower to the higher supply curve. In the case of the subsidy one moves from the higher to the lower one. Marshall's procedure of confining to the compact footnotes all the diagrams, results particularly unfortunate in Chapter XIII of Book V, where it is the diagrammatic analysis that, as he explicitly writes, gives the essence of the reasoning

¹¹ &4 p.468-90. Fig 1 II is Marshall's fig 31 of footnote 2 p.468.

Fig. 1.II

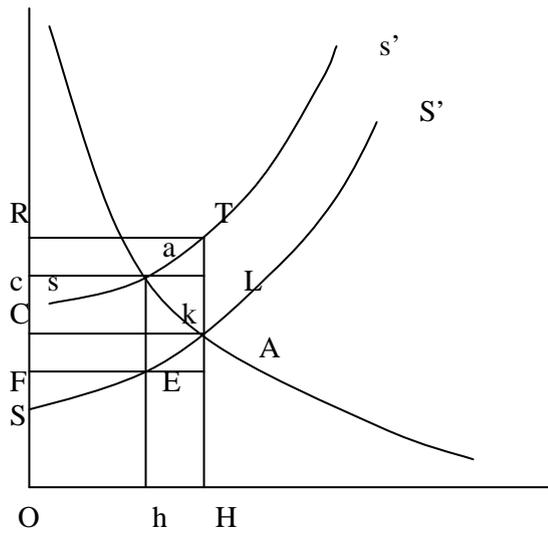
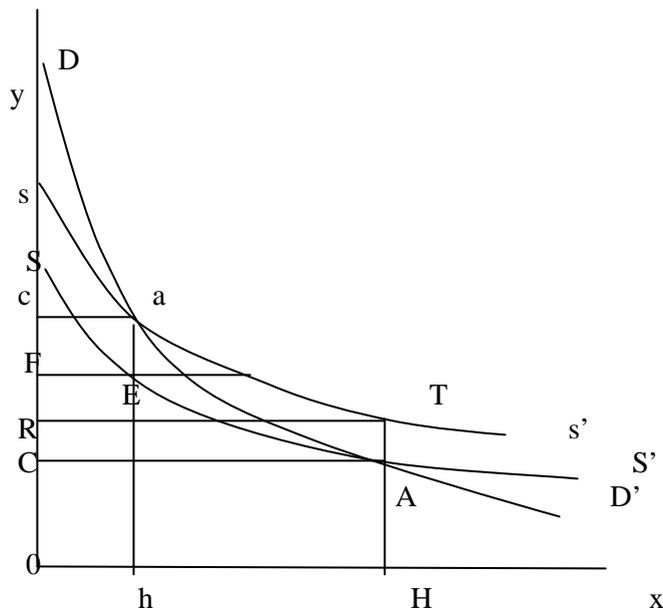


Fig. 1.III



that a small diminution of consumption causes a great falling-off in the expenses of production other than the tax". For the tax shall cause a diminution of production (in Fig 1II from OH to oh) and an increase in price (in the same Fig. from HA to ha=HL). The loss of consumers' surplus shall be equal to the difference between the new and the old market price on the maintained consumption (in Fig. 1 II CcaK) plus all the surplus which the consumers, before the tax, had on the consumption destroyed by the tax (in Fig. 1 II, aAK) On the other side the gross receipt of the state shall be equal to the difference between the supply price, in the new point of equilibrium and the new market price, on the consumption maintained (in Fig.1 II, aECF). The new equilibrium supply price net of tax is > to the old equilibrium supply price net of tax. Therefore is CFKE the difference between hE the new equilibrium supply price net of tax and HA, the old

equilibrium supply price net of tax measured on all the maintained consumption – difference which gives the excess of the state receipts on the loss of consumers surplus on the maintained consumption – is greater than KEA, the loss of consumers surplus on the consumption hH destroyed by the tax, the state shall have a gross tax receipts than the loss suffered by the consumers in their surplus.

b) The bounty, as in the constant returns case, will always cause a gain of consumers' surplus smaller than its direct cost to the state. Quantitatively however there is a difference in the decreasing return case (for a bounty of given unit amount). The excess of the cost for the state on the gain to consumer shall be greater than in the constant return case and, as in the constant returns case, consumers have a surplus which diminish further and further going to the right with the fall of the demand from a. But when diminishing return prevail (Fig. 1 II), on every unity of the consumption, an increasing part of the bounty aE is devoted to pay the increment in the expenses of production, due to the extension of "the margin of cultivation".¹² The bounty costs to the state TARC and gives to consumer a fresh surplus of only CcAa < than one half of RTCA.

1.5. EFFECTS OF TAX OR BOUNTY UNDER INCREASING RETURNS¹³

a) the tax causes a loss of consumers surplus greater than the gross receipts which yields to the state. Moreover the difference between the loss to consumer and the gain to the state for a tax of a given unit height, is greater here than in the constant cost case. This it is so because the tax, in the increasing return case, "lessens the demand and therefore the output. It thus probably increase the expenses of manufacture somewhat: sends up the price by more than the amount of the tax; and finally diminishes consumers' surplus by much more than the total payment which it brings into the exchequer" In Fig. 1 III, first of all, there is a loss of consumers' surplus on the consumption hH destroyed by the tax, measured by EAR. In addition there is a loss of consumer surplus on the maintained consumption, measured by EcaK (the difference between the old and the new market price, on the maintained consumption OH). The state receipts is caFE, which is but a part of CcAK. In Fig. 1I, relating to the constant returns case, the loss of the consumer surplus on the destroyed consumption was smaller than in Fig. 1 III because less consumption was destroyed This was due to the fact that the supply price net of tax did not increase with the reduction of the output. Furthermore, the loss of consumers surplus on the maintained consumption for the same reasons in Fig. 1I was equal and not greater than the gross receipt to the state.

Here Marshall however adds an important qualification which we shall remind in the subsequent analysis. *The supply curve which holds for downwards movements does not necessarily holds for the backwards ones even in the long run*. The internal and external economies which make for a downward shape of the supply curve "are not readily lost"¹⁴, when the production shrinks; and hence the supply curve valid for

¹² The use by Marshall of the expression "margin of cultivation", instead of "production" underlines that he, as for decreasing returns industries, basically refers to agriculture.

¹³ See §4p.469-70. Our fig. 1 III is Marshall fig.32 of footnote 2 p.469.

¹⁴ The reasoning is based on a long run perspective, so the word "readily" appears to mean "easily".

backward movements may easily be less steep than the other. The shrinkage of production, per consequence, shall be less than that depicted in fig. 1. III. But the conclusions above presented, shall be still valid, except in the limiting case in which, for the backward movements, the supply, for the increasing return industry under consideration, could be viewed as a constant return curve.

b) A bounty on increasing return commodity may cause a gain in consumers surplus greater than the cost of it to the state, and “certainly will do so in the case of the law on increasing returns acts at all sharply”. In Fig.1 III, ss' can be taken as “the position of the supply curve before the granting of the bounty” and SS' as its position afterwards.

The increase of consumers surplus is represented by $cCAa$ while the direct payment made by the state under the bounty is represented by $RCAT$. As the figure is drawn, the former is much greater than the latter. However, the latter is not a subset of the former, having in common with it only the area under the demand curve. If the figure was differently drawn, the part of $RCAT$ above the demand curve, could have been bigger as for the share of consumer surplus gained by means of the bounty not included. In this case, the cost of the bounty to the state would have been greater than the gain of surplus to the consumers. This could have happened if “we had drawn ss' so as to indicate a very slight action of the law of increasing return”, that is if it had been quasi horizontal. This case “would have differed but little from that of the bounty on a commodity which obeys the law of constant return.” As we have seen in fig 1.I, in this case, the bounty clearly has a costs for the state $>$ than the benefits the consumers, because part of the bounty is offset, for the consumers, by the decline of their demand curve.

Considering that there are cases where, because increasing returns act sharply, a subsidy *may* give to the consumers a gain of surplus $>$ than its costs to the state and case where, because decreasing returns act sharply, a tax may inflict to the consumers a loss of surplus $<$ than its gross receipt to the exchequer, Marshall finds enough theoretical reasons for advancing his welfare theorem and the normative propositions steaming from it, that we have mentioned above.

1.6. PUBLIC CHOICE LIMITS OF MARSHALL THEOREM

It is interesting to note that Marshall limits the policy relevance of his theoretical findings, with reference to problems that are now familiar in the public choice literature, from Buchanan's (1962) seminal contribution on state failures as compared with market failures on¹⁵ “it will be necessary to take account of the expenses of collecting a tax and of administering a bounty, and of the many indirect effects, some economic and some moral, which a tax or a bounty is likely to produce”¹⁶

Among these problems Marshall emphasises those connected with the difficulty of ascertain that the burden of the tax and the benefits of the bounty were equitably distributed; the openings for fraud and corruption; and the danger that in the trade to get subsidies, people “would divert their energies from

¹⁵ J: BUCHANAN (1962), *Politics, Policy and the Pigouvian Margins*, *Economica*, XXIX, February, p. 17-28

¹⁶ Chapter quoted, §4, p.470

managing their own businesses to managing those persons who control the bounties”¹⁷ And as for the protective duties on nascent industries, he observes that “even there the policy is apt to be wrenched from its proper use to the enrichment of particular interests; for those industries which can send the greatest number of votes to the poll, are those which are already on a large scale, that a further increase would bring very few new economies.” As one can see from the above sentences, Marshall may be considered as a precursor of the “rent seeking” theory. It should be added that in his theory, at any rate, bounties are better than protective duties because “Protection to any one industry nearly always tend to narrow the markets, especially the foreign markets, for other industries”¹⁸ But one should remind that Marshall ad hoc bounties and taxes on industries with different returns to scale intend to be simplified paradigms of a general policy attitude to the market forces as for economic growth problems. The general claim it is that *per se* they may not be leading to the maximum growth, via a continuous development of productivity. Their attitudes to develop productivity should be encouraged and thus overcome the tendency of natural resources as such to gradual reduction of their unit productivity.

1.7.POLICY PROPOSITIONS DERIVED BY MARSHALL

The first was that ¹⁹ the aggregate community welfare might be increased by a bounty “on the production of these goods with regards to which the laws of increasing returns acts sharply” financed by levying of “a tax by the community on their own incomes, or on the production of goods which obey the law of diminishing return”.²⁰ This was so because “the direct expenses of a bounty sufficient to call forth a greatly increased supply at a much lower price, would be much less than the consequent increase of consumers’ surplus”.²¹ We shall see, however, that Marshall is very careful in deriving from this general proposition practical policy suggestions about protective duties on infant industries or other forms of subsidy to increasing return industries in general.

The second proposition was that when individuals spend on things which obey to the law of diminishing return they make those things more difficult to be obtained by his neighbours and thus lowers the purchasing power of their incomes; while in so far as he spends on things which obey to the law of increasing return, he makes those things more easy of attainment to others, and thus increases the real purchasing power of their incomes.²² Clearly, by this proposition, Marshall finds out the paradigm of *pecuniary external economies and diseconomies* of consumption. Beside the ethical implications of this

¹⁷ Chapter quoted, §6, p. 473.

¹⁸ See Chapter quoted §2, p.465

¹⁹ More than often this proposition is not interpreted *exactly*: somebody, for instance, seems to believe that for Marshall the taxation of decreasing returns is *strictly* connected with the financing of the bounty. But this is not true as we can see from the following quotation in the text. For Marshall, this last measure could be carried on divorced by the first and viceversa.

²⁰ . See Ch. XIII of Book V, & 6, p.472-73. .

²¹ See Ch. XIII of Book V, §6, p.472.

²² See Ch. XIII of Book V, §7, p.47-75)

proposition as for the individual consumers choices , we shall see that there are also important implications, in the interaction among internal and external economies.

