Returns to Scale and Marshallian Economics

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His [Marshall's] analysis of the Laws of Return brought order and meaning to the theories of Smith, Ricardo and Marx. But his reconciliation of decreasing cost and competitive equilibrium via the notions of external economies, monopolistic competition, and the representative firm,...., raised false problems that took the best efforts of a generation of economists to solve. (Blaug,1962,p.399).

The chief aim of this article will be to consider critically the above claim by Blaug, made in relation to a dilemma which emerged from Marshall’s attempts to construct a theoretical framework capable of providing an “engine for the discovery of concrete truths” to be directed to the cause and cure of poverty. In order to evaluate Blaug’s conclusions, it is important to consider the nature of the logical difficulties encountered by Marshall and his followers in their attempts at adequately incorporating the “Laws of Return” (and increasing returns in particular) within the theoretical frameworks which have developed from Marshall’s original contributions. To anticipate the conclusion, I argue that:

(i) Marshall’s analysis of returns to scale did not bring “order and meaning” to classical value theory - rather Blaug shares Marshall’s own misinterpretation of the purpose of classical value theory and the role of the “Laws of Return” in the “classical” scheme, and

(ii) The generation of economists who followed in Marshall’s footsteps, or even more significantly those who adopted alternative “marginalist” frameworks, have not “solved” the “reconciliation problem”, but have instead constructed theoretical models which are incapable of confronting the issues. The nature of Marshall’s struggle was not fully understood by his contemporaries, nor by subsequent critics and supporters.

The Laws of Return and Marshall’s Theory of Value
This section considers the approaches adopted by Marshall in his attempt to satisfactorily provide an analysis of the operation of the Laws of Return within the
context of the theory of value he constructed in his *Principles of Economics*. Marshall is most often remembered by his followers for the role he played in developing tools of analysis of particular relevance to what became popularly known as the ‘partial equilibrium’ approach. This method of analysis, described by Marshall “not quite accurately” as the “statical method”, was seen to represent a “scientific device” used by “sensible men for time immemorial” to deal with forces which were “so numerous, that it is best to take a few at a time; and to work out a number of partial solutions as auxiliaries to our main study”. [*Principles* p.xiv]². Marshall viewed this method of analysis as representing an appropriate starting point for economic analysis on the grounds that:

The theory of stable equilibrium of normal demand and supply helps indeed to give definiteness to our ideas; and in its elementary stages it does not diverge from the actual facts of life, so far as to prevent its giving a fairly trustworthy picture of the chief methods of action of the strongest and most persistent group of economic forces [*Principles*, p.461]

However Marshall was well aware of the limitations associated with this form of analysis. In the paragraph immediately following that containing the passage quoted above, Marshall warned his readers in the following manner;

The statical theory of equilibrium is only an introduction to economic studies; and it is barely even an introduction to the study of the progress and development of industries which show a tendency to increasing return. Its limitations are so constantly overlooked, especially by those who approach it from an abstract point of view, that there is a danger in throwing it into definite form at all [*Principles*, p.461]³

In this passage Marshall refers specifically to the difficulties associated with studying the “progress and development of industries which show a tendency to increasing returns” within the confines of “statical theory of equilibrium”. It is these difficulties which came to be known as the ‘reconciliation problem’ associated with Marshall’s theory of value.

The term ‘returns to scale’ has been the subject of diverse interpretation and its meaning and content has not been unambiguous. At the theoretical level, the term has acquired a precise meaning in current usage, being represented by a homogeneity condition in the context of the ‘production function’. Increasing returns corresponds to a situation where output increases in a greater proportion than does the vector of inputs.⁴ It is important to note that this condition would only imply the existence of ‘decreasing costs’ if input prices were invariant to changes in the scale of production. This situation would occur if the productive unit existed in a ‘competitive’ market where all prices were independent of the output quantities of individual producers. It is also important to distinguish between ‘returns to scale’ and what has come to be known as the ‘law of diminishing marginal returns’, which is concerned with the ‘short-run’ relationship between variations in output and the quantity of an input on the assumption that the quantity of at least one of the other inputs used in the production process is fixed. Failure to distinguish between the concepts discussed in this paragraph has contributed to the misinterpretation and ambiguity associated with the operation of the laws of return in competing economic models.
Marshall's Representation of Increasing Returns

In *Principles* [pp.318,319], Marshall defines the law of increasing return as;

An increase of labour and capital leads generally to improved organisation, which increases the efficiency of the work of labour and capital.....Increasing Return is a relation between a quantity of effort and sacrifice on the one hand, and a quantity of product on the other.

At this initial stage four important aspects of Marshall’s treatment of the laws of return should be noted. As the passage quoted above indicates, Marshall saw increasing return as a relation of quantities. However, the distinction between returns to scale and long-run normal costs of production is clouded in Marshall’s *Principles*, to the extent that Pigou (1946,p.216) was to suggest that Marshall’s “increasing returns” should be replaced by “decreasing supply price”. The important point at issue here is not one of definition but a failure to recognize the possibility of independent forces determining outputs and costs. This represents an important point of departure between Marshall’s interpretation of the role of the ‘Laws of Return’ from that to be generally found in the value theory of his ‘classical’ predecessors.

Secondly, as observed by Stigler (1941,p.68), Marshall’s treatment of the ‘law of increasing return’ is subject to criticism because of the failure to recognize that this law is not at all parallel with Marshall’s statements concerning a ‘tendency towards diminishing returns’. This “tendency” was specifically applied by Marshall in the context of “equal successive doses” of labour and capital to a fixed quantity of land (i.e. an “old country”). It is therefore inconsistent of Marshall to define “constant returns” as arising “if the actions of the laws of increasing and diminishing return are balanced”, such that “an increased produce is obtained by labour and sacrifice increased just in proportion.” [Principles, p.318].

The third aspect of Marshall’s treatment of increasing returns which needs to be noted is that, in a fashion similar to the modern demand and supply theorists, the long-run supply schedule is drawn on the assumption of ‘given technology’ –“We exclude from view any economies that may result from substantive new inventions; but we include those which may be expected to arise naturally out of adaptations of existing ideas”. [Principles, p.460].

Finally, it is important to record the distinction drawn by Marshall between ‘internal’ and ‘external’ economies of scale. External economies are defined as “those dependent on the general development of the industry”, while internal economies are “dependent on the resources of the individual houses of business engaged in it, on their organisation and the efficiency of their management”. Three major classes of internal economies are isolated - those generated through increased subdivision of labour; increased specialisation of the managerial function and those arising as a result of creative innovations in the organisational and mechanical aspects of production. External economies are treated less precisely by Marshall. Two general types can be isolated, however. Economies arising from “the use of specialised skill and machinery” depending on “the aggregate volume of production in the neighbourhood” are one type. The other involves “especially those connected with the growth of knowledge and the progress of the arts” and which depend on the “aggregate volume of production in the whole civilised world”. [Principles pp.265-266]. Significantly, both classes of economies of scale only make sense in a situation of growth.
The ‘Reconciliation Problem’
The following passage from *Principles* most clearly represents Marshall’s assessment of the logical difficulties associated with reconciling the existence of increasing returns with the attainment of equilibrium in the context of normal supply and demand conditions.\(^\text{12}\)

In fact when the production of a commodity conforms to the law of increasing return in such a way as to give a very great advantage to large producers, it is apt to fall almost entirely into the hands of a few large firms; and then the normal marginal supply price cannot be isolated on the plan just referred to, because the plan assumes the existence of a great many competitors with businesses of all sizes, some of them being young and some old, some in the ascending and some in the descending phase. The production of such a commodity really partakes in a great measure of the nature of a monopoly; and its price is likely to be so much influenced by the incidents of the campaign between rival producers, each struggling for an extension of territory, as scarcely to have a true normal level. \(^{\text{13}}\) *Principles*, p.397.

In a later footnote Marshall repeats this argument, and at the same time is critical of other writers for failing to realise the full implications of the dilemma presented by the existence of increasing returns:

Some, among whom Cournot himself is to be counted, have before them what is in effect the supply schedule of an individual firm; representing that an increase in its output gives it command over so great internal economies as much to diminish its expenses of production; and they follow their mathematics boldly, but apparently without noticing that their premises lead inevitably to the conclusion that, whatever firm gets a good start will obtain a monopoly of the whole business of its trade in its district. While others avoiding this horn of the dilemma, maintain that there is no equilibrium at all for commodities which obey the law of increasing return; and some again have called into question the validity of any supply schedule which represents prices diminishing as the amount produced increases. \(^{\text{14}}\) *Principles*, p.459.

The dilemma confronting Marshall therefore was to reconcile a strongly held conviction that increasing returns were widespread and played a key role in industrial expansion, with the observation that monopolisation was not the natural outcome of this process. The significance of the dilemma to the satisfactory development of Marshall’s value theory is captured in the following extract of a letter to A.W. Flux dated March 7, 1898:

My confidence in Cournot as an economist was shaken when I found that his mathematics re I.R. [Increasing Return] led inevitably to things which do not exist and have no near relation to reality. One of the chief purposes of my Wander-jahre among factories, etc was to discover how Cournot’s premises were wrong. The chief outcome of my work in this direction, which occupied me a good deal between 1870 and 1890, is in the “Representative firm” theory …… (Pigou 1925, pp.406-407, Marshall’s emphasis).\(^\text{15}\)

From the above passages, Marshall’s early thinking about the ‘reconciliation problem’ was clearly much influenced by his critique of Cournot’s analysis of the problem. Cournot (1838, pp.91-2) was of course aware of the potential difficulties
associated with decreasing costs, acknowledging that in such a situation "the effect of monopoly is not wholly extinct" and that therefore competition may not be great enough to ensure that an individual producer would not be able to affect price by a "perceptible extent". Marshall's early criticisms of Cournot were concentrated on logical inconsistencies arising from Cournot's implied assumption of the independence of costs between (profit maximising) firms when decreasing costs prevail. His later criticisms of Cournot concentrated on Cournot's failure to realise the magnitude of the logical difficulties arising when "the effect of monopoly is not wholly extinct", along with his failure therefore to investigate the existence of forces which may counteract the tendency towards monopolisation induced by 'decreasing costs'.

Marshall's recognition of the logical difficulties associated with the reconciliation of increasing returns and static equilibrium theory can be observed in his early writings on the theory of value. In his earliest (extant) systematic analysis of value theory, *Early Essay on Value*, Marshall's attempts to establish an operational relationship between "supply price" and scale of production indicated an awareness of Cournot's problem. In his discussion of markets [class "D"] in the context of a time horizon later referred to as the long period in *Principles*, the possibility of downward sloping supply curves is specifically identified. Discussion is centred on the problems arising because of the prospect of "multiple equilibria", however reference is also made to the possibility of "displacement of small manufactories by one or a few large ones". [Marshall, 1975a,p.151]. In addition, the Essay makes indirect reference to what Marshall was later to term 'external' economies, and to issues which later came to the attention of the early theorists of imperfect competition. In *The Pure Theory of Foreign Trade*, Marshall (1975b, p.144) again refers specifically to circumstances where the "difficulty of producing" a country's exports "diminishes rapidly when their amount increases". Many of the concepts raised tentatively in Essay were developed further in Marshall's privately circulated *Pure Theory of Domestic Values*, probably written almost 15 years before the publication of the first edition of *Principles*. Here Marshall further develops the concept of 'external economies', and draws a distinction between these economies and those he later called 'internal' economies. In *Pure Theory* Marshall also mentions the possibility of 'irreversibilities' because of the existence of returns to scale - a subject which later received attention in Appendix H of the *Principles*. Marshall (1975b,p.202) argued that extensive economies were not readily lost as "Developments of mechanical appliances, of division of labour and of organisation of transport, when they have been once obtained are not readily abandoned". Marshall refers to such a situation as an "unstable equilibrium" and argued that such an occurrence would necessitate at least a "partial re-drawing" of the supply curve.

Marshall's early writings offer little on the factors which may constrain the expansion of firms induced by the availability of decreasing costs. In the Essay, while discussing the possible displacement of small manufactories by a few large ones, Marshall (1975a,p.151) simply argued that it "cannot in general happen without a social change" which by "the very definition of the curves" were excluded. According to Marshall the assumption reflected a situation where the smaller the amount produced the more difficult it is to "start and keep employed large manuf actories", a difficulty which remains "in general tolerably constant for any given set of social
conditions”. It is in *Economics of Industry*, first published in 1879, that Marshall first introduces the concept of the biological analogy of a natural life cycle. Here a situation is described where industries could be concentrated in the hands of a few wealthy firms created by men with “practical genius” who were able to ensure that their “successors for several generations should have a like genius”. It is added however that: “in the whole course of history we meet with but very few instances of private firms which have been managed with eminent genius for three generations in succession” (Marshall and Marshall 1881, pp.141-2). Here we can observe a forerunner to the ‘trees in the forest’ analogy which many readers of Marshall’s *Principles* interpreted as performing a crucial role in the ‘reconciliation’ process.

**Marshall’s ‘Solutions’ to the Reconciliation Problem**

Attention can now be focused on the analytical devices which readers of *Principles* have isolated as attempts made by Marshall to overcome the ‘reconciliation problem’ outlined above.

Emerging from Marshall’s early treatment of the laws of return is the clear implication that Marshall could not accept a theoretical ‘solution’ to the ‘reconciliation problem’ which relegated to low ranges of output the operation of returns to scale. This is not to say that Marshall failed to postulate any limit to the operation of increasing returns. Whilst not envisaging ‘diseconomies of scale’ of the variety later to be associated with the ‘U’ shaped long-run average cost curve, Marshall did suggest that, as a result of forces operating from within the firm, some limits may exist to the operation of internal returns to scale. These related to the “cumbersome system of checks that are necessary in the business of a large firm” and possible communication and information difficulties. *Principles*, p.284. However it was in forces external to the individual firm, along with ‘biological’ concepts of competition, which were to play the key role in the ‘reconciliation’ process suggested in Marshall’s *Principles*.

Traditionally commentators, adopting what A. Levine (1980) has referred to as the “consensual” view of Marshall’s reconciliation exercise, have isolated three major vehicles through which Marshall appeared to launch his attempt at confronting his ‘notorious dilemma’. These vehicles, all of which are listed in *Principles*, Book V Chapter 12 (section 2), may be referred to as:

i. Biological analogies associated with the ‘life cycle of the firm’ assisted by the notion of the Representative Firm

ii. External economies

iii. Market imperfections

Most writers adopting the ‘consensual’ approach argue, as Negishi (1988, p.27) for example does, that Marshall placed the main burden in solving the ‘reconciliation problem’ on his life cycle theory of firms. The external economies explanation was the route most often pursued by Marshall’s contemporaries and immediate followers, such as Pigou in particular. The third ‘vehicle’ listed above is particularly interesting as it is also concerned with questions relating to the precise nature of the object of the reconciliation exercise in Marshall’s *Principles*. 
Biological Analogies and the Representative Firm

It is not surprising that Marshall should have turned to biological analogies in his attempts to incorporate the operation of returns to scale into his theoretical system. In Appendix B of Principles Marshall discusses the significance of the "great stride forward in the speculations of biology" to the growth of economic science, while in the Preface Marshall presents his now famous claim that "The Mecca of the economist lies in economic biology rather than in economic dynamics". [Principles, p.xiv]. The task Marshall allocates to his biological analogy is basically one of illustrating how internal economies may not be fully exploited by an individual firm because of limits to its productive life span. According to Marshall;

Nature still presses on the private business by limiting the length of the life of its original founders, and by limiting even more narrowly the part of their lives in which their faculties retain full vigor. And so, after a while, the guidance of the business falls into the hands of people with less energy and less creative genius, if not with less active interest in its prosperity. [Principles, p.316].

As a result, "the full life of a firm seldom lasts very long", as the firm is likely to "ere long quickly to decay" having lost the "exceptional energy which enabled it to rise". [Principles, p.287]. The process is further illustrated in Marshall's famous analogy, where the growth of business is likened to the growth of trees in a forest:

But here we may read a lesson from the young trees of the forest as they struggle upwards through the benumbing shade of their older rivals. Many succumb on the way, and a few only survive; those few become stronger every year, they get a larger share of light and air with every increase of their height, and at last in their turn they tower above their neighbours, and seem as though they would grow on for ever...but they do not. One tree will last longer in full vigour and attain a greater size than another; but sooner or later age tells on them all. Though the taller ones have a better access to light and air than their rivals, they gradually lose vitality; and one after another they give their place to others .... [Principles, pp. 315-316].

However, from the 6th edition of Principles in 1910, Marshall added a significant qualification to the 'trees in the forest' analogy by acknowledging the growing importance of joint-stock companies. Marshall conceded that because of the "great recent development of vast joint-stock companies", his "general rule" of eventual stagnation "is far from universal" [Principles, p.316]. As a result such an organisation could under "favourable circumstances .. secure a permanent and prominent place in the work of production". [Principles, p.316]. However, at least in Principles, Marshall did not consider that this qualification substantially altered his general proposition, as he considered it "likely" that joint-stock companies would eventually lose much of its "progressive force" such that "the advantages are no longer exclusively on its side in its competition with younger and smaller rivals".

In Industry and Trade, joint-stock companies command a much more significant role in Marshall's scheme. Here Marshall (1920a, p.315) argues that joint stock control had become "general even in regard to manufacturing and other industries which have an urgent need for alert and versatile administration". Because such entities tend not to materially dwindle with age, Marshall (1920a, pp.315-316) conceded that joint-stock companies do not face the same order of difficulties as the
smaller nineteenth century firms did on the score of maintaining their vigour unimpaired. As Hague (1958, pp. 684-5) suggests, Marshall’s discussion of joint-stock companies in *Industry and Trade* represents a significant weakening in Marshall’s commitment to the life cycle analogy and his conviction that small firms could survive in a world characterised by increasing returns. However there can be little doubt that in *Principles* Marshall believed that his biological analogy of a firm’s life cycle played a crucial role in providing a solution to the compatibility problem associated with increasing returns and equilibrium associated with ‘normal’ supply and demand conditions.

If accepted, Marshall’s life cycle theory of firms clearly implied that a position of long-period equilibrium for an industry coincided with a situation in which individual firms are at disequilibrium. In this context the notion of the “marginal firm” can have no operational role for the derivation of long-period normal supply conditions, and Marshall replaced it with the theoretical construct of the Representative Firm. The Representative Firm is “representative” of an industry in the sense that it has “normal access to the economies, external and internal, which belong to the aggregate volume of production”. (*Principles*, p. 317). It can be seen as corresponding to the miniature of an industry, and it is “its marginal costs on which we fix our eyes” when “normal” long-period supply price is being discussed. (*Principles*, p. 460).

While Marshall considered a study of the expenses of a representative producer as essential to his analysis of supply when returns to scale prevail, many commentators have argued that this rather hazily defined concept adds nothing of significance to Marshall’s analysis of long-period supply. While claims made by writers such as Robbins (1928, p. 386) and Williams (1978, p. 100) that the concept was in fact “conceived as an afterthought” by Marshall may be contested, it is difficult to dispute Shackle’s (1967, p. 45) conclusion that the “Representative Firm is an expository, not an analytical device”. The Representative Firm can be seen simply as a device which ‘selects’ the appropriate ‘tree’ to illustrate the general conditions of the ‘forest’, and ceases to perform the role allocated to it by Marshall if the biological analogy is rejected.

### External Economies

The theoretical validity of Marshall’s treatment of external economies has been the subject of some debate. As Arndt (1955, p. 192) emphasises, Marshall’s interest in external economies appears to have been twofold. Firstly along with internal economies they represented one of the chief sources of economic progress, and secondly “they provided a partial answer to the problems posed for partial equilibrium analysis by the phenomenon of increasing returns”. Stigler (1941, p. 68), emphasising the importance of the second of these two objectives, claimed that it is the existence of external economies, and not, as others had suggested, that of the Representative Firm, which permits reconciliation of competition and decreasing long-run average costs.

From the text of *Principles*, it is difficult to isolate the precise nature of the relationship Marshall believed existed between internal and external economies.
Jenner (1964-5) has suggested that external economies may be interpreted as operating to shift to other firms in the industry the efficiency advantages gained by the 'vigorou's' producer who may be realising increasing returns. Alternatively, since external economies are accessible to the whole industry, and indeed other industries, they may support competition in the sense that "the prices of the products will keep close to a level which yields only a normal rate of profits to that class of industry" [Principles, p.615]. In this respect external economies may be contrasted with internal economies, the potential destroyers of competition. Despite his extensive discussion of the significance of internal economies in Principles, Marshall 'apparently' believed that external economies were more important than internal economies:

we have seen how the economies which result from a high industrial organisation often depend only to a small extent on the resources of individual firms. Those internal economies which each establishment has to arrange for itself are frequently very small as compared with those external economies which result from the general progress of the industrial environment. [Principles, p.441, Marshall's emphasis].

However, in his conclusion to Book IV of Principles Marshall implies that the existence of external economies does not in fact limit firm size or the extent to which internal economies may be realised:

The general argument of the present Book shows that an increase in the aggregate volume of production of anything will generally increase the size, and therefore the internal economies possessed by such a representative firm; that it will always increase the external economies to which the firm has access; and thus will enable it to manufacture at a less proportionate cost of labour and sacrifice than before. [Principles, p.318].

Marshall's most direct analysis of the dilemma presented by increasing returns to the theory of long-period normal equilibrium is to be found in Chapter XII of Book V and Appendix H. Significantly, this analysis did not include any reference to the notion that the solution to the reconciliation problem could be uncovered through the existence of external economies. It is difficult therefore to support Jenner's (1964-5,p.32) assertion that Marshall viewed external and internal economies as "exactly counterposed forces: external economies negate the advantages gained by internal economies". Rather, the external economy 'solution' was the path to be chosen by many of Marshall's immediate followers, until its rather unhappy destination was illuminated by Sraffa and others during the 'Marshallian' value theory debates of the 1920s.

Market Imperfections

Clear statements on market structure definitions are not to be found in Principles. As Andrews (1951) and Hague (1958) have highlighted, it is essential to distinguish between the type of market structure being discussed during the first few chapters of Book V in Principles and Marshall's later discussion of manufacturing industries. In Chapter Three of Book V Marshall makes what he terms a "provisional" assumption of "much free competition" in which "the forces of demand and supply
have free play” amongst independently acting buyers and sellers. All participants have “sufficient knowledge of what others are doing” to prevent them “from taking a lower or paying a higher price than others are doing”. As a result of these assumptions “there is only one price in the market at one and the same time”. [Principles, pp 341-342]. This type of model is applied to his simple example of a fishing industry undergoing a once-and-for-all change in demand. While Marshall [Principles, p.341] emphasises clearly that such assumptions must be seen to be only provisional; “we will have to inquire further, how far these assumptions are in accordance with the actual facts of life”, it is in this very context that Marshall’s ‘notorious dilemma’ is most often discussed.

Therefore to many of Marshall’s followers and critics the challenge Marshall’s dilemma presented was the reconciliation of returns to scale with the existence of ‘competitive equilibrium’, with the latter characterised by price taking behaviour by firms each of which reacts passively to the ‘freely operating’ forces of Demand and Supply. However Marshall’s discussion of manufacturing and large scale production in Principles clearly encompasses a market structure more complex than that described in his ‘provisional’ assumptions used in the preliminary discussion of equilibrium found in the early chapters of Book V36. Significantly, in his discussion of manufactures the object of Marshall’s reconciliation exercise appears to differ substantially from the configuration which came to be formally defined as ‘competitive equilibrium’37. Moreover the departures from the ‘free competition’ made explicit in his discussion of such industries presented to Marshall a further, if incompletely considered, ‘device’ to assist him in his explanation for the absence of monopolisation induced by increasing returns to scale.

In his discussion of manufactures in Book V of Principles, Marshall drew a distinction between what could be termed ‘general’ and ‘particular’ markets. The precise nature of the relationship between ‘general’ and ‘particular’ markets was never clearly specified in Principles, although Hague (1958, pp.678-680) presents a case which suggests that it may be plausible to view ‘general’ markets as being the sum total of the ‘particular’ (or ‘special’) markets of the firms in the industry. Significantly, manufactures were seen as being “adapted to special tastes”, and thus tended to be confined “more or less to its own particular market”. [Principles, pp.457-458]. Therefore, as Shove (1930, p.106) suggests, manufactures could be seen as representing “substitutes but not perfect substitutes”. Because it was therefore likely that in the case of manufactures each firm was likely to be confined to its own ‘particular’ market, Marshall argued that:

any hasty increase in its production is likely to lower the demand price in that market out of all proportion to the increased economies that it will gain; even though its production is but small relatively to the broad market for which in a more general sense it may be said to produce. [Principles, p.458, emphasis added].

It can be seen quite clearly here that once Marshall’s analysis escapes from the ‘provisional’ assumptions of ‘free’ competition it makes no sense at all to speak of the forces of demand and supply achieving an industry equilibrium characterised by the existence of ‘only one price in the market at one and the same time’. Firms can no longer be assumed to be passive price takers with ‘perfectly elastic’ demand curves. This point is strongly reinforced by the following important footnote from Principles [p.458]:
This may be expressed by saying that when we are considering an individual producer, we must couple his supply curve—not with the general demand curve for his commodity in a wide market, but—with the particular demand curve of his own special market. And this particular demand curve will generally be very steep; perhaps as steep as his own supply curve is likely to be, even when an increased output will give him an important increase of internal economies. [Principles, p.458].

As many commentators have noted the passages quoted above from Principles are highly suggestive of the ‘solution’ presented by Sraffa (1926) and of the models of ‘imperfect competition’ which emerged in the early 1930’s. Liebhartsky’s (1955) study shows that the links between Marshall’s analysis and those later developments can be discovered even more clearly in Marshall’s much neglected Industry and Trade, particularly in Marshall’s (1920a, p.397) discussion of ‘conditional monopoly’ where “though monopoly and free competition are ideally widely apart, yet in practice they shade into one another by imperceptible degrees”. However, while Marshall’s discussion of departures from ‘free competition’ appears to parallel Sraffa’s (1926) call for the abandonment of the assumption of ‘perfect competition’, it is difficult to dispute Shackle’s (1967, p.11) conclusion that “Marshall did not argue strictly enough to be embarrassed by this situation”. One reason for this was that while Marshall may have provided all of the ‘bricks and mortar’ necessary for a theory of ‘imperfect competition’ the ideas were not developed sufficiently to form an essential part of the foundations of the theoretical structure being constructed.