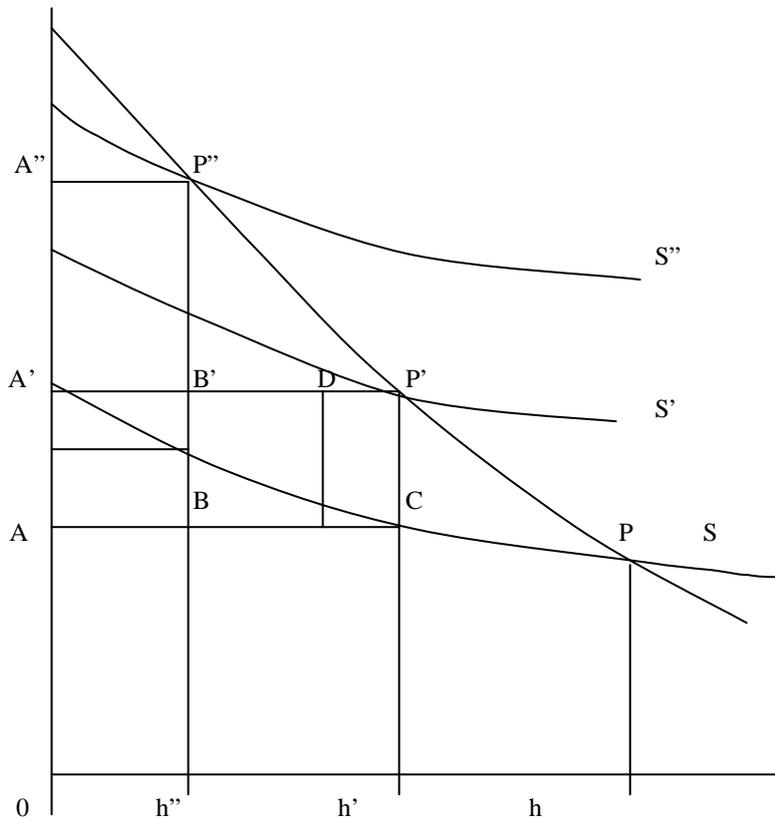
The third normative proposition regards the optimal taxation theory. It is not true what “it is commonly argued that an equal *ad valorem* tax levied on all economic commodities (material and immaterial) ...is *prima facie* the best tax because it does not divert the expenditure of individuals out of its natural channels . A discriminated taxation on diminishing return industries would be preferable, for rising funds for general expenditure purposes.²³ Marshall does not expressly draw another inference that one could be tempted to derive from his reasoning: namely that a general tax on decreasing return industries might be commendable, even when no revenue is required, because it could increase aggregate welfare channelling more demand to the increasing return industries. A careful lecture of “Principles” gives some good arguments to believe that Marshall theory could be used to support this additional statement. But this conclusion, as we shall see, is not granted framework.

1.8. A FURTHER POLICY IMPLICATION: THE CUT OF AN HIGH UNDER INCREASING RETURNS COULD EASILY INCREASE ITS REVENUE

The Marshallian analysis of the differential loss of consumers’ surplus brought by a tax on increasing return industries opens the way to realise that , under a positive elasticity of demand and sharp increasing return, an increase of the tax may easily decrease its revenue. Actually this effect might also take place with constant returns and even with decreasing returns provided that the demand is enough elastic. But under increasing returns the perverse elasticity of costs combines with a negative elasticity of the demand to cause an early decrease revenues with an increase of rates of taxation. Consider Fig. 1.IV in which Oh represents the equilibrium supply at price P of a given increasing returns industry before any tax on it , with demand curve DD’ and supply curve SS’. Now an excise tax t on each unit of quantity of the considered commodity is introduced which increases the supply curve gross of tax to S’. The new price is P’ with a supply of Oh’, that provides to the Treasury a revenue of P’CAA’. Then the tax amount per unit of quantity is increased to t’=2t and the supply curve gross of tax shifts up to S’’ that crosses the demand curve in P’’ The equilibrium supply is now Oh’’ with a tax rate of P’’B’ that gives to the Treasury the revenue B’’P’’A’’A’>P’CaA’. Indeed in our Figure 1.IV A’B’R’R’’ that under t’ gives to the Treasury the revenue corresponding to t is equal to the share A’B’AB of the revenue obtained by the Treasury under the rate t. This it is so because the two rectangles have the same height in the y and the same length on the x. And B’BP’C it is clearly >A’’P’’R’’R’ that represents the additional revenue obtained under t’ by the rate t’-t. Indeed while BB’=A’’R’’, BC it is clearly >RR’ .

²³ See Ch. XIII of Book V, §7, p.475

Fig.1.IV



Now let us call ed the elasticity of demand D , es the elasticity of supply S , h the quantity of supply before a tax T with rates $t, t' \dots t^m, t^n$ and $h', h'' \dots h^m, h^n$ the reduction of supply brought by the taxation, we may say that the revenue Y of T shall diminish when $t^m (ed+es)(t^n - t^m Oh^m) > t^n - t^m (Oh^n)$, i.e. when the loss on the revenue provided by the old tax rate t^m due caused by the sum of the elasticity of demand and supply time the increase in tax rate as percentage of the units Oh^m becomes higher than the increase in revenue on the new supply due to $t^n - t^m$.

A numerical example will help to clarify how the formula works. Let us suppose that the elasticity of demand ed is 2 as well as that of supply es . Let us now assume that the equilibrium supply before any tax is 200 q and that a tax T is introduced with a 10% rate t . Since the tax increases the supply price of twice its amount i. e. of 40 and diminishes the demand at the same rate 40, the new equilibrium supply shall be 120, with a revenue $Y=12$. Now the rate is increased to $t'=20\%$. Thus both the supply and the demand diminish of 24=48 losing 4,8% and the new equilibrium supply shall be 72 on which the revenue is $Y'=14,4$. The next increase of rate of 10% to t'' implies a reduction of 28,8 with a loss of revenue of 5,76. The supply is reduced to 43 with a revenue $Y''=12,9\%$, in which 8,3 is due to the "old tax rate" and only 4,3 to the new one. And since the revenue lost on the decrease in quantity supplied=5,76 exceeds that gained by the rate increase =4,3 the increase of taxation damages the Treasury, while substantially deteriorating the productivity.

Thus the maximum revenue is given by the t'' rate, not by $t''' > t'$. Not only it may be better to tax the decreasing or constant return industries than those with increasing returns. In general, when these are taxed there are more stringent limits to the maximum revenue that may be collected by rate increases

SECTION II. THE MINOR ROLE OF PRODUCER SURPLUSES

2.1. MODEST RELEVANCE OF MARSHALL' OMISSION OF PRODUCERS SURPLUSES

Marshall' demonstration of his theorem leaves out the producer surplus²⁴

This might appear a disturbing feature. A reader of the present period could easily concede that the producers surplus does no need to come in the play directly, in the constant returns and increasing return cases²⁵; but would maintain that it must be taken in to account in the decreasing returns cases and that also its indirect role in the constant returns and in the increasing returns case needs to be considered.²⁶

The proposition that the tax on increasing return industries may cause a loss of consumer surplus smaller than its gross receipt to the state, indeed, may appear rather misleading²⁷ because the excess of the receipts to the state over the loss to the consumers is accompanied by a loss to the producers. And the sum of these two losses always outweighs the gross gain accruing to the exchequer. In fig 1.II the tax yields $\Delta KFE > \Delta LAEF$, sum of the losses of consumers and producers surplus due to the tax. On the other hand, one may argue that also the proposition that the tax on commodity where decreasing returns act sharply causes a loss of consumers surplus larger than a tax of the same amount on a constant return commodity and *a fortiori* larger than a tax on an increasing return one, needs to be qualified bringing in the different changes, if any, of producers surplus.²⁸ Someone could observe that the increase of the supply price net of tax arising after the imposition of it, may well have a counterpart in greater producers rents.²⁹ Thus it is not so obvious that the net loss of welfare given by the sum of the losses of producer and consumer surplus, in the increasing returns case, must be greater than in the decreasing return cases, where both producers and consumers surplus are reduced by taxation.

²⁴ In addition to P. SAMUELSON (1947), also H. ELLIS & W. FELLNER (1943) *External economies and diseconomies*, American economic review, 1943, reprinted in *Readings in price theory* of AEA and W. BAUMOL, (1967) *Welfare economics and the theory of the state*, p.22, criticise Marshall alleging his total omission of producers surplus. As we shall see in any case, the omission is not as total as they seem to believe.

²⁵ "Openly" must be stressed, because here also, as we shall see, they may exist even if concealed by the diagrammatic representation.

²⁶ See SAMUELSON (1947) and BAUMOL (1967) above quoted.

²⁷ And openly contradicting the theorem of excess burden of indirect taxation stated by Barone in 1912 and now universally accepted even if through a much stronger proof.

²⁸ This result come out combining the two Marshall's proposition above seen that a tax on constant return industry gives a loss greater than a tax on a commodity where decreasing returns act sharply and that tax on increasing returns gives a loss greater than a tax on constant returns.

²⁹ This criticism seems to be implied in the argument of OORT above quoted)

Marshall was not so naive as some critics seem to maintain, his analytical engine was not so unrefined and his theorems, at more careful analysis, are perfect. Indeed, Marshall had good reason to leave aside the producers' surplus, through all the passages of his central reasoning, above seen.³⁰ He admits³¹ that there are questions relating to the effects "which any particular tax or bounty might exert on the interests of landlords, urban or agricultural, who own land adapted for the production of the commodity in question." These questions "must not be overlooked" but do not in firm the general outcomes of the theorem.³²

2.2. FOR BOUNTIES TO DECREASING RETURNS OVERLOOKING PRODUCERS SURPLUSES REDUCES THE QUANTITY OF THE DISTORTION

As for the subsidy to decreasing return industries, Marshall's conclusions seem able to escape the criticism steaming from the consideration of producers' surplus, only from a qualitative point of view. Marshall, indeed, as seen, here maintains that the bounty causes a gain of consumers surplus smaller than its costs to the state. The reason is that part of the bounty is absorbed by increased supply price net of bounty and that (another) part of the bounty does not give origin to a gain in consumer surplus because of the decline in the demand curve. Even in the extreme case in which all the increment of supply price net of bounty had an exact counterpart in an increment of producer surplus, the correctness of Marshall's conclusion is assured, *from a mere qualitative point of view*, by the fact that, due to the downward slope of demand curves, part of the subsidy does not go to the consumers as a gain in their surplus.

2.3. CONSTANT OR INCREASING RETURNS, CONSIDERING PRODUCERS' SURPLUSES MAY REINFORCE THE THEOREM

In the case of constant return industries under competition by definition producers' rents do not directly emerge. They in the short run might be concealed in the supplies of the various firms that provide this constant return supply with their marginal costs. But in the long run these rents disappear. One however, following Marshall, may argue that they may remain, in the supplies of factors of production, if they imply natural scarce resources. This it is true, but when a comparison is made with increasing return industries,

³⁰ One should note, that in Appendix H, §4 he presents (in note 2) a Fig. 39 where, under increasing cost, explicitly producers surplus are considered, specifying, however, this is not the true supply curve but the (short run) particular expense curve, relevant only in the static case. In the long run correct perspective supply curves are diminishing, as far as manufacturing and the various trades are concerned. And in earlier paragraph of his "Principles", as for machinery and skilled labour, he defines the scarcity rents as "quasi rents", because they tend to disappear in the long run, due to a new (more efficient) supply of these factors made possible by the increased demand. "The *law of increasing return* may be worded thus:—an increase of labour and capital leads generally to improved organisation, which increase the efficiency of the work of labour and capital". Thus diminishing returns are confined only to particular cases. And, as we have seen above, Marshall suggests that the bounty to increasing return industries may be theoretically appropriate only when "the supply price falls much" with the expansion of demand. Therefore even if this would result in some loss to the producers, yet this loss may be very much less than money value of the gain to purchasers which is represented by the increase of consumers' surplus."

³¹ In Chapter quoted, §6 at the end.

³² "These are questions which must not be overlooked; but they differ so much in their detail that they cannot fitly be discussed here". Chapter quoted, § 6, at the end.

one must note that here too there may be producers rents concealed in the scarce factors of production and since the variation of supply under taxes or bounties is greater in the increasing return industries as compared with constant ones, their consideration might reinforce Marshall theorem as for the two types of industries.