Perhaps more significantly, the concept of ‘free competition’ from which his analysis was departing differed in many significant respects from the concept of ‘perfect’ competition which had come to represent the object of the reconciliation dilemma and ‘target’ of the value theory controversies during the 1920’s. As Stigler (1957, p.9) stated, Marshall’s treatment of ‘competition’ was much closer to Adam Smith where competition did not coincide with a particular ‘situation’ but represented an active process, than to that of his contemporaries. As writers such as McNulty (1967) and Williams (1987) have argued, Marshall’s representation of ‘competition’ needs to be carefully distinguished from the ‘large numbers, homogeneous product’ concept originating with Cournot and subsequently developed and formalised by writers such as Edgeworth, Pareto, J.B.Clark and Knight. To Marshall ‘free competition’ was generally seen as corresponding to a situation of openness of entry and the availability of information to independently acting agents. A major point of departure between the two concepts is the distinction between competition as a behavioural activity and competition as a market structure. To the extent that it can be said Marshall adopted the former and his followers the latter interpretation, a change in the precise nature of the object of the reconciliation exercise is observable. Therefore it is not surprising that the ‘imperfect competition solution’, at least in the form which Sraffa (1926) was to present, did not appeal to Marshall as having a direct role to play in the reconciliation process.

Market ‘imperfections’ had a less direct role to play in Marshall’s search for a ‘solution’ to the reconciliation problem. Marshall believed that marketing difficulties placed constraints on the ability of a firm to expand its output to the extent required to exploit returns to scale. Marshall’s argument is captured in the following passage:
The rise of a firm may be prolonged if he can hand down his business to a successor almost as energetic as himself. But the continued very rapid growth of his firm requires the presence of two conditions which are seldom combined in the same industry. There are many trades in which an individual producer could secure much increased "internal" economies by a great increase of his output; and there are many in which he could market that output easily; yet there are few in which could do both. And this is not an accidental, but almost a necessary result. [Principles,p.286].

The major reason for these 'marketing difficulties' according to Marshall was that "many commodities with regard to which the tendency to increasing return acts most strongly are, more or less, specialties: some of them aim at creating a new want, or at meeting an old want in a new way". [Principles,p.287]. As a result "the sales of each business are limited ... to the particular market which it has slowly and expensively acquired". It was therefore the difficulties associated with expanding sales in a 'particular market' which Marshall believed contributed to an explanation for the absence of monopolisation (of a 'general' market) and the continued existence of small firms despite the widespread potential for the realisation of increasing returns to scale.

A.L. Levine's 'Alternative' Interpretation and 'Dynamic' Aspects of Returns to Scale

A.L. Levine (1980, pp.269-70) states that he has "no great quarrel" with the role assigned to 'external economies' and 'market imperfections' in what he termed the "consensual" interpretation of Marshall's reconciliation exercise. The major cause of Levine's discontent with the 'consensual' interpretation is his belief that Marshall did not intend the "biological folklore which is the life cycle of the firm" to serve as a vehicle for effecting "competitive dispensation". He argues that such a belief represents a basic misconception of Marshall's intent, "assuming again that his [Marshall's] intentions were reflected in his actual performance." Support for his view, he claimed, was to be found firstly in his belief that the trees in the forest and like analogies were "largely the stuff of secular change" and not in the domain of the 'long-period' in which the reconciliation exercise was being analysed. Secondly he argued the "biological analogy solution" implied a degree of "generalization" inconsistent with Marshall's "particularization" which Levine believed was implied by Marshall's general methodological stance. Levine further argues that the "analytical specifics" provided by Marshall for the reconciliation exercise "were dynamic, but they came not from biology".

However, on the basis of the arguments presented, it is difficult to accept Levine's conclusion that Marshall did not intend his 'biological analogies' to play a significant role in the reconciliation exercise. The passages quoted from Principles above would add little support to Levine's claim. It is important to note that an acceptance of the 'consensual' interpretation in this context does not imply a judgment of the ability of Marshall's biological analogies to perform their designated tasks, but merely a recognition of the important role Marshall intended such analogies to play.
The ‘dynamic but not biological analytical specifics’ of the reconciliation process emphasised by Levine (1980, p.270) referred to the “slow, imperfect adjustment of the firm through time”. Using examples from Principles, Levine (pp.270-272) pointed to limitations placed on the expansion of the markets of individual firms, constraints which are then linked with Marshall’s (Principles, p.460) statement that “we do not expect […] the true long-period marginal cost” to fall immediately in consequence of an … increase in demand”. In this sense, Levine (1980, p.273) supported Shove’s (1930, p.109) conclusion that “the solution to the problem turns, as Marshall saw, on the element of time”.

However it is important to note that the long-period supply curve is developed by Marshall under the assumption that “those economies that normally result from an increase in the scale of production …have time to develop themselves” (Principles, p.497, emphasis added). Therefore the ‘slow, imperfect adjustment of the firm over time’ can not affect the ability of the long-period supply curve to incorporate the existence of returns to scale. The chief difficulty arising in this context is the operational meaning which can be attributed to the long-period supply curve. The problem of time in the reconciliation process as discussed by Levine would in fact appear to arise directly from the nature of the ‘market imperfections’ discussed above, and as Loasby (1978, p.7) has demonstrated, “the time needed to secure increasing returns through improved organisation becomes particularly important when related to Marshall’s notion of the life-cycle of firms”. Opie’s (1931) detailed study of Marshall’s time analysis clearly demonstrates there can be no doubt that Marshall saw the satisfactory treatment of time as a necessary pre-requisite for an acceptable theory of value. And as Levine (1980) suggested, a satisfactory treatment of returns to scale must involve a study of dynamics, which Marshall came closest to realising in his discussion in Appendix H of the importance of recognising the ‘irreversibilities’ associated with the existence of returns to scale along with the associated problems confronting ‘static equilibrium’ theory. However the ‘higher level’ of analysis incorporating ‘dynamic’ issues would necessitate the introduction of historical time, and a reversal of what Groenewegen (1982) observed as the increasing tendency for ‘Equilibrium’ to triumph over ‘History’ as Marshall’s work developed from his earlier methodological contributions and through successive editions of Principles.

To summarize the argument so far, it was Marshall’s purpose in Principles to construct a theory of value where, in its ‘elementary stages’, stable equilibrium could be represented in the context of ‘normal’ supply and demand conditions. The ‘statical’ approach he anticipated would ‘give definiteness and precision’ to his ideas without at the same time leading to conclusions not in compliance with real life. One of the chief difficulties Marshall perceived as challenging this method of analysis was the pervasive forces operating through returns to scale. The dilemma arose from Marshall’s awareness of the potential for monopolisation of industries where such returns prevailed. Such an occurrence would cast doubt on the ability of his chosen form of analysis to consider the strongest and most persistent group of economic forces. The ‘reconciliation exercise’ was therefore an attempt to establish the existence of equally pervasive forces which rendered monopolisation unlikely, and at the same time enabling actual events to be considered in the context of ‘normal’ conditions.
Despite the opposing views expressed by Stigler (1941) and A.L. Levine (1980), there can be little doubt that Marshall placed the major burden of his proposed ‘solution’ to the reconciliation problem on his ‘biological’ analogy of the natural life cycle of the firm. Equally it can be observed from the later editions of Principles, and even more directly from Industry and Trade, that Marshall was becoming increasingly aware that the growing significance of joint stock companies was representing a severe challenge to the continuing relevance of his ‘biological’ analogies. While subsequent writers may have interpreted Marshall’s ‘hints’ relating to the growing significance of external economies as suggesting an alternative ‘solution’ to Marshall’s dilemma, it can not be convincingly argued that Marshall himself held closely or consistently to such a view. On the other hand ‘market imperfections’ appeared to be attracting increasing interest from Marshall. Marshall’s discussion of manufactures clearly implied that the conditions which had to be met for the existence of ‘free competition’ departed too violently from real life to represent anything but ‘provisional’ assumptions. However Marshall failed to pursue these ‘imperfect competition’ implications to the extent that Sraffa and others were eventually to do in the decades immediately following the publication of the final edition of Principles.

Even less satisfactorily developed in Marshall’s writings were the essentially ‘dynamic’ implications arising from the widespread existence of returns to scale. Marshall (1898, p.313) had argued that “dynamical solutions” of economic problems were “unattainable”. Nevertheless Marshall’s discussion of the ‘irreversibilities’ associated with returns to scale clearly indicated that there were ‘dynamic’ dimensions associated with an analysis of returns to scale which had serious implications for equilibrium theory in general. It was left to Young (1928), drawing on his reading of Adam Smith, to bring to the surface these ‘dynamic’ repercussions. The key to gaining an understanding of the ‘dynamic’ dimensions of the problem was to realise, as Marshall (1898, p.313) himself had stated, that “when a force moves the thing on which it acts, it thereby changes the force which that thing afterwards exercises”.

The following section will highlight the inability of Marshall’s immediate followers, adopting what was referred to in the previous chapter as the ‘simplified Marshallism approach’, to understand the full implications of the issues which Marshall had attempted to come to terms with in the reconciliation exercise. These implications were to be brought to the attention of the economics profession emphatically by the contributions of Sraffa (1925,1926,1930), who at the same time pointed to the deficiencies in Marshall’s interpretation of the role of returns to scale in ‘classical’ value theory. It is argued that it was in this respect that Marshall’s analysis failed to bring ‘order and meaning to the theories of Smith, Ricardo and Marx’.

The Challenge to the ‘Marshallian’ Representation of Returns to Scale

In the tranquil view which the modern theory of value presents us there is one dark spot which disturbs the harmony of the whole. This is represented by the
supply curve, based upon the laws of increasing and diminishing returns. That its foundations are less solid than those of the other portions of the structure is generally recognised. That they are actually so weak as to be unable to support the weight imposed upon them is a doubt which slumbers beneath the consciousness of many, but which most succeed in silently suppressing (Sraffa 1926, p.536).

The assessment contained in Sraffa's critique of the existing theory as it related to the laws of return and competitive conditions provides an introduction to the issues central to this discussion. Significantly, Sraffa's critique appeared just six years following the publication of the eighth and final edition of Marshall's *Principles*. The pursuit of a solution to the "dark spot" which Sraffa spotlighted as “disturbing the harmony of the whole" represented in Marshall's view an objective central to the provision of the theoretical foundations to a theory of value based on 'normal' demand and supply conditions. Sraffa's assessment not only reflects the unsatisfactory nature of the 'solution' proposed by Marshall but also the inability of Marshall’s contemporaries and immediate followers to shed any light on the 'reconciliation problem' raised by Marshall. We will examine the nature and significance of the difficulties that created the doubts which “slumbered beneath the consciousness” of Marshall’s followers in the 1920's, together with the reactions of those attempting to protect the evolving theoretical structure from Sraffa’s 'destructive contributions'.

**Discontent During the ‘Age of Tranquillity’**

Shackle (1967, p.289) described the first two decades of the nineteenth century as an "Age of Tranquillity" during which the evolving 'Marshallian' theoretical apparatus reigned virtually undisputed in the English speaking world. Certainly, the almost total absence of any significant debate or systematic critique relating to the evolving 'Marshallian' value theory was a notable feature of the published writings prior to Sraffa's contributions of the mid-1920's. As Clapham (1922b, p.563) observed, due in part to a “certain very natural piety”, things were “constantly said in conversation which never got into print”. However there is some indication that Marshall himself was concerned about many of the extensions to his theoretical structure being undertaken by his followers, some of whom appeared to overlook the many important limitations and qualifications Marshall had placed on the usage of the 'handy tools' he had developed or refined.

An early indication appears in an unpublished correspondence between Marshall and Edgeworth [dated March 26, 28 1892] in which Marshall (1961, p.819) expresses much displeasure at Edgeworth's misinterpretation of his time analysis, accusing him of introducing a "calamitous confusion". Marshall's correspondence also contained some significant criticisms of an article written by Henry Cunynghame, who was described by Keynes (1935, p.398) as the "first in the long succession of Alfred Marshall's favourite pupils". Cunynghame (1892) had endeavoured to analyse producers' surplus in an industry with increasing returns using 'Successive Supply Curves' which attempted to allow for increasing costs in the short-period and decreasing costs in the long-period. Marshall (1961, pp.810,812) judged Cunynghame's analysis in this respect to be "hopelessly obscure", and advised Edgeworth
to think carefully before lending his "great authority" in support of what Marshall termed a "half-thought out notion". Marshall remained convinced that producers' surplus could not be represented in the supply curve except in curves which ignored the economies of organisation and production on a large scale. Such conditions were consistent with Marshall's 'Particular Expenses Curve', where these economies were taken as fixed and constant throughout. In *Principles* (p.810) Marshall had made it clear that he believed curves drawn under such assumptions had no operational role to play, as it "is not a true supply curve adapted to the conditions of the world in which we live, but it has properties which are often erroneously attributed to such a curve". In addition, Cunynghame's graphical analysis failed to address the issues central to the reconciliation problem, despite the fact that his example illustrating the printing of different sized books clearly implied economies of the variety Marshall termed 'internal'. Marshall's intent to distance his own analysis from Cunynghame's cost curves is further illustrated by the comments in his heavily annotated copy of Cunynghame (1904), where he noted "he [Cunynghame] merely confuses students by implying that his reasonings have any connection with my curves".

**Marshall on Pigou**

Marshall's manuscript notes on his copy of Pigou (1912), reproduced with commentary in Bharadwaj (1972), provides useful insights into how Marshall viewed the 'extensions' of his model by his successor to the Chair at Cambridge. In Pigou (1912) returns to scale (or more correctly, economies of scale) were represented by a divergence between "supply price" and "marginal supply price". This followed from his analysis of long-period supply in Pigou (1910) where increased output was associated with the *external* economies of improved general organization. As Bharadwaj (1972,p.45) stresses, Pigou's (1912) treatment of decreasing and increasing returns implied that both were due to external factors. Marshall's comments on the end-paper of his copy of Pigou (1912) summarises his rather serious reservations of Pigou's work: "I incline to think that the marginal supply curve Part II Ch. VII has no reality; I think he [Pigou] overrates the possibilities of the statical method".

Rather, Marshall restated his preference for using the expenses of a Representative Firm to depict economies which are internal to a particular firm, and strongly disputes Pigou's (1912,p.176) claim of equivalence between his "Marginal Supply Curve" and his own 'Particular Expenses Curve'. That Marshall failed to directly communicate his very significant reservations of his successors 'extensions' to his own theoretical apparatus is indeed unfortunate, as Pigou's method of interpreting returns to scale remained largely unchallenged for over a decade in the published literature, gaining the support of influential writers such as Edgeworth. Attention was therefore diverted away from the pursuit of the 'reconciliation problem' as formulated by Marshall, soothing what Sraffa had described as 'the doubt which slumbered beneath the consciousness of many'.

Before proceeding to discuss directly the value theory debates of the 1920's, it is interesting to note that Marshall's comments on Pigou (1912) appear to have been
occasioned by an attack on the same book contained in Hobson’s *Work and Wealth*. Hobson (1914, p.174, n.1) had highlighted what he believed to be Pigou’s virtual admission of the “futility of marginalism”, as ‘marginalist’ conclusions could be meaningfully derived only under ‘statical’ conditions where all industries conformed to constant returns such that Pigou’s ‘supply price’ and ‘marginal supply price’ were equivalent. Marshall had supported Hobson’s conclusion believing it to be consistent with his own view that Pigou had underestimated the limitations of the ‘statical method’. However the implications of Hobson’s critique went somewhat beyond Marshall’s misgivings, targeting the marginal productivity theory of distribution for critical attention. In a book published four years earlier, Hobson (1910, pp.112-120) had launched a powerful challenge to marginal productivity theory, demonstrating with the aid of numerical examples that when increasing returns prevail the product of the quantity of the input and its ‘marginal product’ would exceed the value of total product. Marshall, in his rather unsatisfactory response contained in the footnote regarding ‘marginal shepherds’, had claimed that Hobson “appears to be mistaken”. Hobson had been, as Robinson (1934a, p.403) described, somewhat betrayed by the “crudeity of his arithmetic examples”, however the eventual conclusion reached to the controversy surrounding the so-called ‘adding up’ problem showed clearly that Hobson had in fact been correct. Robinson (1934a, p.404) captured the unfortunate context in which the Marshall-Hobson ‘exchange’ took place when she declared: “if Mr Hobson had been more subtle in his use of arithmetic, or Marshall less unable to suffer fools gladly, the whole controversy would have been cleared up on the spot”.

Instead, Marshall had failed to grasp the significance of the ‘adding up’ problem, and as Stigler (1941, pp.352-53) has shown, there are passages in Marshall’s *Principles* which would suggest support for the theory of exhaustion of product by marginal imputation. On the other hand Marshall’s assertion that the marginal productivity theory “cannot be made into a theory of interest, any more than into a theory of wages, without reasoning into a circle” indicates that his acceptance of the marginal productivity approach was not without considerable qualification. Marshall’s failure to commit himself to an unambiguous position relating to the role of the marginal productivity theory meant that the important interrelationships between the laws of return and the theory of income distribution were left unexplored by Marshall and his followers at Cambridge. As a result the marginal productivity theory of distribution was incorporated without serious challenge into the ‘simplified Marshallism’ which was to form a central element of much of the routine of the teaching of economics in the decades which followed.

The Controversies of the 1920s

*Empty Economic Boxes*

The “Age of Tranquillity” which had characterised the previous two decades was to be overturned and replaced in the 1920’s and 1930’s by what Shackle (1967, p.289) termed the “Age of Turmoil”. It was Clapham’s (1922a) questioning of the relevance
of the dominant theoretical scheme to the problems of the real world which represented the first significant (published) challenge to the existing 'Marshallian' orthodoxy. In the process of presenting his "hat-factory" example Clapham posed the question of whether the various "boxes" labelled "constant", "decreasing" and "increasing" returns had any content. Clapham (1922a,p.305) complained that the writings of Marshall and Pigou failed to give "even one illustration of what industries are in which boxes". As a result Clapham (1922a,p.312) argued:

I think a good deal of harm has been done through omissions to make it quite clear that the Laws of Return have never been attached to specific industries; that the boxes are, in fact, empty...Unless we have a good prospect in the near future of filling the boxes reasonably full, there is, I hold, grave danger to an essentially practical science such as Economics...

In his reply to Clapham's critique, Pigou (1922) accused Clapham of failing to distinguish between "realism" and "practical usefulness". He stressed that, while it was true that changes in demand would have different effects according to the types of returns which prevail, that this was a "mere incident in our general analysis of the problem of value" (1922,p.461). The real significance of the Laws of Return to economic theory was clearly stated by Pigou (1922,p.461) in the following passage:

It would be easy enough to drop the names; but does anybody seriously imagine that we could have any understanding at all of the influences governing economic values if the fact that aggregate output and supply cost have varying relations to one another were ignored?...These boxes, as he [Clapham] calls them, are not merely boxes; they are also elements in the intellectual machinery by which the main part of modern economic thought functions. (Pigou's emphasis).

In his rejoinder, Clapham (1922b,p.562) repeated his "fear" that a theory of value might "in the long run be neglected by mankind" if it should prove "permanently unable to state of particular and individual values some of its more important conclusions were true". Pigou (1922,p.464) had agreed that this task should not be underrated, however argued that something "might be accomplished if economists would take counsel with leaders of business, expert in particular branches of production". In terms of the methodological arguments central to their exchange, Pigou had managed to satisfactorily defend the existing orthodoxy from Clapham's 'empty boxes' challenge, although his predecessor in the Chair at Cambridge may have placed a higher priority on the 'parallel' task of providing empirical content to the emerging value theory.

There are two further aspects of Clapham's (1922a) critique which require brief comment. Firstly, in arguing that constant returns "must always remain a mathematical point, their box an empty one" because they arose from "perfect balance" between increasing and decreasing returns, Clapham (1922a,p.310) had committed the same 'error' in his interpretation of the Laws of Return as had Marshall.

Significantly, Pigou failed to pass any comment on Clapham's interpretation of constant returns as reflecting 'perfect balance'. Secondly, Clapham (1922a,pp.311,314) properly notes that significant difficulties arise in distinguishing between "gains in efficiency" arising from "size and organization only" and those which coincide with "a fresh 'dose of resources' which is due to invention". This
distinction, suggested earlier by Marshall was not to be found in Adam’s Smith’s pioneering discussion of ‘increasing returns’ spoken so highly of by Marshall, and represented a significant point of departure from the ‘Classical’ representation of the Laws of Return.

Two years following his exchange with Clapham, Pigou was forced to defend the existing orthodoxy against a further ‘empty boxes’ assault. On this occasion however, it was Pigou’s own theoretical contributions which formed the ‘battle field’. The thrust of Robertson’s (1924) “empty boxes” claim was that Pigou’s treatment of the Laws of Return in Economics of Welfare not only rendered the filling of the boxes unnecessarily difficult but also positively misleading and dangerous if they were to be used as a guide for policy implementation. It will be recalled from the discussion above that Pigou (1910,1912) had increasingly come to associate decreasing (long-period) costs with external economies. This position was re-enforced in Pigou (1913,p.22), where it was claimed that “apparent conflict between mathematical analysis and experience” was basically to be resolved by the proposition that each individual firm was operating under increasing costs, while the industry as a whole was operating under decreasing costs, therefore reflecting economies external to the firms in the industry. It is this feature of Pigou’s treatment which forms Robertson’s most significant point of contention:

I cannot, therefore, bring myself to believe that, under any conception of competition which is appropriate to the matter in hand, the phenomenon of decreasing cost can be explained entirely in terms of external economies: nor, therefore, that if the rigid mathematical disharmony which Professor Pigou predicates...between competitive and socially desirable output really exists, it is to be explained on this ground of the certainty that the individual producer will not reap the reward of his own improvements. (Robertson, 1924,pp.23,24).

A similar point had been raised earlier by Young (1913,p.678) in his review of Pigou (1912) where in a footnote Young had stated “I cannot imagine ‘external economies’ adequate to bring about this result”. Pigou’s response to Robertson’s critique, though strongly worded, lacked the conviction of his reply in the earlier ‘Empty Boxes’ debate. Pigou (1924,p.31) was forced to concede that his response contained in Economics of Welfare to Young’s earlier criticism was “not adequate” with “modifications” promised in his forthcoming new edition. Notwithstanding this concession, Pigou (1924,p.31) asserted that Robertson was in error in suggesting that he had denied the existence of internal economies, as “no economist, who is not an imbecile, could deny the existence of internal economies”. Pigou’s suggestion that “some bad phrasing in the text” may account for Robertson’s criticism failed to convince Robertson, who in his rejoinder continued to maintain his criticism of the neglect of internal economies in Economics of Welfare.

There can be little doubt that Robertson’s ‘Empty Boxes’ attack, inadequately defended by Pigou, had more serious ramifications to the theoretical structure presided over by Pigou then did Clapham’s earlier offensive. As Robertson (1924,p.29) noted, the implication of his discontent was that “the uses that can be made of them [the ‘boxes’] are more modest, even in theory, than has been claimed” (emphasis added). However the full extent of these limitations was to lay unexposed until they were emphatically revealed two years later by Sraffa’s destructive assault on the theoretical foundations of the existing ‘Marshallian’ structure.
Sraffa's 1926 Critique
Sraffa's 1926 'destructive' contribution, a restatement with some modifications of his paper published in Italian one year earlier, represented the first attempt to work out systematically the contradictions and implications of the 'Marshallian' orthodoxy prevailing in the 1920's. The following passages from a letter written to Keynes in June 1926, outlined the principal points of the critique contained in Sraffa's 1925 paper, which were also to form the basis of Sraffa (1926):

The difficulties of the system, which may be briefly described as that of 'crossing curves of demand and supply', is that it is subject to two conditions: (1) perfect competition, (2) 'coeteris paribus', that is independence of the conditions of production of the commodity concerned from those of all other industries ... as to increasing returns, external economies 'can seldom be allocated exactly to any one industry: they are in a great measure attached to groups, often large groups, of correlated industries', as Marshall himself recognizes (Industry and Trade, p.188). ...Consequently, in a Marshallian supply schedule, if the amount produced of the commodity concerned is changed, not only its own price, but the prices of many other commodities are changed; and the supply schedule, based on the 'coeteris paribus', becomes invalid.

In the same letter to Keynes, Sraffa argued further that it was Marshall's departure from Ricardo's interpretation of the Laws of Return which was at the source of the difficulty associated with the existing value theory in a regime of competition: "Originally the two laws were designed for quite different uses: diminishing returns for the analysis of rent, increasing returns for the division of labour. Marshall coordinated this heterogeneous material for use in his theory of prices; hence arise its weak points".

In some respects, Sraffa's critique of the characterisation of decreasing costs can be seen as an extension of the earlier dissent of Young and Robertson. Like Robertson, Sraffa (1926,pp.536-7) observed that the Law of Increasing Returns had been subjected to a "radical transformation" with consideration of internal economies associated with the internal division of labour rendered possible by an increase in the dimensions of the individual firm being "entirely abandoned as it was seen to be incompatible with 'competitive' conditions". Instead the importance of external economies had been emphasised, being seen to be compatible with the existence of 'competition'. The comfort to be derived from the adoption of such an approach was shattered by Sraffa's demonstration that such a 'reconciliation' had rested on what he termed in his 1925 paper a "purely hypothetical and unreal construction", in which such economies had not only to be external from the individual firm's viewpoint, but also internal to the industry:

the assumption becomes illegitimate, when a variation in the quantity produced by the industry under consideration sets up a force which acts directly, not merely on its own costs, but also upon the costs of other industries; in such a case the conditions of the "particular equilibrium" which it was intended to isolate are upset, and it is no longer possible, without contradiction, to neglect collateral effects. [Sraffa (1926,p.539)].