2.4. PRODUCERS SURPLUSES HAVE MINOR ROLE FOR THE TAX ON DECREASING AND CONSTANT RETURN FINANCING A BOUNTY TO INCREASING RETURNS

Let us now consider whether the omission of producers surplus damages Marshall propositions that a tax on decreasing and constant return industries to finance a bounty scheme. As noted, producers rents do not appear directly in the long run in increasing return industries and in constant return industries as well. But they may exist there as quasi rents in the shorter run. Moreover they may be present in the industries supplying them, causing the increase of some factor costs. Obviously producers rents are more important in diminishing return industries (and in constant return industries) than in the increasing return ones. But still one must remember that an expansion of production with lower supply prices, does not imply a reduction but, as for land's scarcity, on the opposite, an increment in producers' rents.³³ And if it is true that the tax on decreasing return industries destroys producer surpluses, it is also true that the bounty to increasing return industries gives origin to fresh one. On balance one may argue that only a minor part of the rents destroyed in diminishing return and in constant return industries is relevant. And we must remember that Marshall maintains this theorem in face of industries where increasing return act sharply and of industries where the opposite situation exists (sharp action of diminishing returns). Hence the loss of landlords' rent in the second case (that where the tax is levied) is considerably greater than the gain in the first (that where the bounty is applied). It is possible also "to make liberal allowance for the cost of working of the government department that manage the collection of the tax and the awarding of the bounty; and yet to conclude that by the scheme in question (tax and bounty) government may have conferred a great economic benefit on the nation as a whole". Thus producers surpluses destroyed in diminishing return industries *matter but play the minor role of setting quantitative limits to the basic proposition of the theorem.*³⁴

2.5. THE THEOREM RESTS ON THE GAIN OF PRODUCTIVITY AND PRODUCTION UNDER INCREASING RETURNS. THEN THE TAX NEEDED TO FINANCE THE BOUNTY SHALL BE LOWER THAN IT

Marshall theorem relies on the argument that, where increasing return are present, consumers may be greatly benefited by an expansion of production, without an appreciable loss for the producer, in terms of gains per unit of supply. The increased supply at lower unit costs inherent to the increase of consumers'

³³ The difficulties of grasping this conception, by the synthetic Marshall representation by a diagram shall be considered at length in the next section of present work.

³⁴ Another reason why Marshall leaves the consideration of producer's surpluses out of the centre of his picture is explained in note 1 second sentence p.473 and appendix H, where the difficulties due to the interaction between scale of enterprise and scale of the industry are stressed.

surplus brought about by an increased amount of demand at lower unit cost provides an additional income that implies an increase of aggregate welfare.³⁵ In Kaldor-Hicks terms, consumers would be able to compensate producers for their loss, and still would retain a net gain. The money for the bounty, in pure theory, may well come from a lump sum tax on the benefited consumers. Marshall, more realistically, considers either a general income tax or one on a diminishing return industries. He concentrates chiefly on this latter, because of his general theory of taxation in which an income tax, due to the discriminatory effects on savings,³⁶ is inferior to a general commodity tax.³⁷ So the diminishing return industries are drawn in the picture.

Marshall implicit assumption that the tax to finance the bounty should be of the same amount however, in normal circumstances, it is not correct: indeed, if a Government exists, before the suggested corrective intervention, this shall imply that normal taxes on the income produced or/and consumed already exists. Therefore the *net* increase of product due to the bounty implies an additional normal tax revenue, that shall be used to partly finance the bounty itself. Thus the special taxation needed to cover the *net* costs of the bounty shall be of a smaller amount than the bounty. And this consideration reinforces Marshall's theorem.

2.6. THE PROPOSITION THAT A TAX ON DECREASING AND CONSTANT RETURN INDUSTRIES IS BETTER THAN A GENERAL AD VALOREM TAX STANDS EVEN CONSIDERING PRODUCERS' SURPLUSES

As seen before, Marshall for general revenues purposes suggests to avoid a general uniform indirect tax and to prefer one which, by exempting the increasing return industries, is less damaging to growth of product and of product per giving units of factor. The reason that enables Marshall to reach the conclusion about the greater welfare loss caused by the tax on increasing return industries as compared with a tax on those with constant or decreasing returns, is that when production shrinks in the increasing return case, market supply price increases of an amount greater than the tax. This result is caused by the loss of productivity. And the consumers suffer a double loss: because of the tax and because of the higher supply price net of tax, caused by the loss of productivity that is a dead weight. Producers surpluses may be thus overlooked. But in so far as the above theorem of Marshall stands, in spite of the lack of explicit consideration of producers surpluses, also this Marshallian theory of optimal taxation focusing on consumers' surpluses stands. For, of course, if it is advisable to subsidise some increasing returns industries with some bounty scheme to expand them, *a fortiori* shall not appear commendable an indirect tax

³⁵ Remember the passage referred to in the several pages of this work. Marshall stresses this point saying that a bounty to commodities where *increasing return acts sharply*, would be able to give a gain to consumers greatly over and above its cost to the state.

³⁶ See the "Pure theory" p. 34. Marshall had in mind a systematic work on the theory of taxation. This may explain why Chapter XIII of book V of the Principles his treatment of the tax alternative to finance the bounty is so condensed.

³⁷ And, of course this last is inferior to a particular tax on diminishing return industries, when the problem of financing a bounty to the increasing one is faced.

restricting their supply . And if one believes that, for practical reasons, such subsidies favouring increasing return industries should not be applied, at least shall refrain to impose them the burden of indirect tax.

SECTION III.

FROM PARTIAL TO GENERAL EQUILIBRIUM: INCOME EFFECTS DO NOT INFIRM THE THEOREM BUT MONEY SUPPLY MUST BE CONSIDERED.

3.1.MARSHALL' DEMAND CURVES ARE NOT COMPENSATED FOR INCOME EFFECTS

In Marshall partial equilibrium models demand curves are drawn on the assumption that the marginal utility of money is approximately constant.³⁸ This does not mean that Marshall - as Friedman has argued³⁹ - normally assumes a compensated demand curve, but that - as Hicks correctly maintains,⁴⁰ this *income neutral* curve, in the case in which the variations in aggregate income are small, may not be relevant as the changes of price do not appreciably affect the marginal utility of income. That this is the Marshallian position as for the discussions about effects of taxes as for consumers surpluses appears clearly from his following statement "This method of enquiry⁴¹ (by consumer surpluses) is not applicable to a tax on a commodity insofar as it is consumed by a labouring class which spends a great part of its income on bread; and it is not applicable to a general tax on all commodities, for if neither of these cases can be assumed that the marginal value of money to the individual remains approximately the same after the tax has been levied as it was before."⁴² But as we have seen, Marshall asserts that because a general *ad valorem* tax falls also on increasing return industries is inferior to a tax that is applied to constant and decreasing return industries only. He implicitly assumes that his partial equilibrium demonstration conducted for specific taxes and subsidies in situations where the income effects are small, are also applicable when they may be relevant. One may well argue that moving from a partial equilibrium to a general equilibrium perspective , as it may be appropriate for the effects of general *ad valorem* tax or an income tax, one should also consider the income effect of the spending made possible by the tax. However, the assumption of compensated demand curves for the various income classes and industries would be rather artificial, particularly as for the perspective of the Marshallian discussion of increasing versus decreasing and constant returns. The lower income classes might devote a smaller share of their budget to increasing return goods and a bigger share to decreasing return (e.g. foodstuff) than the middle or higher income classes. Moreover Marshall's reasoning implies *an increase in aggregate income, due to his bounties-taxes scheme*. It is therefore important to inquire if Marshall demonstrations loose their validity when important variations of purchasing

³⁸ See the explicit statement on this assumption on footnote 1 appended to page 466-7, last sentence of the Principles. This qualification does not appear in the first edition.

³⁹ See M. FRIEDMAN (1949), *The Marshallian demand curve*, Journal of political economy, p.463ss.

⁴⁰ See J.R. HICKS (1956) *A revision of demand theory*, Oxford, Oxford University Press.

⁴¹ That which we have analysed in the first part of the present paper.

⁴² See footnote 1 appended to p. 466 above quoted.

power are involved and marginal utility of income cannot be assumed approximately constant over the relevant range of the considered demand curves. To do so we shall compare *ordinary*⁴³ demand curves with relevant income effects and compensated demand curves where the income effect is absent

3.2. CONSIDERING INCOME EFFECTS REINFORCES THE THEOREM UNDER INCREASING RETURN

As for a bounty to increasing return industries, one must observe that when income effects are present – insofar as normal commodities are concerned⁴⁴ – these give additional power to the cost and price reducing effect of the subsidy. This is so because, under increasing returns, every increase to the quantity demanded either generated by a lower price or by a greater real income, implies an increased supply at a diminished cost. Even if all the increased demand should be generated by income effects – that is if the commodity considered should have zero price elasticity but a positive income elasticity – Marshall theorem stands. A similar reasoning, in reverse, may be made for the tax on increasing return industries, because the non compensated demand curves, taking account of the reduction of demand due to the income effect, are more elastic than the compensated ones.

In fig.3.I the case of normal commodities is considered, with increasing return industries. CC is the demand curve inclusive of income effect, that is the curve that gives the variations of quantity demanded both in responses to variation in prices and to the variations in real income induced by these price changes, while Aa is the compensated demand curve⁴⁵ which keeps constant real income existing in P. This curve still lies below Cc on the right of P. For here the increases of purchasing power due to lower prices are offset by an equivalent increase of money income whereas, on the left of P the opposite happens, because the compensation of loss of purchasing power due to the increases of prices cancels the reductions of demand due to diminished incomes.

⁴³ By “ordinary “ here I mean those ordinarily employed in marketing researches which, obviously, take account of the income effects, if any.

⁴⁴ Following FRIEDMAN (1949) we can call “normal commodities” those whose demand increases when consumers’ real income increases, and decreases when consumers’ real income diminishes.

⁴⁵ Of course reshaping Marshall theorem in terms of compensated demand curve, a lump sum subsidy must be given to the consumer of the taxed (increasing return) commodity. This would eliminate the income effect as far as they are concerned; the increase of real income of the consumers of the subsidised commodities should be compensated with a lump sum tax.

Fig. 3.I.

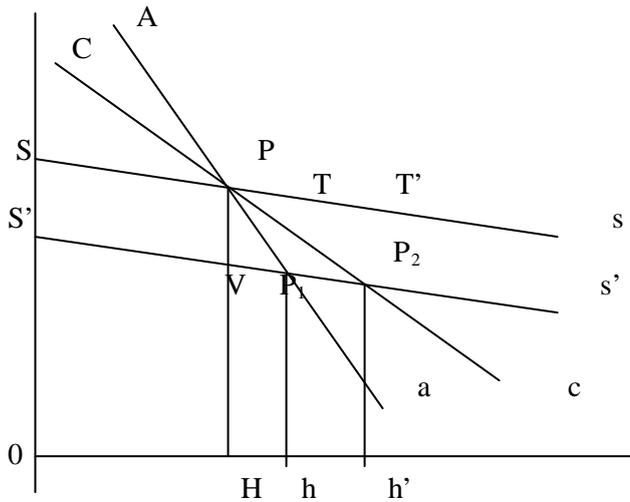
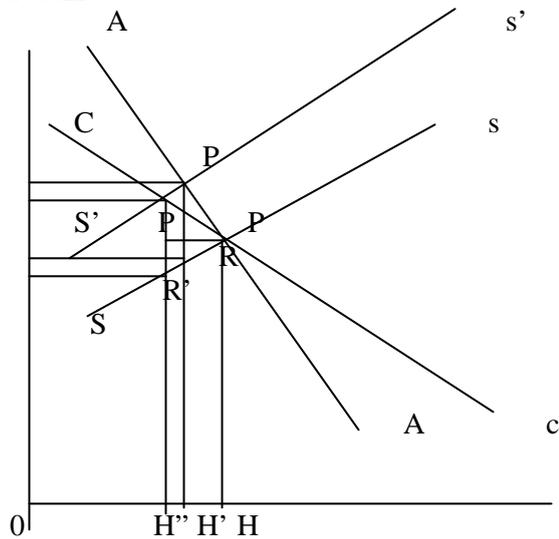


FIG. 3.II



Recalling that Marshall partial equilibrium model assumed no income effect, one may argue that his demand curves actually coincide with the “compensated demand curves” that Friedman – against the common usage - considers the true Marshallian ones. Thus the non compensated demand curves (let us call them the “current” demand curves) of Fig. 2.I are above the Marshallian ones on the right side of P and below on the left side. The welfare effect of the subsidy is thus magnified (PC lies above Pa), in a greater reduction of supply prices and in an increase consumer surplus. On the other hand the tax, under the current demand curve, would shrink the consumer surplus more than in the Marshallian assumptions (CP lies below AP).