Sraffa, drawing on Marshall's own conclusions in Industry and Trade, demonstrated that in reality it was rarely possible to allocate the effects of external econo-
mies to any particular industry. The consequence of Sraffa's critique was therefore that the supply schedule, in the context of 'particular equilibrium' and 'competitive conditions' to which it was being applied, was capable of representing only those 'exceptional' economies which were both 'external' to the individual firm, and 'internal' to the industry.

The conclusion to the aspect of Sraffa's critique discussed above obviously constituted a severe challenge to those who believed that an appeal to external economies could conquer the difficulties associated with representing decreasing costs (increasing returns?) with the device of a supply schedule, at the same time preserving 'competitive' assumptions. Sraffa, in his 1925 paper, included Marshall amongst those who had expanded the role of external economies to the extent that they were considered the sole cause of decreasing costs in a regime of competition. Marshall's statement in *Principles* (p.441) that internal economies are "frequently very small as compared with those external economies" would lend support to Sraffa's judgment on Marshall's treatment of external economies. However as Sraffa's own account of Marshall's (1920a) treatment of increasing returns clearly illustrates, Marshall in fact did not consider 'external' economies to be the exclusive cause of decreasing costs. Marshall's consideration of decreasing costs in *Principles* placed much emphasis on 'internal' economies. It was for this reason that Marshall struggled to preserve his biological analogy of the Representative Firm, even in the presence of what Marshall conceded to be the severe challenge it faced arising from the growing significance of joint stock companies. It would appear therefore that Sraffa's criticism of Marshall in *this context* is rather hasty. There can be little doubt that the ambiguous and at times imprecise nature of Marshall's treatment of the role of external economies, together with his failure (in published contributions) to question the analysis of those who pursued this path, contributed indirectly to the development of the representation of the sources of decreasing costs which Sraffa attacked. However the legitimate target of Sraffa's critique in this instance is to be found in the 'simplified Marshallism' presided over by Pigou.

As was the case with his attack on the role of external economies, Sraffa's frequent reference to 'competitive' conditions illustrated the extent to which the 'Marshallian' framework of the mid 1920's had departed from Marshall's own analysis. The theoretical model to which Sraffa's critique most directly applied was, as Williams (1978,p.151) argues, "an elaboration of Cournot's static, large numbers, quantity adapter model, married to Marshall's time period analysis", with much of the writing on costs, and almost all of that on supply schedules during the 1920's being conducted within the context of what now is termed 'perfect competition'. As Wolfe (1954, p.338) has observed, those who attacked Marshall's theory of value had assumed that Marshall had in mind what we now call 'perfect competition' in his derivation of the long-period 'normal' supply schedule from the Representative Firm. Discussion above of the nature of the 'reconciliation problem' posed by Marshall would strongly support the conclusions reached by Wolfe (1954,p.341), Andrews (1951, pp.141-2) and Maxwell (1958,p.694) that such an interpretation of Marshall's work is unjustified and mistaken. Conditions resembling 'perfect competition' are to be found only amongst the 'provisional' assumptions used in Marshall's *preliminary* discussion of equilibrium found in the early chapters of Book V in *Principles*. Marshall's subsequent discussion of a firm's 'particular demand
curve’ must surely be seen as being clearly inconsistent with the conditions necessary for the achievement of perfectly competitive markets. The nature of the ‘reconciliation exercise’ implicit in Sraffa’s critique is at once more precise but less meaningful than that posed initially by Marshall; belonging instead to the world of ‘simplified Marshallism’.

Marshall’s Interpretation of the Laws of Return in Classical Political Economy

That part of Sraffa’s critique which hit most directly at the weaknesses of Marshall’s theoretical structure related to Marshall’s interpretation of the laws of return in the ‘classical’ system. Sylos-Labini, (1985,p.51), in a passage from his insightful ‘restatement’ of Sraffa’s assault on Marshallian price theory, captured the context of Sraffa’s argument as follows:

According to Sraffa, at the root of the inconsistencies in Marshall’s theoretical construction and especially in his treatment of the supply curve we find the heterogeneity of the two laws of returns, that of increasing and that of diminishing returns; the former represents largely the consequence of the process of the division of labour and was originally considered in relation to the problems of economic growth, the latter, which presupposes as given one of the factors of production, was originally considered in relation to the problems of income distribution.

Sraffa (1926,p.537) observed that the idea of a functional relationship between costs and quantities did not play a conspicuous role in the laws of return in their original form, with the independence of costs from quantities (at least in the long-period) being central to those who contributed to ‘classical’ value theory. The radical nature of Marshall’s attempted transformation of the role of the laws of return is incisively outlined by Sraffa (1926,p.538):

it has removed both laws from the positions which, according to the traditional partition of political economy, they used to occupy, one under the heading of “distribution” and the other under “production,” and has transferred them to the chapter of “exchange-value”; there merging them in the single “law of non-proportional returns,” it has derived from them a law of supply in a market such as can be co-ordinated with the corresponding law of demand; and on the symmetry of these two opposite forces it has based the modern theory of value.

The law of diminishing returns, as outlined in some detail in Sraffa (1925), was used originally in the context of differential rents on land. It had been used by Ricardo to investigate not the laws which regulate price, but rather as an essential component of his theory of distribution. Ricardo’s usage had placed emphasis on the ‘extensive margin’ being concerned largely with the simultaneous cultivation of lands characterised by different fertilities. In order to transfer the law of diminishing returns from the chapter of ‘Distribution’ to the chapter of ‘Exchange-Value’ emphasis was transferred instead to the ‘intensive margin’, which as Bharadwaj (1978a,p.45) notes was referred to only “with some hesitation” in the classical
treatment of rent. In this context the 'margin' was associated with successive doses of capital and labour to a fixed quantity of land. This change in emphasis, represented as Bharadwaj (1978a p.44) suggests "the junction at the cross-roads of the two theoretical systems". The notion of a functional relationship between costs and output clearly evolved from the switch in emphasis to the 'intensive margin', with the concept of rent on land being extended to all factors of production, symbolised as the factor's 'marginal product'.

The transfer of increasing returns from the chapter on 'Production' to 'Exchange-Value' involved an even more dramatic change in interpretation of the role and operation of the laws of return. To incorporate increasing returns into the law of supply not only did the 'classical dichotomy' of the separation of cost and output determination have to be broken, but also a purging of the dynamic dimensions of the law of increasing returns was required to enable its application in the static equilibrium framework. Marshall had attempted to retain a dynamic element of the law of increasing returns through his biological analogies, however the limited external economies permitted to coexist with the supply curve of the 'simplified Marshallism' variety saw the completion of the process resulting in the removal of the dynamic aspects from the laws of returns. It was Young's (1928) critique of the 'Marshallian' treatment of increasing returns which pursued the issue of the neglect of the dynamic dimensions of the increasing returns process. In the case of Sraffa's critique, the inconsistencies to be found in Marshall's interpretation of the laws of return were highlighted more in his discussion of 'constant costs'. Following the approach adopted by Marshall it had generally been accepted that constant costs could only occur in an exceptional situation where the two laws of return operated as (exactly) opposing tendencies. Sraffa, in opposition to this conclusion, argued that the absence of variability in costs in fact corresponded to the "normal case":

"it can be assumed that the case of constant costs arise not from the offsetting of two opposite tendencies, but from the absence of both; if all factors of production employed by an industry are used in many others and if the conditions of production of the individual firm are independent of each other, the industry shows constant costs. None of these assumptions is unlikely; and, on the other hand, the small probability of the assumptions which give rise to either one or the other of the tendencies to variable cost seems to indicate that the absence of both should be considered to be much more general - given the partial equilibrium conditions - than the presence of one of them and that therefore one should, if at all, regard as normal the case of constant costs, rather than that of increasing or decreasing costs. (Sraffa 1925, p.316, as translated and quoted in Maneschi 1975, p.7).

Sraffa's conclusion has far reaching ramifications for a theory of value based on a symmetry between demand and supply, as such a symmetry depends critically on the non-proportionality between costs of production and quantities of output. As Sraffa (1925,p.316) emphasised, the greater the significance of constant costs the greater the disturbance in the symmetry and the more important the influence of costs of production in determining price. It is of critical importance here to distinguish between constant costs and constant returns to scale. In his 1925 paper Sraffa noted that Ricardo had maintained that constant costs constituted the greatest part of the goods that are exchanged in the market. Marshall (1920b,p.814) accused Ricardo
of assuming constant returns, an assumption he interpreted as constituting a simplifying assumption as Ricardo "thought it best to ignore the distinction" between the classes of returns on the grounds that "a commodity chosen at random was just as likely to obey one as the other of the two laws... and therefore he thought himself justified in assuming provisionally that they all obeyed the law of constant return". Marshall (1920b, p.503) had warned that such was the importance Ricardo's theory occupied in the history of economics "any misunderstanding as to its real character must necessarily be very mischiefous": in this context Sraffa's critique finds Marshall guilty of falling into such an error. Constant costs in Ricardo did not imply constant returns, merely the absence of a functional relationship between costs of production and output.

Central to Marshall's misunderstanding was his relegation of distribution to the chapter of 'Exchange-value' where, as Garegnani (1983) has demonstrated, the role of demand in determining prices depends on its part in determining distribution by means of the relative scarcity of the factors of production. In Marshall's analytical framework distribution was seen as a problem which, along with exchange, could be analysed with the tools of demand and supply, culminating in the attempt to establish a symmetry between wages and profits not to be found in classical theory. It is indeed ironical that the point illustrated by Garegnani reveals a failure on the part of Marshall to realise that, on the basis of his own treatment of distribution and the laws of return, the existence of constant returns would indeed result in increasing costs as the expansion of output would render the factors used in higher proportions more costly.

Sraffa’s Suggested 1926 Solution
Roncaglia (1978, p.12) isolated three potential alternative routes for the elaboration of the theory of prices as emerging from Sraffa’s destructive attack on the ‘Marshallian’ approach:

(i) To attribute general importance to the case of “constant returns”;
(ii) A system of general economic equilibrium; and
(iii) Abandonment of ‘perfect competition’ and recognition of permanent imperfections in competition.

The first of the alternative routes listed by Roncaglia should properly be referred to as ‘constant costs’, for as has already been outlined, whether constant returns lead to conditions of constant costs depends on the theory of distribution included in the analysis. It was the constant costs route which Sraffa favoured in his 1925 paper, however Sraffa appeared to be rather uneasy with this “solution”, suspecting that it constituted "only a preliminary approximation to reality". It should be noted that the 1925 ‘solution’ proposed by Sraffa did not encompass the ‘classical dichotomy’, i.e. the separation of the determination of output and costs. His conclusion was related specifically to his own demonstration that only constant costs appeared to be compatible with statical competitive conditions in the study of the particular (partial) equilibrium of an industry.

The adoption of a ‘General Equilibrium’ approach to specify the general interrela-
tionships among the production costs of various industries was considered by Sraffa as a possible means by which the difficulties associated with non-proportional costs and external economies could be overcome. However it was an approach rejected by Sraffa (1926,p.541) on the grounds that the complexity of this "well known conception" prevented it from bearing fruit "at least in the present state of our knowledge, which does not permit of even much simpler schemata being applied to the study of real conditions". Having rejected the general equilibrium approach Sraffa had thus closed the door on the analysis, using the existing 'Marshallian' tools, of those external economies he had argued were most likely to be observed.

Having found the general equilibrium alternative unfruitful, and the assumption of constant cost required for 'competitive' conditions unrealistic, Sraffa (1926,p.542) made the following constructive suggestion: "It is necessary, therefore to abandon the path of free competition and turn instead in the opposite direction, namely, towards monopoly". In his subsequent discussion of industries found "along the intermediate zone" between competition and monopoly, Sraffa proceeded to outline the key characteristics of the modern theory of imperfect competition in a manner described by Shackle (1967,p.20) as "with an ease and economy that have never been improved on". Sraffa (1926,p.542) viewed as "fundamentally inadmissible" the view that imperfections would "retard or slightly modify", and ultimately be overcome by, the active forces of competition. Instead Sraffa (1926,p.542) argued that: "Many of the obstacles which break up that unity of the market which is the essential condition of competition are not of the nature of "frictions," but are themselves active forces which produce permanent and even cumulative effects".

Of particular relevance to the theory of equilibrium in the context of non-proportional costs was Sraffa's (1926,p.544) conclusion that it was "the absence of indifference on the part of buyers of goods as between the different producers", giving rise to a descending demand curve, which "renders a stable equilibrium possible even when the supply curve for the products for each individual firm is descending". In the process of demonstrating this result, Sraffa also acknowledged the insights provided by Marshall's analysis of manufactures where the notion of the firm's 'particular demand schedule' had been developed. This schedule is easily recognisable as a precursor to the demand curve of the individual firm existing in that "intermediate zone" to which Sraffa's positive analysis was directed. Such was the likeness that Shackle (1967,p.21) inquired as to "how it can have taken forty years, from the publication of the Principles, for the great body of doctrine known as imperfect competition to start to be built up on the basis of hints so plainly present in Marshall". The delay in pursuing Marshall's hint was undoubtedly partly due to Marshall's inability to incorporate his 'particular expenses curve' formally into his analysis. However it was more a reflection of just how far the 'simplified Marshallism' had departed from its original source with attention redirected to the formulation of economic relationships with the development of unreal constructs in a world characterised by static equilibrium and perfect competition.

The Decline of Marshall's Biological Analogies
The absence of direct reference to Marshall's 'trees in the forest' biological analogy
and the associated Representative Firm is a notable feature of Sraffa's critique of the so-called 'Marshallian' system. This in turn was a reflection of the almost total exclusion of such analogies from the mainstream of value theory in the 1920's. It was Robbins' (1928) critique which is often highlighted as heralding the decline of the Representative Firm concept. Robbins (1928,p.387) alleged that the 'Marshallian' concept of the Representative Firm had always been a "somewhat unsubstantiated notion", likening it to a "ghost" which threatened to "bid fair to outlast many more virile creations". Robbins' basic conclusion was that the concept was both unnecessary and misleading. It was asserted to be "misleading" by Robbins (1928,p.399) because if incautiously handled it "may mislead with regard to the construction of supply curves, and the way in which, in discussions of the stationary state, it may lead us to imagine that the average is the condition rather than the result of equilibrium". In the context of 'Marshallian' analysis, Robbins (1928,p.397) maintained the concept to be "unnecessary" because "The intersecting curves of supply and demand, which are the main apparatus of this mode of analysis, are capable of construction without resort to this instrument". However, Robbins' discussion of the "special" case of diminishing costs fails to outline the mechanism by which economies which are internal to the firm can be consistently incorporated into an industry supply curve under the 'competitive' conditions he is discussing.

Rather the following argument, which does little to clarify the problem confronting Marshall and highlighted by Sraffa, is presented:

we must recognise that what are internal and external for any one firm are, partly at least, a matter of the capacity and opportunities of new management. What is an internal economy for one firm may be an external economy for another. And in any case it is surely obvious that, whatever their nature, the internal economies will vary with the nature of management. The old doctrine which bade us consider the application of equal quantities of capital and labour to different pieces of land is not more artificial and unnecessary than this doctrine which assumes that all management must be of equal efficiency. (Robbins 1928,p.399).

Moreover, in his discussion of the "disparities of efficiency" which necessitated in Marshall's view the usage of the Representative Firm concept, Robbins neglects the essentially dynamic process imprisoned in Marshall's biological analogies, concentrating instead on elements relating to the accessibility to supply of factors of production of different quality. Indeed much of the discussion in Robbins' strongly worded critique tends to be more obscure than the rather hazy concept which forms its target.

It is difficult therefore to accept the conclusion that Robbins' critique alone could have played a major role in the rejection of Marshall's life-cycle theory of the firm and the associated Representative Firm concept. A more immediate basis for the apparent rejection of the relevance of Marshall's biological analogies is to be found in the shift in emphasis from internal to external economies in the portrayal of decreasing costs, directing attention away from the devices assembled by Marshall primarily to deal with difficulties associated with internal economies. As a result of Sraffa's critique, such an approach required urgent 'reconsideration', as will be witnessed in discussion below of Pigou's (1927) response.

A reason of more lasting significance for the apparent demise of Marshall's 'trees
of the forest’ analogy and associated concepts was that the appropriateness of Marshall’s analogy to the rapidly changing institutional framework of industry appeared tenuous to many observers in the 1920’s. It will be recalled that in Principles Marshall had conceded that the ‘rule’ of eventual stagnation contained in his analogy of the life-cycle of the firm was ‘far from universal’, with the possibility that the emerging joint stock companies could secure a ‘prominent and permanent’ place in an industry. However as emphasised by Shove (1930,p.114) in his response to Robertson’s attempts to re-establish the legitimacy of Marshall’s constructs, the growing historical significance of the joint stock company qualifications conceded by Marshall indicated that Marshall’s ‘general but not universal’ rule of general stagnation on the part of individual firms had come instead to represent the exception. With the separation of ownership and control, the ‘immortality’ of the joint stock company had come to overshadow the smaller family owned firms subject to Marshall’s biological laws. The legitimacy of the Representative Firm, born from within Marshall’s biological analogy, was therefore brought into question, at least in the context of performing its primary role in the ‘solution’ Marshall had proposed to the ‘reconciliation problem’. In this respect, the ‘final word’ should perhaps belong to Marshall (1898,p.314): “It has been well said that analogies may help one into the saddle, but are encumbrances on a large journey. It is well to know when to introduce them, it is even better to know when to stop them off”.

Pigou’s Response to Sraffa’s Critique and the ‘Equilibrium Firm’

The task of defending the ‘Marshallian’ orthodoxy of the 1920’s from Sraffa’s critique was largely taken up by Pigou. Commenting on Sraffa’s contribution, Pigou (1927,p.195) conceded that “What he [Sraffa] says about internal economies must be accepted.” In the following sentence Pigou proceeded to empty completely any remaining dynamic element from Marshall’s Representative Firm, arguing that “the representative firm must be conceived as one for which, under competitive conditions, there is, at each scale of aggregate output, a certain optimum size, trespass beyond which yields no further internal economies.” Furthermore, opposing Sraffa, Pigou (1927,p.196) contended that “there is no reason to deny that increases in the scale of production of particular commodities may bring about external economies in the industries making those commodities sufficient to ensure markedly decreasing average and marginal costs” (emphasis added). Therefore according to Pigou’s vision of industry, external economies of the type required to produce compatibility between decreasing costs and ‘competitive conditions’ were widespread.

It was in Pigou (1928) that Marshall’s Representative Firm was replaced with the notion of an ‘Equilibrium Firm’. Pigou (1928,p.239-240) depicts an industry operating under “competitive conditions” in which, in a manner similar to Marshall’s ‘trees in the forest’ analogy, some firms were expanding, while others were declining. He protested that the situation analysed by Marshall where the industry as a whole was in equilibrium without individual firms necessarily being so was “highly complicated”. Pigou sought to circumvent Marshall’s ‘complication’ through his device of
the Equilibrium Firm which was assumed to be in equilibrium whenever the industry as a whole was in equilibrium. The only economies of large scale production permitted to exist in Pigou’s scheme were, as Robertson (1930, p.86) labelled them, of the ‘internal-external’ hybrid being associated with the increase in the size of the individual firm caused directly by an increase in the size of the industry as a whole. Robertson (1930, p.87) contended, with much justification, that it would be “rash” to “infer that the bulk of the observed internal economies of large-scale production are of the derivative nature which we are invited to suppose”. Significantly, the “intermediate case” lying between ‘monopoly’ and ‘competition’ emphasised in Sraffa’s contribution was in Pigou’s (1928, p.204) analysis to be “left out of account”.

The Pigouvian model is completed with the introduction of the ‘U’ shaped average cost curve for the individual firm, an invention which had its source in his 1927 paper extended to suggest that not only is there an (optimum?) output level which exhausts the available economies of scale, but which also heralds the existence of ‘diseconomies’. The ‘U’ shaped average cost curve has, together with the notion of an Equilibrium Firm, occupied an important place in subsequent analysis, despite the considerable theoretical and empirical objections which have been forthcoming. Both concepts are foreign to Marshall’s published works and their widespread acceptance represented a significant point of departure from Marshall’s original foundations.

The discussion above clearly indicates that in their published works the leading figures of the prevailing ‘Marshallian’ orthodoxy had declined to accept Sraffa’s 1926 call for the abandonment of ‘perfect’ competition. Instead new theoretical constructs were developed, and aged ones ‘reinterpreted’, not in response to a yearning to secure a clearer understanding of economic forces, but in order to preserve the competitive order firmly entrenched in the theoretical foundations of the ‘simplified Marshallism’ approach. It was in this climate that Sraffa delivered his ‘negative and destructive’ protest in the 1930 ‘Symposium’ on returns to scale and the Representative Firm. The contributions of his fellow symposiasts, Shove (1930) and Robertson (1930), were characterised by Shackle (1967, pp.43) as being akin to a performance of “astonishing gymnastic contortions in showing that, while tightly bound by the rope of perfect competition, their hands were quite free to juggle with increasing returns.” Sraffa’s intense dissatisfaction with the line of analysis which had resulted from his earlier critique clearly emerged from his exchange with Robertson over the latter’s unrelenting conviction that competition could be salvaged with recourse to Marshall’s Representative Firm, with not inconsiderable assistance from further metaphors drawn from “all the kingdoms of nature”. As Newman (1960) suggests, Robertson to some extent was attempting to develop an understanding of the process associated with the path to equilibrium, however as Sraffa’s response highlighted, Robertson’s ideas were found to be lacking a firm analytical structure. In the final destructive paragraph of his reply to Robertson, Sraffa calls for the complete abandonment of the existing ‘Marshallian’ system, with any hint of possible rehabilitation along the lines he had previously suggested now completely discarded:

We seem to agree that the theory cannot be interpreted in a way which makes it logically self-consistent and, at the same time, reconciles it with the facts it
sets out to explain. Mr. Robertson's remedy is to discard mathematics, and he
suggests that my remedy is to discard the facts; perhaps I ought have explained
that, in the circumstances, I think it is Marshall's theory that should be discarded.
(Sraffa, 1930, p.93, emphasis added).

A clear implication flowing from Sraffa's 'destructive' contributions to the value
theory debates of the 1920's was that, contrary to Blaug's (1962,p.399) claim, Mar-
shall's analysis of the Laws of Return had failed to bring "order and meaning" to
'Classical' theory. Moreover, Sraffa had exposed a formidable weakness in the
foundations of the evolving 'Marshallian' theoretical structure, and at the same time
highlighted the precarious complexion of the 'unreal constructs' hastily assembled
in an attempt to incorporate the laws of return into the existing theory of value. It
was not that Marshall's pursuit of a solution to the 'reconciliation problem' had
raised "false problems" as Blaug (1962,p.399) also asserted, but rather it was the
inability of his followers to furnish defensible solutions to an inadequately under-
stood dilemma which delivered the challenge to the 'best efforts of a generation of
economists'. As Sraffa's conclusion to his 'negative and destructive' intrusion into
the 1930 Symposium on Costs underlined, it was the very survival of the 'Marsh-
allian' system which was at stake. The much neglected dynamic dimensions of the
increasing returns process should also be highlighted, a consideration which will
emanate from Young's (1928) important and often overlooked contribution.

The Contribution of Allyn Young
Like Sraffa, Young's critique of the 'Marshallian' treatment of increasing returns was
based on his interpretation of the writings of the classical economists. In the case of
Young it was Adam Smith who provided the inspiration. The nature and extent
of Smith's influence on Young is clearly illustrated in the following passage:

They added nothing to Adam Smith's famous theorem that the division of
labour depends on the extent of the market. That theorem, I have always
thought, is one of the most illuminating and fruitful generalisations which can
be found anywhere in the whole literature of economics. In fact I am bound
to confess, I am taking it as the text of this paper, in much the way that some
minor composer borrows a theme from one of the masters and adds certain
developments or variations of his own. (Young, 1928, p.529).

Far from being a "minor composer", Young had performed the important role
of 'rediscovering' the starting point from which a satisfactory analysis of the laws
of return could be launched. The argument central to Young's critique can be illus-
trated in the following extract from a letter Young wrote to his former pupil Frank
Knight: "The static view does not interest me very much, because; if it is
rigourously adhered to, almost everything worth saying about it can be put onto
a very few pages. We have to depart from it somehow. The only question is just how".

It is not surprising that Young had communicated his ideas directly to Knight,
for as Blitch (1983b, pp.361-364) highlights, Knight (1921) had argued that the 'Mar-
shallian' concept of increasing returns should properly be classified as belonging to
'dynamic' analysis, rather than static price theory. Knight also explicitly supported
Robertson's (1924) conclusion that the external economies of the type emphasised by Pigou constituted an "empty economic box". While Young and Knight had differed on the precise meaning and distinction between 'statics' and 'dynamics', it was Young's emphasis of the dynamic aspects of the increasing returns process which formed the basis of his immensely important 1928 contribution.

The specific target of Young's critique was the static demand and supply partial (or particular) equilibrium framework which had been used by the 'Marshallians' primarily to investigate the way in which some sort of equilibrium of demand and supply is achieved in the presence of decreasing costs, or to isolate possible advantages of fostering development of increasing return industries. Young (1928,p.257) believed that the apparatus which economists had assembled to deal with such questions placed obstacles "in the way of a clear view of the more general or elementary aspects of the phenomena of increasing returns". The partial equilibrium analysis of increasing returns, emphasising an individual firm or of a particular industry, was viewed by Young (1928) as being unsuitable for an analysis of the mechanism of increasing returns, as the process itself involved the division and specialisation of industries thereby altering the conditions of industrial activity and structure. In Young's (1928,p.528) own words:

No analysis of the forces making for economic equilibrium, forces which we might say are tangential at any moment of time, will serve to illumine this field, for movements away from equilibrium, departures from previous trends, are characteristic of it. Not much is to be gained by probing into it to see how increasing returns show themselves in the costs of individual firms and in the prices at which they offer their products.