Clearly the income effect adds additional strength to Marshall proof that given bounty to increasing return industries is beneficial and that a tax on them causes a loss in consumer surplus greater than its yield to the Treasury.

3.3. CONSIDERING INCOME EFFECTS OF TAXES WEAKENS THE THEOREM UNDER DECREASING AND CONSTANT RETURN

In regard to the tax on diminishing return industries, the impact of income effect weakens Marshall's proof. (3.II). With the CP curve, the aggregate loss of consumers and producers' surplus is larger *for a given yield* to the Treasury, than when the AP demand curve.⁴⁶ And it is very doubtful that for taxes of equal yield even the loss of consumer surplus alone could be lesser than in the second. Consideration of income effects as for a bounty do not alter Marshall's contention that a subsidy to them would imply a loss of welfare, but diminish the size of the distortion because the current demand curve would be greater than is demand curve.

3.4. A PERMISSIVE MONETARY POLICY TO APPLY THE THEOREM

On balance when all the income and price effects regarding demand curves have to be considered, for increasing and decreasing and constant return industries, Marshall's proposals may be still be valid but, admittedly, in some particular case may lose force.

It must be underlined that the net result that gives a broad validity to Marshall's theorem it is that, by his tax-subsidy scheme, there is a net *real income effect*: more resources are available to the consumers because the product of the existing factors of production has increased. Prices of the increasing return industries go down but the quantity bought may be considerably higher than the price reduction as in Fig. 3.1 above. On the other hand the process of the increasing return industries go up and the percentage reduction of quantity may not be higher than the percentage reduction of prices. Thus to allow the consumers to buy this greater product one needs to assume that either the price level is decreased artificially by a monetary constraint or that the money supply is eased to allow this greater purchasing power with a constant (or mildly increasing) price level. Considering that the dynamic nature of the Marshallian increasing returns implies an interaction of expansionary behaviours of the individual firms, as we shall show in a next section, hardly his theorem could work in practice under a deflationary monetary policy, where the purchasing power of the consumers increases by general decreases in price level.

⁴⁶ In fig.11 II P3PR is the loss of surplus for the tax P3R, under AP demand curve; P4PR' is the loss of surplus for the same tax (P4R'=PR) under AC demand curve. P3PR has PLR in common with P4PR'. The remaining part P3PR, P3PL<P4LRR'.

SECTION IV
INCREASING RETURNS DUE TO INTERNAL ECONOMIES OF SCALE AND TIME
DO NOT IMPLY MONOPOLISATION

4.1.TWO STYLISTED MODELS OF INCREASING RETURNS CAUSED BY INTERNAL OR EXTERNAL ECONOMIES OF SCALE AND TIME

Increasing returns' Industry, in Marshall' model, originates both by internal and external economies, relating to the size of production in a given time period and to the repetition of supply during the various time periods. External economies may be internal to the considered industry or to the considered industrial district or may be partly internal to the given industry and district and partly external to them and internal to the nation considered. Some of them, as in the area of scientific discoveries and technological innovations, may be common to the considered industry at a cosmopolitan level or at an inter industry level. The effects of externalities generated by a given industry *internally*, for its supply curve, may be deeper, because more concentrate than those that spill over the entire economy, that are wider. External economies of scale and of time however are of two different kinds, that Marshall does not clearly distinguish because he does not devote a systematic treatment to the externalities. A broad class of externalities, that we may label as "real" have the character of free goods and services not produced by the public sector but generated by the society and the market economy⁴⁷. Another, less clear, class of externalities may be qualified as "pecuniary external economies" because derive from reduction of prices of factors of production made possible by the increased demand, under increasing return supplies.⁴⁸

In order to better understand how this complex model works, seems us useful to break it into two simplified sets. One in which no external economies exist and only internal economies matter to create increasing returns with a situation of competition imperfect because each firm has its individual demand curve; another in which a perfect competition situation prevails among firms but external economies are allowed and another combining them to get the entire complex picture of the Marshallian' increasing returns theory. Admittedly this procedure is rather un-Marshallian. But we think that we are justified in employing it. Indeed the early polemics about this Marshall's contributions by SRAFFA (1926 and 1930) and others⁴⁹ emphasised the necessity of a clear distinction between the elements connected with the external economies and those connected with the imperfection of the market. They argued that (perhaps)

⁴⁷ T. SCITOVSKY (1954) "*Two concepts of external economies*", Journal Of Political Economy, n.17, has named these externalities as "technological" probably to emphasise that they do not need to be material, because many of them pertain to specialised knowledge. However we need the term "technological external economies" to label the peculiar class of those deriving from technical progress. Clearly many other real externalities exist, as those relating to the quality and dimension of the human capital available in a given country or region that cannot be confused with technical innovations even if it is true that human capital conditions their birth and diffusion.

⁴⁸ The class of the "pecuniary" externalities has been identified by SCITOVSKY, who has also given them that name, making clear that they consists in *reduction of prices caused by an increased demand*, i.e., related to increasing return supplies that may become cheaper with the extension of the market or to the increase of competition that also may be caused by an increase of the size of the market that may allow more competitors.

⁴⁹ See D:H: ROBERTSON, P. SRAFFA, G.F. SHOVE(1930), *Increasing Returns and the Representative Firm*, Symposium, Economic Journal, n.60, March.

the Marshallian external economies in increasing return industries where merely economies internal to these or other firms connected with tendencies to monopoly, due to the fact that individual demand curves were implied.. On the other hand, after it has been clarified that Marshall increasing returns could be consistent with neoclassical perfect competition because of the external economies with the nature of public goods as those relating to human capital and knowledge an opposite orthodoxy developed. According to this new interpretation Marshall increasing returns are solely due to external economies.⁵⁰ Thus totally misunderstanding the complex Marshallian construct of *interaction* between economies internal related to market imperfection and external related to “industry” public goods. Marshall actually assumes limitations of the market of individual firms due to the fact that they have individual demand curves . But he does not assume that in increasing return industries firms have endless increasing returns of scale. There are, as we shall see, market failures due to non exploited internal economies of scale, even if individual firms returns to scale may not be endless. One must not confuse the *representative* firm that may find itself always in the situation of increasing returns to scale with the particular (successful) individual firms. These are like the trees of the forest and, after having grown, may undergo a process of senescence coming in a diminishing return stage through time, after having acquired a given (large) scale of production. It must also be noted that increasing returns of scale and time both internal and external may be present also in decreasing return industries, according to the Marshallian theory: and , obviously this implies that they should be helped to materialise also here .

4.2. EQUILIBRIUM OF FIRMS’ WITH INCREASING RETURNS OF SCALE DUE TO SPECIALISATION OF LABOUR AND DEEPENING OF CAPITAL MAY NOT IMPLY WELFARE LOSSES

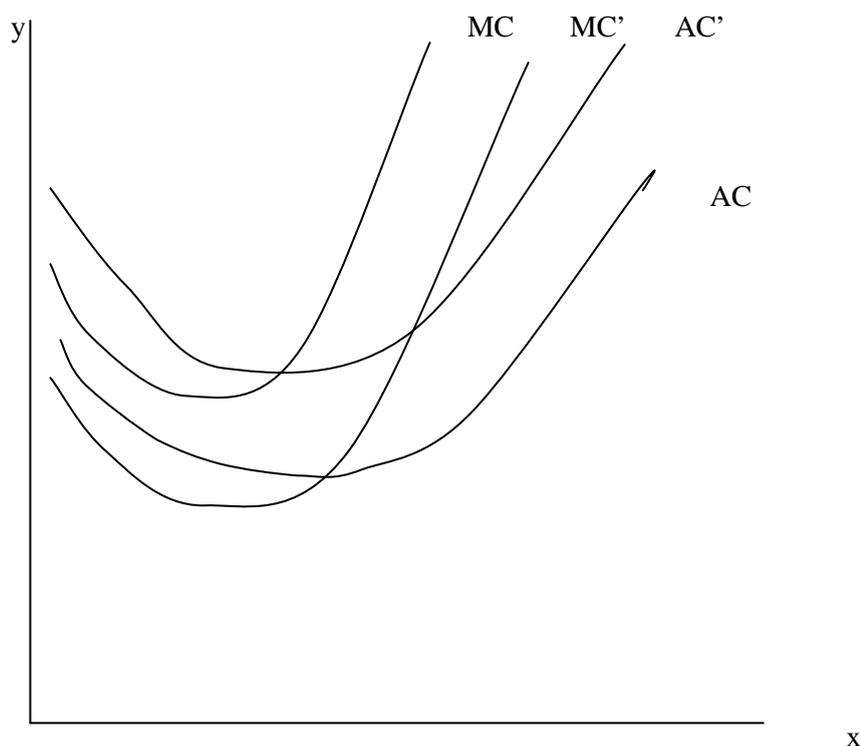
We now consider the first stylised model, where increasing returns are solely caused by economies of scale and time internal to the firms and limited by their declining demand curves .⁵¹ Increasing returns relate to the scale of supply in any given period and to the sequence of periods , with the scale of supply given. We begin with the scale internal economies. A “Marshallian” industry consists of a multiplicity of firms represented, as for their average , by the “representative firm”. Thus the presentation of the industry

⁵⁰ See for instance P.R. KRUGMAN,(1994) *Rethinking International Trade*, Cambridge Mass. The MIT Press, Chapter 5, *Increasing Returns and the Theory of International Trade*, that in § 5.1. bluntly labels as the “Marshallian approach” the general equilibrium analysis of international trade in presence of industries with increasing returns solely due to external economies and constant return industries only because this assumption was adopted by F. GRAHAM, Some Aspects of Protection further Considered, *Quarterly Journal of Economics*, n.37 and later on by W. J. ETHIER (1979) *International Decreasing Costs and World Trade*, *Journal of International Economics*, n. 9, February and ID.(1982) *Decreasing Costs in International Trade and Franck Graham ‘s Argument for Protection*, *Econometrica*, 50. However one may wrongly define this restrictive assumption about the origin of increasing returns as the *Marshallian* theory of increasing returns, the fact remains that ETHIER himself criticises this approach also adopted by R.C. O. MATTEWS, (1950) *Reciprocal Demand and Increasing Returns* and H. MEADE ,(1952) *A Geometry of International Trade*, London, Allen and Unwin, as unduly restrictive and inadequate to explain reality in another paper of 1882. See W. J. ETHIER(1982), *National and International Returns to Scale in the International Theory of International Trade*, *American Economic Review*, n.72, June.

⁵¹ Marshall competition, as we know from his description of the representative firm, is less than perfect; because each firm has its particular demand curve, because has its own customers.

in Fig. 4.I coincides with that of the representative firm⁵² Each firm lies in the long run on average increasing returns limited by its down falling demand curve Average returns are higher than the marginal r⁵³ . Price is made equal to average long run costs (where a fair share of “supplementary costs” inclusive of “normal” profits is added to” prime costs”)⁵⁴The representative firm does not charge more than this average cost because in long run competition would prevent it. It cannot fully exploit its fixed costs , selling at a price = marginal cost, because that price would not cover its average costs.

FIG.4.I



These average cost curves, as noted above, may be viewed not only as the supply curves of the representative firm but also as the market supply curves, i.e. the sum of the average cost curves of all the firms of the industry. Similarly , the demand curve may be viewed not only as that of the representative firm but also as the collective demand curve of the industry. Thus it is clear that in this case of increasing return the industry equilibrium, even without any external economies, is, from the collective welfare point

⁵² The “representative” device simplifies our analytical task.. Indeed , as already noted by FRISCH(1950), the “representative firm” condition is the miniature of the industry condition. See R. FRISCH (1950)*Alfred Marshall theory of value*, Quarterly journal of economics, esp. p. 512-13

⁵³ Note that the if the costs of transport is relevant , even in a perfectly homogeneous market where only one price exists, the demand curve for each seller gross of transportation costs, must be downward falling, as the demand is distributed in places more and more distant from that of the supply. This qualification is not necessary to explain the Marshallian theory of competition. Indeed for Marshall each competitor, generally has his “particular” demand curve, because of the reason given in the previous note.

⁵⁴ As evidence that Marshall considers the average full costs curves as those relevant for the representative firms equilibrium see p.344 note 1 of the Principles (Book, Chapter III,&5) see also FRISCH (1950).

of view, sub optimal, because the price is higher than the marginal cost . A subsidy diminishing the average cost curve to cross the marginal cost might increase welfare, if there were not the public choice failures that Marshall himself as illustrated .

That increasing returns entirely due to internal economies of scale under an individual demand curve imply a loss of welfare due to the fact that average costs are higher than marginal costs, however, rests on the simplified Marshallian assumption that the representative firm is not capable of applying to the demand discriminated prices. Otherwise it could proceed along the demand curve until the marginal cost has been reached, without incurring any loss. One may argue that abandoning the Marshallian price determination, the representative firm could also charge monopoly prices. But this assertion would run counter the Marshallian assumption of a multiplicity of firms of which the representative firm is the average champion. No inconsistency of this kind may arise as for the assumption of price discrimination provided that each firm has its own clientele, as in the Marshallian view.

4.3. INTERNAL ECONOMIES OF SCALE OBTAINED BY INTERNAL SPECIALISATION AND VIA MARKET TRANSACTIONS OF OUTSOURCING

The chief sources of the Marshallian *internal economies of scale* are the Smithian increases of productivity made possible by the division of labour that increases specialisation both in the workers' supply⁵⁵, and in the fixed capital : deepening the specialised capital intensity of production allows an increase of the product per (specialised) worker⁵⁶ . These economies of scale may be captured by the Marshallian representative firm both by an internal reorganisation allowed by the increased dimension of the market of the firm and by an outsourcing that is made profitable by the reduction of the transaction costs per unit of procurement brought by the increase of its demand and by the increased specialisation of the considered firm. Marshall definition of economies external to firms and internal to the given industry is ambiguous⁵⁷ . However, adopting the now commonly accepted terminology it would be wrong to list *all the benefits* from specialised outsourcing as external economies, because many of them are not public goods or goods with a free component resulting from an action external to the considered market transactions. Thus one, as seen, may qualify as pecuniary external economies the benefits of reduction of price that, under increasing returns, the new purchases by a given subject generate to other subjects. But many economies resulting from the division of labour among firms at different stages of production, made possible by the increased scale of production may take place by supplies of firms or individuals supplying goods and

⁵⁵ As exemplified by the famous description in A. SMITH (1776) *An Inquiry in the Nature and Causes of the Wealth of Nation* , of the workers attending to the various stages of the production of pins, in a factory whose size and related opportunities of workers' specialisation is limited by the extent of the market.

⁵⁶ Under the (obvious) assumption of lumpiness of 'plant and machinery's endowments and of specialised units of labour to operate them the increase in fix capital endowment and its specialisation is limited by the dimension of the market available to the given firm. And, following A. YOUNG (1928) it may be re conducted to the general paradigm of the division of labour.

⁵⁷ See A: YOUNG (1928), p.528.

services under decreasing returns as explained by STIGLER (1951).⁵⁸ And increasing returns functions may be conveniently abandoned in the considered representative firm, even if the specialised suppliers replacing them charge discriminated prices so that an increased demand may not give the other purchasers scale pecuniary externalities. In addition to the economies of scale obtained by an inter-firms division of labour that allows to reduce the costs one should also consider those arising from *new varieties* of the goods and services pertaining to the function decentralised that may improve the productivity of the purchasing firm. This theme may be enlightened by COASE's theory of the firm as a system of transactions⁵⁹ as developed by WILLIAMSON(1986) AND NORTH (1990)⁶⁰. Decentralisation of activities reducing the firm's vertical integration may be beneficial if the price paid as compared with internal costs is low enough to compensate for the transaction costs, consisting of the legal costs of the costs of transportation⁶¹, of those of information and control of opportunistic behaviours and of those of the contingency relating to the incompleteness of contracts in a dynamic setting. An increased dimension of supply, big enough to overcompensate as for given functions the transaction cost, may allow to conveniently decentralise them outside the firm. It may also develop *an increased variety of external supplies that was not possible under the vertical integration*. And the providers of these differentiated goods and services may well be small firms and autonomous workers with diminishing return supplies. And when this is not the case and the suppliers are increasing return big suppliers, they may charge discriminated prices or monopoly prices, capturing the rents arising from the reductions of costs due to the increased scale of supply, so that one here too may not speak of external economies but merely of market transactions economies.

4.4. INCREASING RETURNS TO SCALE DO NOT (NECESSARILY) LEAD TO MONOPOLY IN A MARSHALLIAN CONSTRUCT

A standard argument is that the possibility of important of scale economies internal to firms (in the above broad sense that considers also the internalisation by market transactions) signals a strong tendency to monopolisation as general as these economies. But this contention appears too simplistic in a sound Marshallian view. In the very long run, in some industries cost curves, given the scarcity of land tend to increase.⁶² Furthermore, firms are like trees of the forests. There may be diseconomies of senescence in their growth and, furthermore, their further growth is limited by that of younger firms. We shall see that the realism of this picture is increased when economies (partially) external to the firms as those of knowledge

⁵⁸ See the Section *The function of a Firm* where he consider both the case of abandonment by the considered industry of some functions subject to increasing returns and of some other subject to increasing costs.

⁵⁹ R;H; COASE, (1937)*The Nature of the firm*, *Economica*, IV, reprinted in G.J. STIGLER&K. BOPULDING(eds.), (1952)*Readings in Price Theory*, Homewood, Irwin.

⁶⁰ See chiefly O. WILLIAMSON (1986). *Economic Organisation*, Chapters VII, IX, XI; and D. C. NORTH, (1990), Chapter VI and VIII. This author rightly puts a particular emphasis on the actual enforcement of the rules relating to property right and contracts

⁶¹ On which insists G: STIGLER(1951) in the section *Wider Implications*.

⁶² In industries where natural scarce factors are important one may have the situation depicted in Fig. .3 III.

are considered. But in principle there is no need to call them in the scene. It is enough to assume that the market is open domestically and globally.

4.5. “TIME” INTERNAL ECONOMIES LEAD TO INCREASED RETURNS DOWNSHIFTING THE SUPPLY EVEN IF IT IS “SCALE” UPWARD SHAPED

Time factor allows improvement of organisation, increased skill through “learning by doing” and technical innovations that shift down the supply curves as in Fig. 4.IV and 5. In these diagrams⁶³ are represented, for the different time periods, different supply curves gradually shifting down, as a consequence of *time economies*. As a result, in both diagram, an increasing return supply curve depicts the movement of the representative firm *through time*. It a continuum, even if it should consist of discrete points. However in a Marshallian view these points do not imply big jumps but gradual adjustments. And the continuum is not a misleading picture. In Fig. 4.IV the representative firm, in each period, is in increasing returns constrained by the downward slope of its individual demand curve. The increase of demand accelerates the process of downward shift of the supply curves increasing the amount of “learning by doing”, making easier reorganisations and investments in research and innovation. These shifts in turn react on the possibility of benefiting of economies of scale in each period so that the situation of Fig. 4.IV takes place, *provided that the market system is flexible enough*. Fig. 4.V depicts a situation of the representative firm whose returns that in each period are decreasing because of constraints to of natural resources or institutional rigidities of the market system⁶⁴ Nevertheless here too time economies may operate leading to increased productivity.

Thus it is possible to have an increased product here too, even if less rapidly.

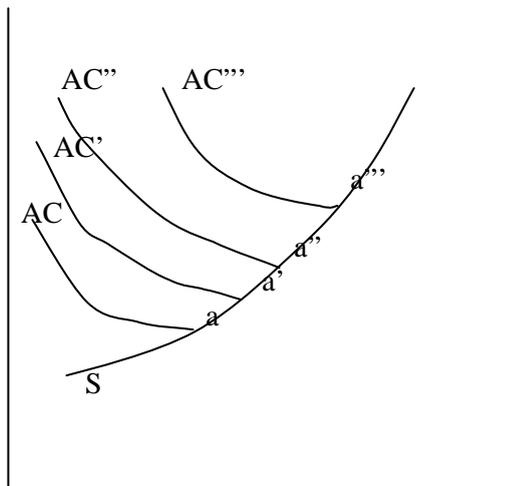
⁶³ The above diagrams are drawn following a suggestion given by Marshall in Appendix H of the “Principles”.: footnote 2, p.809, § 3. Marshall writes “ One difficulty arises from the fact that a suitable time to allow for the introduction of the economies appertaining to one increase in the scale of production is not long enough for another and larger increase, so we must fix on some fairly long time ahead, which is likely to be indicated by the special problem in hand and adjust the whole series of supply prices to it.”

“ We could get much nearer to nature if we allowed ourselves a more complex illustration. We might take a series of curves, of which the first allowed for the economies likely to be introduced as a result of each increase in the scale of production during one year, a second curve doing the same for two years, a third for three years, and so on. Cutting them out of cardboard and standing them up, side by side, we should obtain a *surface*, of which the three dimensions represented amount, price, and time respectively. If we had marked on each curve the point corresponding to that amount which, so far as can be foreseen, seems likely to be the normal amount for the year to which that curve related, then these points would for a curve on the surface, and that curve would be a fairly true long period normal supply curve for a commodity *obeying to the law of increasing returns*” (last Italics added)..

⁶⁴ This hypothesis for Marshall would be valid only in the short run, because of his assumption of elastic market relations, perhaps corresponding to the particular period of the British economy that he was considering or perhaps corresponding to his peculiar “organic” view of the long run social development.

FIG 4.III

I



The consideration of “time” internal economies obviously not only implies that the realm of increasing return may be consistent with a competitive market. It also imply that it is much bigger than what one at first sight may think. And that increasing return may be the real general rule of the “man made” economy . This view would diminish the relevance of the basic theorem about subsidising increasing return industries by taxes “elsewhere”, because very few supplies do not undergo the increasing returns law. But the suggestion would remain as to try to broaden the markets by avoiding a too high tax burden ⁶⁵ and by easing intra regional and international trade. Indeed much economies related to “time” are constrained by the size of the market. This appears to be particularly true as for technical progress

4.5. TIME INTERNAL ECONOMIES BY TECHNOLOGICAL PROGRESS

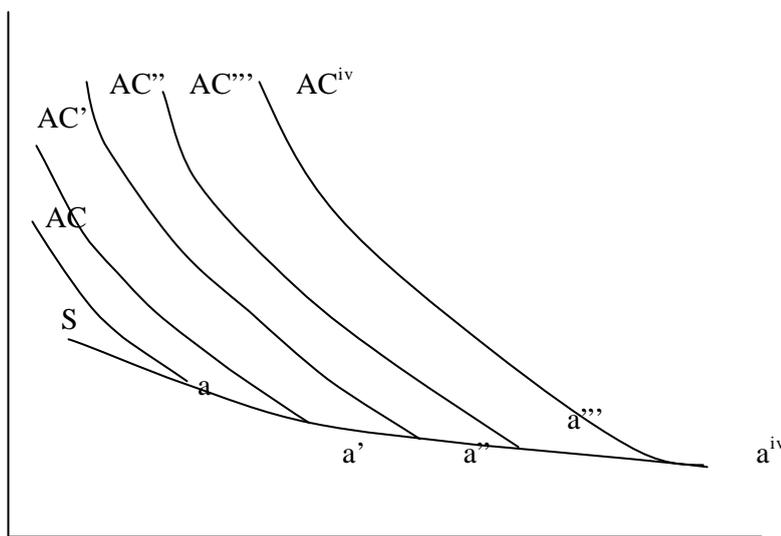
Investment in technological progress (let us call it TP) , either to produce it or to apply it by appropriate human capital, is typically a fixed costs activity, whose exploitation implies increasing returns to scale so that to be promising requires that the market should not be too small. As P. ROMER (1990) writes presenting his model of growth with endogenous technological factors “technological change arise in large part because of intentional actions taken by people who respond to market incentives.” This is certainly Marshall view and his *industry’s* increasing returns through time are certainly originated by internal economies at the firms level, both in the area of specific resources devoted to research and technical development and of improvement of human capital. And he seems to believe that even if TP (inclusive of the human capital needed to conceive and exploit it) is originally endogenous , it subsequently spills to the other firms generating industry’s and district’s external economies.⁶⁶ Being a fixed cost , TP , to be

⁶⁵ The fiscal policy implications of this suggestion shall be discussed below in the” Concluding remarks”.