Instead the "simpler and more inclusive" sectorial view adopted by "the older economists" was advocated. In such a setting the distinction between internal and external economies, representing necessarily a partial view, had little or no operational meaning. Likewise the extension of the division of labour among industries meant that "the representative firm, like the industry it is a part, loses its identity." (Young, 1928,p.538). However it was not merely the partial equilibrium method, but equilibrium analysis in general which Young (1928,p.533) objected to:

the counter forces which are continually defeating the forces which make for economic equilibrium are more pervasive and more deeply rooted in the constitution of the modern economic system than we commonly realise... The apparatus which economists have built up for the analysis of supply and demand in their relations to prices does not seem to be particularly helpful for the purpose of an inquiry into these broader aspects of increasing returns.

The chief difficulty of representing the dynamic increasing returns process within the static confines of the demand and supply equilibrium framework was seen by Young (1928,p.533) as arising from the fact that the process initiated "responses elsewhere in the industrial structure which in turn have a further unsettling process". Importantly, this implied that "change becomes progressive and propagates itself in a cumulative way". It is the existence of this "cumulative causation", as Myrdal appropriately termed it, which precluded the application of static equilibrium theory to an investigation of the laws of return.

From the discussion above it is apparent that the implications to be derived from
Young’s critique of the ‘Marshallian’ analysis of increasing returns are both definite and formidable. It is simply not possible to launch a meaningful investigation of the operation of increasing returns within the confines of static equilibrium analysis. Marshall (1898,p.313) had shown an awareness of these difficulties in his methodological writings when he noted that dynamic analysis was required “when a force moves a thing on which it acts, it therefore changes the force which that thing afterwards exercises”. His discussion of the irreversibilities associated with increasing returns in Appendix H of Principles clearly implied that static analysis was inadequate:

   It must however be admitted that this theory is out of touch with real conditions of life, in so far as it assumes that, if the normal production of a commodity increases and afterwards again diminishes to its old amount, the demand price and the supply price will return to their old positions for that amount...For, when any casual disturbance has caused a great increase in the production of any commodity, and thereby has led to the introduction of extensive economies, these economies are not readily lost. Developments of mechanical appliances, of division of labour and of the means of transport, and improved organization of all kinds, when they have been once obtained are not readily abandoned. [Principles, pp.807,808].

   However Marshall (1898,p.313) argued that “dynamical solutions” of economic problems were “unattainable”. Instead Marshall attempted to circumvent these difficulties by his rather unconvincing appeal to biological analogies which, as has already been observed, failed to survive when subjected to historical scrutiny. Apart from this avenue, Marshall’s defence of the usage of the static equilibrium approach was based on the ‘unavailability’ of a more appropriate analytical framework: “The unsatisfactory character of these results is partly due to the imperfections to our analytical methods, and may conceivably be much diminished in a later stage by the gradual improvement of our scientific machinery” [Principles,p.809].

   However Marshall’s failure to satisfactorily incorporate the laws of return into his analysis was not primarily because of the absence of analytical techniques, but more importantly reflected an inability to fully understand the dynamic dimensions underlying the core of the classical approach to value theory. While it may be true, as Pasinetti (1981,p.140) has argued, that Marshall, as distinct from his successors, correctly concentrated on the commodities of the reproducible type which are of importance in an industrial type of society, there can be little doubt that the static layer in Marshall’s analysis prevented the construction of a theory of value based firmly on the principle of reproduction. As Gram and Walsh (1980,pp.3-6) describe, a characteristic of such an approach is that:

   commodities are produced by means of commodities so that time enters essentially into the economic problem ... Here the fundamental concepts are viability and surplus, and the problem of allocating the surplus between the accumulation of capital and luxury consumption ... come to the fore.

   Therefore productive inputs are treated as variables and not as parameters as in the economic system based on scarcity. It is clear that Marshall’s principle of substitution, in most contexts in which it is used, together with his real cost doctrine, represent but two major elements of Marshall’s analysis which have no role
to play in the classical scheme based on the principle of reproduction. The significance of adopting the classical scheme for the analysis of the laws of return is explained clearly by David Levine (1977, p.233):

For the neoclassical theory of production the problem of the level of production for the individual firm is a problem of the existing scarce factors of production and of demand for the product of the industry within which the firm operates. By contrast, where price is embedded within a system of reproduction, the problem of the scale of production is a problem of the theory of accumulation and of the growth and development of the economy.

In terms of the framework commonly adopted by the 'marginalists', the classical representation of the laws of return has very little to do with the properties of the production possibility frontier (or set), but everything to do with movements of the frontier itself. The significance of this distinction is highlighted in the following passage from Kaldor (1975b, p.355):

There can be no such thing as an equilibrium state with optimum resource allocation, where no further advantageous reorganization is possible, since every such reorganization may create a fresh opportunity for a further reorganization.

While the 'negative' aspects of Young's contribution did not represent a direct attack on the logical consistency of 'Marshallian' theory as Sraffa's critique did, in some important respects the implications for subsequent economic analysis of Young's critique were even more formidable than those flowing from Sraffa's. Not only was the 'competitive' partial equilibrium framework incapable of dealing adequately with the laws of return, but furthermore the ability of any form of equilibrium analysis to provide such a framework was challenged by Young's critique. The significance of the potentially damaging implications of Young's critique become apparent when considered alongside the following claim made by Hahn (1973, p.14):

Here I want to note that the rather uncontroversial view that increasing returns cause difficulties to perfect competition seems to me to bear no logical relationship to the claim that therefore equilibrium notions are not required or that they are sterile.

A clear implication of Young's analysis is that it is not merely the existence of market imperfections which 'causes difficulties' for equilibrium analysis, but rather it is some specific features of the dynamic process which generates such imperfections which provide the challenge to equilibrium theory.

Young's contribution to the development of an understanding of the increasing returns process has been largely neglected by the mainstream of economic theory. Kaldor (1972, p.1243) has suggested the following as a possible explanation for this neglect:

I feel convinced that it was so many years ahead of its time that the progress of economic thought has passed it by despite the attention it received at the time of its publication. Economists ceased to take any notice of it long before they were able to grasp its full revolutionary implications... It was partly also because its importance as a basic criticism of general equilibrium theory itself
was not properly understood.

As writers such as Blitch (1983a) and Walsh (1983) have suggested, this neglect could also be explained in part by the imperfect competition and Keynesian 'revolutions' of the 1930's and 1940's, which had the effect, amongst other things, of redirecting attention to the short-period theory of price and output determination. Moreover the growing popularity at the theoretical level of the Walrasian-Arrow-Debreu general equilibrium method of analysis undoubtedly occurred to a large extent at the expense of the 'Marshallian' partial equilibrium framework. By the time this general equilibrium had been refined into the rigorous Arrow-Debreu type model, the degrees of freedom remaining in which the implications of the critiques of Sraffa and Young could be considered had been all but exhausted. The contributions by Colin Clark (1951), Arndt (1955) and Kaldor are illustrative of some of the implications which may be derived from Young's critique which challenge some of the fundamental conclusions derived from static equilibrium analysis.

Conclusion

We have considered the development of the 'Marshallian' theoretical framework in the context of the serious challenges it was forced to confront in the course of value theory controversies of the 1920's. These controversies arose in the pursuit of a solution to a problem which had been central to Marshall's own analysis, that being the incorporation of increasing returns (or decreasing costs) within the confines of 'particular' equilibrium specifications and based on 'normal' supply and demand conditions. As Sraffa had anticipated, the unsatisfactory resolution to this conundrum did unquestionably 'disturb the harmony of the whole' of the existing 'Marshallian' framework. The inconsistencies in the treatment of the laws of return were clearly exposed in Sraffa's critique, as was the fragile nature of 'unreal constructs' which been hurriedly assembled in an attempt to hide from view the weaknesses in the underlying foundations of the evolving theoretical structure. Sraffa located the principal source of these weaknesses in Marshall's own misinterpretation of the purpose of the laws of return in the 'Classical' model. At the same time Sraffa's critique also served to highlight the extent to which the 'Marshallian' structure of the 1920's had departed from the original foundations laid by Marshall. The object of the 'reconciliation exercise' had by then been transformed to a 'perfectly competitive' equilibrium, and internal economies of the variety emphasised by Marshall had been surpassed by external economies acceptable only in the form which complied with the assumed equilibrium conditions. The role of the Representative Firm had waned with the erosion of the historical relevance of Marshall's biological analogies, and in its place emerged the Equilibrium Firm where the internal economies previously possessed by the Representative Firm were either seriously curtailed or relegated to play a auxiliary role to some form of external economies.

Sraffa in 1926 had argued, as Marshall himself had hinted, that the solution to the dilemma was to be found in the abandonment of the assumption of 'perfect competition', to be replaced by the analysis of industrial structures characterised by permanent market imperfections and price setting behaviour. As was observed, to
the leaders of the ‘simplified Marshallism’ approach such a radical renovation of
could barely even be contemplated. By
Sraffa had lost all confidence in the possibility of the rehabilitation of the
system, and had instead called for its complete demolition. To a large
extent, it is likely that Sraffa’s ‘negative and destructive’ conclusion reflected a
reaction to the ineptitude of his opponents. It is also significant to note that, as is
stated in the Preface to Sraffa (1960), the propositions central to his later more general
critique of ‘neo-classical’ theory (derived from within a classical theoretical frame-
work) had began to take place prior to 1930.

The central conclusion emerging is that, contrary to Blaug’s (1962,p.399) claim,
the analysis of the Laws of Return by Marshall and the ‘Marshallians’ failed to bring
‘order and meaning’ to ‘classical’ theory. The logical inconsistencies in the ‘Marshall-
ian’ theoretical foundations which precluded an effective investigation of the Laws
of Return were emphasised in Sraffa’s destructive contributions, while the shortcom-
ings inherent in the ‘Marshallian’ method of analysis were underlined in Young’s
equally important critique. Marshall’s immediate followers had failed to provide a
satisfactory solution to Marshall’s ‘reconciliation problem’, and their departures
from Marshall’s draftsmanship magnified the limitations which Marshall had at-
tempted unsuccessfully to overcome. Sraffa and Young’s critiques both highlighted
that the logical and methodological difficulties encountered initially by Marshall
derived not primarily from the absence of appropriate analytical techniques as
Marshall had claimed, but rather from a fundamental misinterpretation of the
content and role of the Laws of Return in ‘classical’ value theory. As was emphasised
in Young’s 1928 contribution, the analysis of increasing returns requires the aban-
donment of static equilibrium theory, and instead a return to the dynamic repre-
sentation of the Laws of Return to be found in ‘classical’ value theory.

The precise nature of Marshall’s ‘reconciliation problem’, together with his
proposed ‘solution’, appears to have been seriously misunderstood by many of
Marshall’s immediate followers and subsequent readers of Marshall’s Principles. In
the ‘simplified Marshallism’ emerging in the 1920’s under the leadership of Pigou,
the ‘reconciliation exercise’ increasingly came to embrace the specification of exter-
nal economies which appeared to preserve the achievement of equilibrium condi-
tions later to be defined as ‘perfect competition’. A similar ‘interpretation’ of
Marshall’s dilemma is to be found in the following passage from Thirlwall
(1987,p.324): “Marshall’s reaction was to take refuge in the short run assuming
capacity to be given and to treat increasing returns as ‘externalities’, preserving the
U-shaped cost curve and the notions of the optimum sized firm and competitive
equilibrium”.

The investigation into Marshall’s analysis of increasing returns clearly indicated
that such interpretations are inconsistent with Marshall’s writings. Moreover it is a
misinterpretation which serves to confuse an understanding of the significance of
the issues relevant to the ‘reconciliation exercise’. Marshall, recognising the impor-
tance of increasing returns in industrial production, endeavoured to incorporate such
a process into the ‘statical’ demand and supply theory of value he was
attempting to construct. The dilemma arose from Marshall’s awareness, stemming
from his reading of Cournot, of the potential for monopolisation of industries where
such returns prevailed, a result which would threaten the viability of his theory of
exchange-value. Therefore Marshall's 'reconciliation exercise' involved the search for equally pervasive forces which counteracted the tendency towards monopolisation. It is essential to note that, unlike its representation in the 'simplified Marshallism' literature, the object of the reconciliation exercise in Marshall's Principles was not the existence of a perfectly competitive equilibrium. Such a characterisation is symptomatic of a failure to read beyond the early chapters in Book V of Principles where assumptions explicitly noted as 'provisional' were being employed. Similarly, despite the opposing views expressed by writers such as Stigler (1941) and A.L. Levine (1980), there can be little doubt that it was through his 'biological' analogy of the natural life cycle of the firm that Marshall placed the major burden of his proposed 'solution' to the 'reconciliation' problem. Marshall was aware that the emergence of joint-stock companies threatened the relevance of his 'biological' analogies, and it was indeed the failure of Marshall's analogy to withstand historical verification which invalidated his 'solution', rather than the attacks on the Representative Firm concept launched by critics such as Robbins (1928). While it is true that Marshall had popularised the notion of 'external' economies, a close reading of Principles fails to furnish much evidence to support the widely held view that Marshall perceived external economies as performing the leading role in the 'solution' to his reconciliation exercise. Likewise while Marshall's discussion of a firm's 'particular' market and demand curve constitutes an important and neglected forerunner to the concept of 'imperfect competition', it can not be argued convincingly that Marshall's ideas in this context had been developed to the extent that they could perform a significant part in the 'reconciliation exercise'.