⁶⁶ This theme has received much attention in recent debate on to the theory of economic growth from R.M SOLOW(1956) *A contribution to the theory of economic growth*, Quarterly Journal of Economics, n.70, February in which technological progress appeared as an important exogenous factor to. P.M. ROMER, *Increasing return and*

profitable needs an adequate expansion of the size of the firm and a perspective of persistence or growth through time of the volume of its supply in that market. The part of TP that may be internalised leading to increasing returns through time, in his reasoning, does not assure that a welfare optimum shall be attained because the economies of scale may not be enough to exploit the fruit of the investment. But clearly, the bigger the dimension of the market, the greater the stimulus to invest in technology and related skills and the more pronounced the increasing returns through time. And as we shall see, in any event, in the product of TP one shall consider not only the internal economies of the firms that created it but also the external ones that flow to the others generating additional increasing returns, so that not only the supply curve of some individual firms but also the supply curve of firm representing the average situation of the industry shall shift down, as in Fig. 4.IV. or in Fig. 5.I which relates to the sectors where, as for the scale economies, decreasing returns prevail.

FIG. 4.IV



SECTION V.

SCALE AND TIME EXTERNAL ECONOMIES ADDED TO THE INTERNAL AND GROWTH. FALLACY OF THE RICARDIAN COMPARATIVE COSTS FOR REGIONAL DIVISION OF LABOUR : THE ROLE OF INSTITUTIONS.

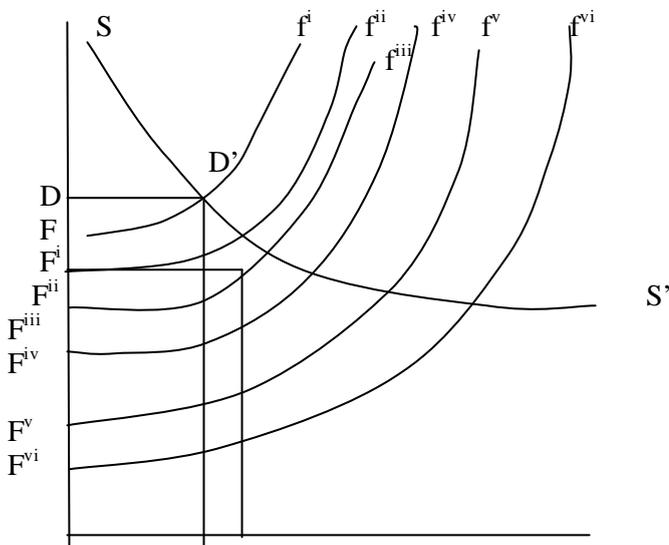
5.1. SCALE PECUNIARY EXTERNAL ECONOMIES OF DIVISION OF LABOUR CONSISTENT WITH MARGINAL DECREASING RETURNS OF THE BENEFICIARY FIRMS

External economies play a pervasive role in the entire Marshallian construct of increasing returns, so that his theory, in principle, may not need deviations from perfect competition. The most important of these

Long Run Growth, Journal of Political Economy, n.94, October; ID(1990):*Endogenous Technological Change*, Journal of Political Economy, n. 98 October where it is endogenised.

externalities, in a genuine Marshallian perspective, even under perfect competition, are those that develop through *time*, caused by *technical progress* and *improvement* of human capital. But also *scale externalities* may matter as the size of the market also under competition, is a very important condition to the development of the productivity of the given factors of production.⁶⁷ *Scale external economies*, in a Marshallian perspective consistent with perfect competition may be both real and pecuniary externalities. We shall now concentrate on the second class, deriving from inter firms specialisation. A STIGLER (1951) points out ⁶⁸ with the continued expansion of the considered industry the firms that supply the decentralised function may increase so that they are forced, by the competition among them, to pass the reductions of costs to the purchasers by reductions of prices. While the suppliers producing these pecuniary externalities are increasing return firms, the purchasers may well be increasing costs firms ⁶⁹.

FIG.5.I



Under these pecuniary scale externalities, the representative firm, assumed to operate in the decreasing returns portion of its marginal supply curve as in Fig. 5II, may find reduced its costs of production thus descending to a lower point of the industry (or district) increasing returns supply curve. This reduction of costs may also change the optimal dimension of the representative firm, in any given period of time, thus gaining a still lower point on the industry's supply curve. The increased size of the production shall allow for more specialisation in the industry thus generating new internal and external economies both at its level and at that of the firms supplying them.

⁶⁷ However in fact because competition is imperfect, in Marshall construct external economies interact with internal economies, generating a better exploitation of the returns to scale through the reduction of prices that stimulates a larger demand for the considered industry and for its suppliers. This aspect shall be examined later on.

⁶⁸ In the Section *The Function of a Firm* mentioned above.

⁶⁹ As in STIGLER (1951):“The cost curve of the product (drawn with broken lines in fig. 1) will be lower and, on present assumption, the output at which average costs are a minimum (if only one such output exists) becomes smaller”.

The representative firm equilibrium point thus may gradually go down along the industry increasing return supply curve, even if in the relevant stage of its supply the firm is operating under marginal decreasing returns that assure the existence of a stable equilibrium, *under neoclassical competition*. In Fig. 5II, under the assumption of perfect competition, the representative firm's demand curve is a straight line. The long run supply curve of the representative firm, at each size of the industry aggregate supply reaches its optimal dimension, cutting the straight line demand curve in its minimum average cost point.⁷⁰

5.2. KNOW HOW AND HUMAN CAPITAL SCALE EXTERNAL ECONOMIES

Specialisation of supplies by vertical disintegration is not the only source of scale external economies. The knowledge internal to an industry in a given area spills from individual existing firms to other existing firms or new starters both at the entrepreneurs and the workers level making easier to organise production, procurement, marketing. The learning by doing process is not only origin of internal economies through time but also of scale external economies. Successful organisational devices experienced by some firms will be imitated by others while the errors incurred by the less fortunate shall be avoided. The greater the scale of the industry the bigger the amount this atmosphere knowledge. And the fact that one firm captures some of these knowledge does not prevent another of getting the same benefits given the intrinsic nature of "public good" of them. With the increase of human capital endowment skilled labour becomes more abundant and training to new activities easier and technicians and experienced managers may move from a firm to another. Unlike knowledge, human capital cannot provide services simultaneously to more than one user. But with the increase of the scale of industrial supply there is more good human capital around and it is less likely that it becomes a scarce factor enjoying monopolistic rents.

5.3. "TECHNICAL-PROGRESS" EXTERNALITIES REAL AND PECUNIARY AND INCREASING RETURNS THROUGH TIME

The downward shifts of the supply curves in Fig. 5.I and 5.II describes time externalities, with (5.I) and without (5.II) scale economies.⁷¹ Time slices between these various supply curves may vary according to various circumstances.

These externalities that shifts of supply *through time* may be brought by the spill over of the knowledge due to inventions and technical improvements undertaken by the (most advanced) firms and by exogenous scientific progress. They may have the nature of real and of pecuniary externalities. Let us begin with the first concentrating on those produced in the market economy, as in the Marshallian treatment.⁷² We shall

⁷⁰ Remember that we are interpreting Marshall and that according to him is not the marginal firm but a representative firm which determines the long run supply price. The "representative" device simplifies our task. Indeed, as already noted, the "representative firm" condition is the miniature of the industry condition. See R. FRISCH (1950) *Alfred Marshall theory of value*, Quarterly journal of economics, esp. p. 512-13.

⁷¹ Fig. 5II implies that the time economies reduces the optimal scale of the representative firm.

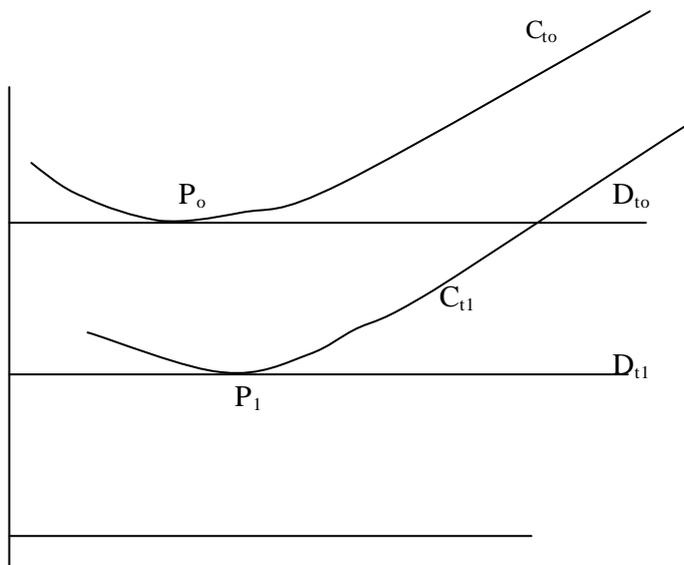
⁷² An important part of technical progress derives from scientific researches done in the Universities and in other non-firm institutions. Similarly a great part of the formation of human capital is exogenous to the market economy process. As Marshall concentrates on externalities internal to the market economy in dealing with increasing returns, these exogenous factors shall be overlooked here.

call them “tech-progress” externalities. As ROMER (1990) points out a new invention, as for instance a new technical device enabling the production of a new good that can be used to produce a given output , also increases the total stock of knowledge, thus increasing the productivity of human capital in new researches. And the owner of this new technical device created by its research investments has property rights over its use in the production but not on over its use in research where it may be used to create a new invention. This means that even for the time that the property right on that invention is valid, its tech-progress actually is only partially a private good. From the beginning, even with full property right, tech-progress is a good partially public i.e. generates external economies. ROMER example seems to specifically refer to *process* innovations for better producing existing products. But clearly also applies to research addressed to the *improvement* of existing products and/or to get *new products*. In both cases, i.e. of process or product tech-progress these externalities do not produce their effect instantaneously. To be exploited they require investment effort in human capital to extract new knowledge from that patented invention : by studying its description in the patent certification and by analysing the productive process or product in which it is incorporated. Then investment in human capital and in technical capital is required for the new researches stimulated by these tech-progress externalities. Thus they display their effects of shifting downward the supply curves only trough time and only if the scale of the expected supply is enough to justify these efforts. On the other hand the considered tech-progress externalities do not need to remain strictly internal to a given industry, even if this may often be the case. Since they do not operate by the possibility of copying the invention from which they flow, but by easing other innovations of process or of product, they may display their effects in different industries. Obviously the more these externalities arising from new inventions are important and numerous, the greater shall be the possible downward shifting of industries supply curves .

But tech-progress, aside these time “real externalities” that to be enjoyed need investments in research, may generate also other time externalities more easily obtainable, i.e. the *pecuniary* externalities deriving to the producers and to the consumers by reduced prices or by better products to perform given function in a less costly way.⁷³ There is a certain contradiction between the monopoly power that the patents on new inventions may give to the owners of the property rights and the transmission to the purchasers of the benefits of the increasing returns by reduced prices or better products. However when the fixed costs are important enough to make the supply curves rather steep and demand is quite elastic, the monopolists have the interest to reduce the prices.

⁷³ We focused on benefits of tech-progress flowing *as externalities* to *producers*, because were discussing the Marshallian externalities as for the increasing returns trough time. But obviously tech-progress may provide a great amount of consumers’ surplus also directly by the internal economies of the firms that realise it.

FIG:5.II



5.4. LOOSE PROTECTION OF PROPERTY RIGHTS AND STRICT MONOPOLY RULES REDUCE TECH-PROGRESS BUT INCREASE ITS EXTERNALITIES

As noted above the amount of technical progress conditions the amount of real and pecuniary technical progress externalities. The amount of technical-progress *real* externalities economy is conditioned by how technology property right are protected, while technical-progress *pecuniary* externalities are conditioned by the different regulations of the related monopoly powers. But the other way around also matters. If the protection of the property rights relating to technical progress is not too strict any unit of it shall be suitable to produce more externalities but the incentive to technical progress diminishes. The same shall be true if there are severe regulations of the technological monopoly powers. How to strike the balance. In a Marshallian tradition one, unlike ROMER⁷⁴ would not argue for *an a priori* rigid protection of the property rights of the firms creating tech-progress, but would consider the aggregate effects on the increasing returns through time. Indeed a less severe protection may generate an high rate of *real* externalities giving origin to additional tech-progress in such a way that, on balance, the supply curves have been shifted down more than with a severe protection producing a lower rate of real externalities. And, additionally, following Marshall suggestions as for the bounties to increasing return industries, one would provide a subsidy to firms for research creating tech progress to internalise the returns on the above externalities so that the welfare losses would be reduced and growth would be enhanced coming closer to the optimal rate.⁷⁵ On the other hand, a less severe regulation of monopoly powers relating to tech-progress would increase the

⁷⁴ We are referring to his model of endogenous technological growth as in ROMER(1990).

⁷⁵ This is also Romer’s suggestion in ROMER(1990), because even with a severe protection of the property rights on tech-progress, this it is still a quasi public good, due to the unavoidable presence of tech-progress externalities. Furthermore R. NELSON(1992) *Capitalism as an Engine of Progress*, shows that a large part of the know of how of the inventions cannot be covered by the patents.

benefits that may be derived, for a time, from the property rights on it, thus enhancing the incentive to the invest in it. Truly a lower rate of pecuniary external economies shall be thus produced on each unit of tech- progress, but also the competitors investing in tech-progress shall be more enticed to do so. And in the long run, given the presence of important real tech-progress externalities, new trees in the forest will grow to compete with the older ones.

5.5. DISTRICT INTERNAL AND EXTERNAL ECONOMIES

Fig. 5.I and 5.II may be employed to describe the network of interacting internal and external scale and time economies that may develop in an industrial district. As Stigler (1951) writes “One expects to find some relationship between the functional structure of an industry and its geographical structure localisation is one method of increasing the economic size of an industry and achieving the gains of specialisation. The auxiliary and complementary industries that must operate in cooperation can seldom do so efficiently at distance” Stigler adds that “The individual plants can specialise in smaller ranges of products and functions in highly localised industries (the size of industry in some sense being held constant)...there is also some evidence that the plants of an industry are smaller in the larger production centers ” But economies of scale are important. The vast network of auxiliary industries which we can take for granted here will not be available in small economies. Their educational institutions will be unable to supply narrowly specialised personnel; they will lack the specialists who can improve raw materials and products. At best, the small economies that imitate us can follow our method of doing things this year, not our methods of changing things next year.”

5.6. MARSHALLIAN INCREASING RETURNS UNDERMINE THE COMPARATIVE COSTS AND REGIONAL DIVISION OF LABOUR THEOREMS

Some of the “time” factors leading to downward shifts of the supply curves, as for instance those relating to the improvements in organisation, are of the same kind as those leading to the downward movements along the given supplies curves caused by increases of demand. However there is a basic distinction in shifts to the right on existing increasing return supplies and shifting these curves down. Shifting the supply curves down, may give origin to *irreversible supply curves*. And when scale economies are lost but the skills thus generated remain, in case of contraction of demand in that industry, there may be *an irreversibility* too. Obviously this shall be represented by a shift down of the curve so that even at a lower scale of supply, the cost does not go up as if the old supply curve was still valid.

Thus a temporary subsidy or a protective duty might foster the *take off* of low of given nascent industries or industrial districts. And the cessation of these measures after a while, even if may somewhat reduce the scale of the operations, shall allow a self sustaining process of production, because irreversible competitive supply curves have been reached. If this is true, the comparative advantage theorem based on diverse endowment of factors loses its meaning, in spite of the efforts of the international trade economists to claim that it is consistent with the increasing returns view.⁷⁶

⁷⁶ See for instance P. R. KRUGMAN (1994), Chapter 5, *Increasing Returns in the Theory of International Trade*.

Indeed two countries with identical factor endowment may trade between themselves *similar* products with mutual advantage of their consumers and producers merely because in this way the size of the market has been increased for both of them so that the consumers of both countries get simultaneously the benefits of a larger variety of similar products and the economies of scale of their suppliers.⁷⁷ Actually this has been demonstrated by KRUGMAN (1979)⁷⁸ under the standard assumption of Chamberlinian monopolistic competition which is actually a theoretic development of the Marshallian competition.

But why comparative advantage in factors endowments may then be still valid? First of all of what kind of factors are we talking about? Natural factors may be a minor component or even mere historical component of the development of a given industry producing factors of production, as crude steel or milk as component of cheese. Silk industry had originally, as a natural factor endowment, the production of silk worms but hardly one can explain, even historically, the success of Como's silk industry by a Ricardian comparative advantage in raising silk worms.

It may be that a country changes its comparative advantage through time because in a given overdeveloped diminishing return industry cannot have any more a relative advantage in comparison with an increasing return industry rapidly grown by tech-progress.

The international division of labour under Marshallian returns and related internal and external economies network becomes a man made reality that may be change by changes in human capital, investment in factors generating tech-progress and ,as further explained below, by institutional changes.

SECTION VI.

GENERAL EQUILIBRIUM

6.1. AT FIRST GLANCE DUE TO THE PERVASIVE NATURE OF INCREASING RETURNS THERE IS NO ROOM FOR MARSHALL THEOREM

Marshall suggests a bounty for industries where increasing return act sharply and is ready to consider a tax on diminishing return industry as the possibly best tax to finance the subsidisation scheme, as a way to minimise social distortions. The device by which Marshall passes from the one-industry model to the general model, in his maximum satisfaction theorem, is that of assuming that there is a rough sort of compensation between the loss of producer's surplus generated in these diminishing return industries where the tax is levied and the gain of producer surplus generated in those increasing return industries to which the bounty is given. Because, after that, a net gain in consumers' surplus remains, the tax-bounty scheme must have increased welfare. Marshall conceived the surplus generated in all the industries considered by him as separated each by the other. His conclusions , as seen, are reached *compounding the separate results*

⁷⁷ See J. BUCHANAN (1994) , *Introduction* p.9 to ID: (ed.) *The Return to Increasing Returns*, Ann Arbor, The University of Michigan Press.

⁷⁸ P.R. KRUGMAN, *Increasing Returns, Monopolistic Competition and International Trade*, Journal of International Economics, n.9 Nov reprinted as first Chapter of (1990) *Rethinking International Trade*.

obtained in partial equilibrium analysis. In a general equilibrium conclusion may differ. These are the issue that we must now explore.

The question that now opens to us is whether due the wide effects of increasing returns of scale and time internal and external, with the division of labour connected with the enlargement of the markets and technological progress really diminishing return industries remain. Let us begin with agriculture. Internal economies of scale may exist also here: for instance for vegetables and other perishable agricultural products, where the extent of the local market is important even if are not sufficient to prevent the representative enterprise to operate in the diminishing return phase of its marginal and average costs. The existence of internal economies of scale is revealed by the fact that the average cost curve minimum⁷⁹ is shifted more and more to the right, with the enlargement of aggregate scale of production. That is the optimum size of the firm increases, with the increase in the size of the industry⁸⁰

Furthermore increasing returns deriving from tech-progress here too clearly apply. Mechanisation allows division of labour and shift downward of cost curves by internal economies. Cost curves may shift downward due to externalities and better know how. The enormous increase of productivity in agriculture is evidence of these fact.

One may device particular situations where these economies, even if important are not enough to offset the increment in factor price due to the enlargement of the scale of production, as for instance for some exhaustible mineral sources. But are in the very long run constant and diminishing return industries an important phenomenon? The answer, except for urban soil and mineral resources and few cases of services where given human factors are unavoidable in a given amount to produce a given supply, as for some artistic performances, productivity may be enhanced by technical innovations and returns appear increasing, if enough time is allowed, at least for very long periods. Thus the question of whether returns are or not increasing appear related to the time dimension considered. And even limiting the consideration to a given rather long run period, in which diminishing and constant returns are relevant deviations from optima might result, in a partial equilibrium context, because of the presence of non exploited internal and external economies in various combinations.

6.2. IN GENERAL EQUILIBRIUM WITH PERFECT FLEXIBILITY MARSHALL THEOREM HOLDS A FORTIORI.

Marshall was aware of the difficulties entailed in the proper handling of the *ceteris paribus* clause. What it says in this respect referring to time, may be well applied to industries. "The study of some group of tendencies is isolated by the assumption of other thing being equal: the existence of other tendencies is not denied, but their disturbing effect is neglected for a time. The more the issue is thus narrowed, the more exactly it can be handled: but also the less closely does it correspond to real life. Each exact and firm handling of a narrow issue, however, helps toward treating broader issues, in which the narrow issue is

⁷⁹ Remind that both marginal and average cost curves here are long run curves.

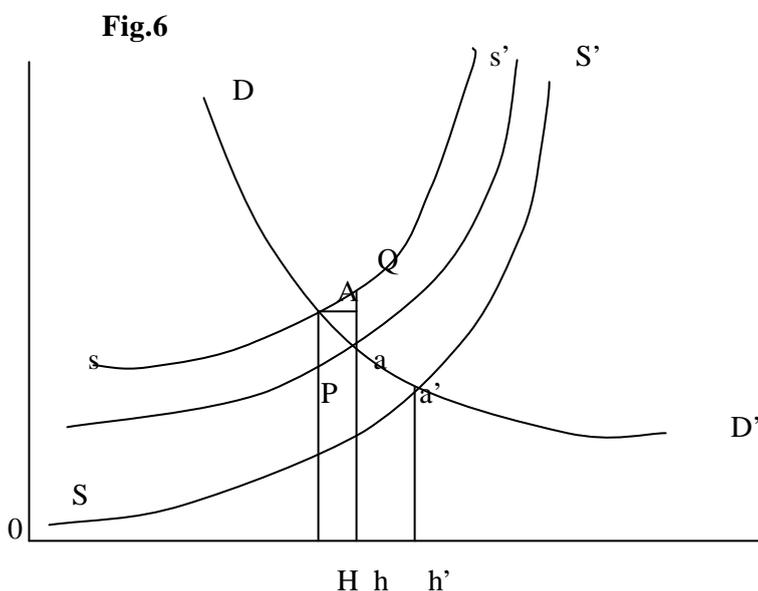
⁸⁰ Otherwise the shift to the right of aggregate supply would have required the increment in the number of the enterprises operating on the scale which, in our graph, we have reserved to the representative firm.

contained, more exactly than would otherwise have been possible. With each step more things can be left of the pound; exact discussion can be made less abstract, realistic discussions can be made less in exact than was possible at an early stage.”⁸¹

Here his analysis seems to be faulty, not, however in the sense that proofs too much, but in the opposite sense that proofs too few.

In a general equilibrium context, assuming full employment and perfect mobility of resources, if in one industry too few resources are invested, automatically it follows that in all other industries too many resources are employed. The private costs in all these other industries are artificially lower as respect to the social costs; resources here are under priced and indirect tax placed here up to a certain point increases and not decreases the total amount of consumers’ and producers’ surplus enjoyed by the community; it entails a net benefit and not a cost to be offset by the benefit gained through the subsidy.

Borrowing from J. R. HIKS (1941)⁸²



in fig. 6 we depicted the equilibrium of a diminishing return industry I.

SS' is the supply curve as seen by the representative enterprises belonging to this industry. Oh and ah are the market equilibrium output and price. However, internal and external economies are present. If only industry I is considered – that is in a strict partial equilibrium analysis – social costs appear less than private costs. $oh' > oh$ and $h'a' < ha$ are the partial equilibrium optimum output and price. But we know that in other industries too few resources are in fact invested; and a great distortion between private and social optima there exists. Then correctly considered, in a general equilibrium context, the social cost curve of industry I must be ss': the overvaluation of the costs by the private enterprises of I due to failure to take account of

⁸¹ Principles, Book V, Chapter V, §2, p.336.

⁸² J.R: HICKS (1941) *The rehabilitation of consumers' surplus* Review of Economic Studies, 1940-41, 9, p.108-16

external economies and imperfection of competition is more than offset by their under valuation of the costs which is the result of the failure to take account of the external economies and imperfection of competition existing in the other industries.

The general equilibrium optimum output in industry I is therefore $OH < Oh$; the optimum price $HA > ha$. “A tax which has the result of reducing output from h to H is a social improvement involving a gain not a loss in total surplus. The measure of the gain is the triangle AQa , but more useful to think of it as the difference between the quadrilateral $aQAP$ and the triangle Apa ; that is, the gain due to extra profits and lower prices in other industries, minus the loss of consumers’ and producers’ surpluses in the first industry. This is the difference that has to be estimated in order to see whether a contraction of the original industry is desirable”⁸³

Marshall demonstration that the gain of total surplus obtained by a bounty to industries where increasing returns act sharply (and therefore economies internal and external insert a great wedge between social and private optimum, seen in a partial equilibrium context) exceeds the loss of surplus realised by taxing diminishing return industries (where internal and external economies insert only a small wedge between social and private optimum, seen in a partial equilibrium context) is thus reinforced The excess of internal and external economies of some industries in respect to the others helps his theorem much more than he thought.⁸⁴

6.3. LIMITS TO THE ABOVE GENERAL EQUILIBRIUM CONCLUSION DUE TO ITS EXCESS OF ABSTRACTION

General equilibrium conclusion above examined follow only a highly abstract model which is far away from the realistic and less definite dynamic Marshallian universe. Full employment of resources is by no means a clear concept especially when dynamic is allowed. The process of transformation of resources from one use to other is not instantaneous and frictionless. Marshall theory of ubiquity of internal and external economies of industries and places grant us that in every place and industry a certain “latent” amount of misused factors (and of non exploited possibilities of improving given factors) exist. Technologies are not given but develop with the development of the aggregate volume of production and its repetition through time.

⁸³ HICKS (1941), p.114-5, some changes in the letters was done in order to harmonise the hicksian references with our diagram.

⁸⁴ HICKS (1941) seems to suggest that Marshall proposed the well known tax bounty scheme having perceived the general equilibrium implications of his problem. One might argue that if Marshall had in mind what Hicks holds, it was easy for him to suggest – at least for certain instances – the scheme of a tax on diminishing return industries alone as scheme alternative to the tax bounty proposal. But he did not propose and it is likely that he did not, because he had not in mind this general equilibrium formulation .A. C. PIGOU (1932), *The economics of welfare*, IVed, London Mcmellan Part,II ,Ch.IX and XI and R.F. KAHN(1935) *Some notes on ideal output*, Economic Journal, vol. XLV pp. 1-35. have extensively developed this aspect before HICKS. The novelty of the latter – as far as this point is concerned -consist in the application of the surplus technique. See however J. DE V. GRAAFF (1957), *Theoretical welfare economics*, Cambridge, University Press, Chapter II, *Corrective taxes and competition*, who argue that taxes may be insufficient to bring the optimum when the number of enterprises is wrong, because some cannot earn profits.

A tax on diminishing return industries shrinks the development of all those possibilities in the place and sector considered but it does not automatically enhance the opportunities of all other industries and places. On the opposite a subsidy on diminishing return industries, which develops further these possibilities, would not necessarily deprive all other industries of the same amount of factors, because if the bounty was not granted, the aggregate supply of factors to the community would have been lesser. To use the hydraulic analogy familiar to some general equilibrium theorists, the vases are not fully frictionless communicating if the water level in one is lowered, it is not granted that the others shall rise in the same extent and at once. Moreover their bottom is not fixed; it tends to go up with the rise of the level of water contained them and to decline with the diminution of it. The supply of labour versus leisure and supply of capital versus consumption, in Marshall universe, are by no means a fixed quantum. They depend on many causes, among which the incentive and the general atmosphere. But if the private profitability fall short the social one, in some industry, work and capital, are artificially discriminated against leisure and consumption.

6.4. LIMITS TO THE MARSHALLIAN MARKET FAILURES GRACE TO THE INTERACTION OF EXTERNALITIES

External economies in Marshall theorem play two contradictory games. On the one hand, they reduce the convenience to reach the social optimum for the firms that produce them thus getting a private revenue lower than the revenue for the society. On the other hand, they move the benefited firms rightward on lower levels of their increasing return curves in given time periods and shift their supply curves downward through time both in the *scale* increasing return and in the *scale* decreasing return industries. As many of them, as tech-progress have an intrinsic nature of public goods it would be incorrect to totally internalise them and yet because this does not happen there are maladjustment. The solution suggested *in theory* by Marshall is the bounties-tax scheme as paradigm of public planning to correct the market failures due to them as well as those due to the insufficient exploitation of internal economies of scale due to the divergence between marginal and average costs. But, as seen, a systematic planning of this kind, according to Marshall himself would be extremely dangerous. It seems to us, however, that once a truly dynamic general equilibrium perspective is adopted much of the market failures due to these externalities appear exaggerated. Indeed one must consider the *reciprocal* externalities among firms that generate tech-progress and improve human capital by learning by doing and training of the labour force and managers. One must also consider that, in the interaction thus set forth, pecuniary external and internal economies develop that otherwise could not have taken place. Thus a long run growth on the increasing return path with productivity increases and low inflation may take place.

6.5. PROBLEMS OF COORDINATION

However, in this perspective, external and internal economies of increasing return face problems of coordination that may be solved spontaneously by the market, when the spur of the entrepreneurial forces to invest, to create new initiatives and to innovate are strong enough. But if there are obstacles to them and they are weak or disappointed the Marshallian complex network leading to a long run growth path with

increasing returns may fail to operate. Inflation may develop because the increasing returns do not materialise. And restrictive fiscal and monetary policies may aggravate rather than ease the situation because, as seen, the dimension of the market is the prime drive of increasing returns of scale and time.

SECTION VII:

SOME CONCLUSIONS FOR THE CURRENT FISCAL THEORY

7.1. REDUCTION OF TAXES WITH PARALLEL REDUCTION OF SPENDING AS A WAY TO INCREASE RETURNS

Marshall' proposal of bounties to increasing return industries to be financed with general taxation or taxes on decreasing and constant return industries, derived from its maximum welfare theorem, is only a general paradigm about a general policy orientation toward favouring the development of increasing return. In this sense, as seen, in spite of all its limits, it preserves its validity in this era of important tech-progress .

We have already seen many possible policy deductions from it . It seem useful to end this revisit with two more general observations.

The first has to do the theory of fiscal policy and begins with the reasons why a cut of taxes with a parallel reduction of public spending may create growth. A normal current argument would be that fiscal downsizing shall increase the incentives to work, to undertake entrepreneurial activities, to save and to invest and therefore it shall generate more growth than a a situation with high taxes and high public spending. Public choice scholars are likely to add that, except when there are clear, huge market failures and public goods may be therefore productive of social welfare, money left in private hands may be better employed than those in public hands so that presumably allowing more resources to the market sector, they shall increase the product and the efficiency of the economy. The same view shall be applied to privatisation. All this may be true as a general indiscriminate view. However, from the Marshallian theorem one may deduce that to pour resources in increasing returns industries, at expense of decreasing or constant return sectors, increases growth and induces in the economic system a beneficial tendency to lower prices that counteracts the stimulus to inflation that tend to emerge in growing economies because of the pressures of demand on scarce resources. And therefore if one reduces public spending in areas of constant or diminishing return letting them to the market economy that it is mostly operating under increasing returns one shall increase growth, productivity and welfare and stimulate low prices, in accord with the Marshallian theorem. However not all public expenditures need to imply decreasing returns or constant return supplies. Thus, public investment may not be in this situation when it is not vertically integrated in the public hands, but it is basically done by project financing in a flexible market context.

It should be added that, if this operation is leading to increasing returns, it is wrong to imply that the reduction of spending to balance the budget needs to be, in the medium run, exactly equal to the tax cut, because there shall be an increased product. Furthermore because this policy is likely to reduce the tendency to rising price relating to high growth, it shall be possible to have a more permissive monetary policy allowing for the development of the increasing return factors that counteract this tendency. So that the tax cut shall also help to have a pro-growth monetary policy.

7.2. PRIVATISATION OF THE PUBLIC SECTOR MAY HELP GROWTH VIA INCREASING RETURNS

But this is not the end of the story and perhaps not even the most important part of it. The focus must now be addressed to privatisation of public supply, as a way to vertical disintegration and innovations promoting increasing returns. Public expenditure for education is clearly important in the Marshallian perspective of human capital as main resource for increasing returns. But education provided to a great extent via the market is more likely to be an increasing return industry. Similar views may be developed as for the health sector. And obviously the same reasoning shall be applicable to any public service that may be produced by market firms as, for instance, water supply, airports, local transportation, railways, postal services.

Some more reflection is needed as for the partial replacement of public pensions financed by the pay as you go system with private pension funds fully fiscally equalised to them. In this case, the spur to increase returns shall take place by the increased amount of savings that flows to investments, thus broadening this market both in its financial and in its real aspects.⁸⁵

7.3. INSTITUTIONS ORIENTED TO INCREASING RETURN

Scholar of economic growth are considering institutions as a factor of growth, to be considered together with the other “immaterial” endowments of human capital and tech-progress. In Marshall’ analysis institutions are in the shadow. Property rights and enforcement of contracts are implicitly assured. Yet in this (in a sense, optimistic⁸⁶) picture, Marshall shows that the “invisible hand” of market forces does not assure the optimality as for the full exploitation of the increasing returns path. He merely presents a simplified scheme of bounties and taxes to reduce the maladjustment, with cautions about the “political failures” intervening in the process of correcting the market failures. The reflection on the limits of this scheme of visible hands superimposed to the market economy invisible hands and to a tenuous institutional frame leads to think about the role of the institutions that infrastructure the market economy, from the point of view of obstructing or easing the development of increasing returns. A starting point may be the seminal analysis of D. NORTH (1990)⁸⁷ in terms of “increasing return institutions” of politics and of economics favourable to growth. Central to North’s conceptions are the recognition and the respect of the property rights on the resources owned or obtained by exchange and on the fruits of the innovations and the reduction of the transaction costs. Clearly these, as seen, are prerequisites of the development of the Marshallian increasing returns. High transaction costs may limit the division of labour and the

⁸⁵ See on this point J.M. BUCHANAN (1992, 1994) *The Supply Of Labour And The Extent Of The Market, In Michael Fry Adam Smith’s Legacy Is Placed In The Development Of Modern Economics, London Routledge, Reprinted In BUCHANAN AND YONG J.JOON (1994) The Return To Increasing Return, Ch. 10.*

⁸⁶ Realistic because reflecting the British situation as observed by Marshall himself at the beginning of the twenty century.

⁸⁷ D:C: NORTH, (1990) *Institutional Change and Economic Performance*, Cambridge, Cambridge University Press.

development of scale internal economies. inefficient protection of property rights may severely limit the investment in tech-progress. But to limit the endogenous institutions in optimal growth model to this setting⁸⁸ amounts to assume that there is only one possible definition of property rights and that it does not exist any problem of choice about the regulations that increase transaction costs, in relation to their effects in promoting or limiting growth and between the pursuance of this or other objectives. The perspective of “increasing return” institutions promoting increasing returns begins from where NORTH paradigm stops. Certainly the ends of a “good society” cannot be reduced to economic growth. But the Marshallian perspective of increasing returns implies growth with increasing remuneration of the various factors of production without inflation, overcoming the natural scarcities by human progress. And, consequently, models of growth with endogenous institutions promoting increasing returns in a (near) optimal way may be worth of being pursued.

⁸⁸ Clearly important particularly as for the underdeveloped countries and regions.