The futility of the path taken by the 'simplified Marshallism' approach to derive a 'solution' to Marshall's dilemma was emphatically confirmed in Sraffa's 1926 critique, which revealed that the supply schedule in the context of 'particular equilibrium' and 'competitive conditions' was capable of representing only those exceptional economies which were both 'external' to the individual firm and 'internal' to the industry. Of particular importance was Sraffa's demonstration that the source of the logical difficulties confronting the 'Marshallians' was Marshall's attempted transformation of the role the Laws of Return traditionally played in 'classical' value theory. Following in the tradition of Smith, the Laws of Return in 'classical' analysis were represented as a dynamic process, belonging to the chapters of 'Distribution' and 'Production' in value theory. The heterogeneity of the Laws of Increasing and Decreasing Returns could be clearly observed, and a role for these laws in the determination of a functional relationship between costs and quantities was explicitly denied. In order to establish the symmetry between the opposing forces of demand and supply, Marshall had attempted to combine the two laws into a simple law of non-proportional returns in the derivation of the supply schedule, shifting the laws from the positions they had traditionally occupied to the chapter of 'Exchange Value'. Rather than bringing 'order and meaning' to the 'classical' analysis of the Laws of Return, Marshall's attempted transformation had introduced disorder and the beginnings of a theory riddled with logical difficulties his followers were unable to solve.

Marshall's attempted transformation of the Laws of Return not only introduced serious logical difficulties, but also resulted in a purging of the dynamic dimensions of the Laws of Return in order to accommodate the static equilibrium framework he
helped to erect. It was Allyn Young who emphasised that this static equilibrium framework precluded a meaningful investigation of the increasing returns process. Marshall in his writings on economic methodology and in Appendix H of Principles had shown some awareness of some aspects of the dynamic issues raised through the operation of increasing returns, however he had attempted to preserve his static equilibrium method of analysis by circumventing these difficulties through his rather unconvincing appeal to 'biological' analogies. The process of transferring the consideration of the Laws of Return from the sphere of growth and development to one of static equilibrium conditions was completed in the ensuing 'simplified Marshallism' approach with its emphasis on a static representation of external economies and theoretical constructs such as Pigou's 'Equilibrium' firm.

As Sraffa (1930) came to suspect, the introduction of market 'imperfection' into the 'Marshallian' system in itself did not provide a solution to Marshall's dilemma. Market imperfections are illustrative of the outcome, rather than the operation of the increasing returns process. It was Joan Robinson, in her later reconsideration of the imperfect competition approach she had helped to pioneer, who highlighted most clearly that the timeless static setting in which such market imperfections were introduced prevented such theories from providing a suitable basis for an analysis of the problems of price, production and distribution. The Arrow-Debreu general equilibrium framework, depicting the modern 'neo-classical' approach to value theory in its most rigorous form, had struggled largely unsuccessfully to complete the task of considering the market imperfections which Marshall had been aware were implied by the existence of increasing returns. More importantly, even if such a task could be successfully completed, the analysis of the dynamic aspects of the increasing returns process remains outside the scope of the Arrow-Debreu model, for precisely the same reasons which were outlined in Young's 1928 paper, and which have been reiterated subsequently in the work of writers such as Kaldor and Joan Robinson. Read in the context of its intended purpose, Sraffa (1960) provides the stimulation to reconsider the applicability of the 'classical' approach to economic analysis, a shift in methodological stance which would return the consideration of the laws of return to its proper dynamic setting.

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Notes

1 Samuelson’s (1947, p.27) view that “the so-called method of partial equilibrium consists of nothing more than a liberal sprinkling of zeros into the equations of general equilibrium” offers some support for Marshall’s claim that his analysis was ‘general’ rather than ‘partial’. See Williams (1978, pp.74,91) for a discussion of this point.


3 A similar warning is to be found in a footnote in Principles pp.379-380, where Marshall once again asserts the “difficulties and risks” associated with the use of the “statical” method “reach their highest point in connection with industries which conform to the law of Increasing Return”

4 This is one of the major conclusions emerging from Bharadwaj (1979) and represents a major point of discussion in Snaffa (1925).

5 As Bharadwaj (1979) has also illustrated, this ‘theoretical precision’ has not always been translated to the same level of precision in the context of empirical studies.

6 Marshall’s ‘confusion’ was shared by many of his contemporaries and immediate followers, including Clapham (1922a, p.310), one of the most vigorous critics of the ‘Marshallian’ methodology.

7 In the first three editions of Principles, this “tendency” was in fact referred to as a “Law” - see Marshall (1961, p.278).


9 See Jenner (1964-5, pp.23-28). Chapter xi of Book IV of Principles is devoted almost entirely to ‘internal economies’.

10 See Stigler (1941, pp.69-76).

11 The general link between value and growth in Marshall’s analysis, as illustrated in his discussion of increasing returns, is highlighted by Losby (1978).

12 Marx (1867, p.626) was the first economist to provide a clear statement of such pressures leading away from ‘free competition’ - “The battle of competition is fought by cheapening of commodities. The cheapness of commodities depends, ceteris paribus, on the productiveness of labour, and this again on the scale of production. Therefore, the larger capital beat the smaller...”. For a discussion of Marx’s contribution see Sylos-Labini (1984, pp.48-51).

13 A more detailed description of this process was presented in Marshall (1920a, pp.315-316). In the first four editions of Principles the clause “as scarcely to have a true normal value” read “that no free play is allowed to the normal action of economic forces, and it can scarcely be said to have a normal supply price”. See Marshall (1961, p.406).

14 Marshall (1891, p.69) claimed that Cournot’s ‘failure’ contributed to the delay in the formal publication of most of his diagrams relating to value. See comments by Whitaker in Marshall (1975a, p.51).

15 See also Cournot’s (1838, p.59) reference to the possibility of decreasing costs in the case of “manufactured articles”.


18 Marshall (1975b, p.141) puts forward the case of Australian preserved meat as a “bona fide” example - “In such a case highly paid skill is required for superintending small works, as the works increase this expense does not increase proportionally, and the application of machinery renders the cost of production in other ways less”.


19 See for example Marshall (1975a, p.151).
20 See Marshall (1975a, pp.150-151) where the example being discussed appears to imply a firm confronted with a negatively sloped 'demand curve'.
24 This is in contrast to the approach adopted by some of the modern ‘general equilibrium’ theorists - for a discussion see Hahn (1973, pp.12-14).
25 Marshall (1920a, pp.316-318) added further internal constraints relating to the structure of ownership of large firms.
26 The contributors representative of this approach include Shove (1942), Blaug (1962, p.391), Hague (1958) and Negishi (1988). Elements are also to be found in Loasby (1978) and Jenner (1964-5).
27 See also the discussion in Marshall (1898, p.318).
28 See also Marshall’s discussion in Appendix H, where he concluded that in the case where “these businesses are fused in a trust.....the use of the term "normal" is less inappropriate than seemed probable a priori”. [Principles, p.805].
29 In Marshall’s terminology, “some businesses will be rising and others falling”. [Principles, p.378].
30 For a discussion of the close relationships between the Representative Firm, normal profit and long-period normal supply price in Marshall’s *Principles*, see Frisch (1950, pp.508-513).
31 “We will have to analyse carefully the normal costs of producing a commodity, relatively to a given aggregate volume of production; and for this purpose we will have to study the expenses of a representative producer for that volume of output”. [Principles, p.317. Marshall’s emphasis].
32 See for example A. Levine (1980), Robbins (1928), Shackle (1967), Williams (1978) and Whitaker (1982). A notable exception is Robertson (1930, p.84) who claimed that the concept of the Representative Firm is “essential to an understanding of the theory of increasing returns”.
33 This claim was based on an observation by Robbins (1928, p.387) that the Representative Firm did not figure in the first edition of *Principles*. However as Guillebaud (1942, p.332) indicates, while the Representative Firm did not make ‘its first official bow’ until the Second Edition, the idea was already present in the First Edition. The extract from the Letter to Floux quoted above would also suggest that the Marshall had developed the notion of the Representative Firm before the First edition of *Principles* was published.
34 Stigler (1941, p.76) argues “Marshall’s chief purpose in creating this category [external economies]... was to explain the great historical reduction in production costs, which were associated with increases of output, size of plant, and size of firm, and which to a large extent were not accompanied by monopolisation”. Jenner (1964-5) also places much importance on the external economy explanation.
35 See also *Principles*, p.284. These passages from *Principles* would suggest a shift in emphasis regarding the relative importance of internal and external economies as compared to Marshall’s earlier writings.
36 The notion of a ‘perfectly elastic’ demand curve for a firm also is suggested in Marshall’s rather confusing account of the “marginal shepherd”. [Principles, p.517]. In his Mathematical Appendix Marshall makes it clear that “normal” implies the absence of a consideration of “diminishing expenses of production” and trade associations” associated with the “spoiling of a man’s special market”. [Principles, p.849].
37 As Guillebaud (1952, p.118) summarises, Marshall’s *Principles* is “riddled with statements and arguments which imply that competition is not assumed to be perfect”. Shirai (1968) makes the interesting and significant observation that the phrase “in a perfect market” which appeared in
Marshall (1890, p.402) was deleted from the subsequent editions of Marshall’s *Principles*.

This interpretation is specific to *Principles*, for as Hague (1958, pp.695-696) indicates, in *Industry and Trade* Marshall appears to suggest that the ‘general’ market in which all firms compete are completely distinct from the ‘particular’ markets in which the firms operate. See the definitions given in Marshall (1920a, p.182).


By 1930 Sraffa had called not only for the abandonment of the assumptions of ‘perfect competition’, but also of the ‘Marshallian’ theoretical approach in general.

Some commentators have, however, tended to overstate the resemblance. A prime example is to be found in the claim made by Stykolt (1956, p.251) who argues that Marshall’s example of fishmongers and greengrocers in working class quarters (*Principles*, p.661) represents an example of “the tangency solution of the problem of group equilibrium with product differentiation”.

As Liebhaftys’s (1955) study highlights, this conclusion is more applicable to Marshall’s analysis in *Principles* than to that contained in *Industry and Trade*.

Significantly Pigou, one of Marshall’s most influential followers, by as early as 1912 had adopted the ‘Cournot - Pareto’ approach defining ‘simple competition’ as occurring when the number of firms has to be so large that each takes the price as given. See Pigou (1912, p.180) and comments in Williams (1987, p.3).

On at least one occasion in *Principles* (p.397) Marshall did in fact suggest that “the existence of many competitors” may be a characteristic of ‘free competition’. It was significant that Marshall did not assume that all such competitors would be ‘small’, but rather that the competitors would own “businesses of all sizes”.

In this context Loasby’s (1978, p.10) claim that the resemblance in Marshall’s writings to later models of ‘imperfect competition’ is “only superficial” is difficult to dispute.

Levine (1980) also shares the view outlined that the formally defined notion of ‘competitive equilibrium’ does not correspond to the objective of the reconciliation exercise in *Principles*.

Any remaining doubt concerning the importance Marshall placed on the role of biological analogies as a method of economic analysis can easily be dispelled by reference to Marshall (1898).

This aspect of Marshall’s analysis is also highlighted by Newman (1960) who emphasises the considerable differences between the sticky and random nature of the adjustment process described by Marshall and Walras’ *Équation*.

Similarly Marshall stated “the tendency to increasing returns does not act quickly”. [*Principles*, p.455].

The same point is highlighted by Bharadwaj (1972, p.44).

This point is clearly illustrated by Dasgupta (1985, p.104); “Marshall’s chief endeavour in value analysis is to indicate a junction between equilibrium economics and the economics of growth as a sequence in time”.

See for example Marshall (1885).

Robinson (1974a, pp.127-8) discusses similar issues.


Marshall’s discussion of the “Particular expenses curve”, found to be “confusing to the extreme” by Blaug (1962, p.393), is contained in Appendix H, (section four) of *Principles*. Ophio (1931, pp.211-214) provides an excellent summary of the nature and role of the ‘Particular Expenses Curve” in Marshall’s analysis.


As quoted in Bharadwaj (1972, p.33).

See Marshall’s notes quoted in Bharadwaj (1972, pp.36-37).
59 Pigou (1910,p.366) had seen his work as being "merely supplementary" to that of Marshall's. As Bharadwaj (1972,p.32) reports, Marshall stated that he did not intend to disclose his reservations "for the present", even to Pigou himself.

60 As shall be noted below, Young (1913) contains a criticism of Pigou's method.

61 A more detailed account of what he termed the "Cunynghame-Edgeworth-Pigou" is contained in Whitaker (1982).

62 See Bharadwaj (1972,pp.32-33).

63 Principles, pp.516-517.

64 The 'adding-up' problem in a sense represented a 'reconciliation problem' similar in many ways to that being pursued by Marshall; in the former the problem related to the (impossible) task of reconciling non-constant returns to scale with the marginal productivity theory of distribution. The major participants in the controversy included Wicksteed, Flux, Barone, Pareto, Walras and Wicksell. Stigler (1941,pp.327-387) provides a detailed summary of the controversy (and concludes that the role played by Marshall's colleague Edgeworth as "neither important or praiseworthy"). Robinson's (1934a) paper "written in satirical spirit" outlines the futility of the attempted 'reconciliation'.

65 Principles, p.519.

66 To some extent Marshall's 'failure' to pursue these issues can be explained by his emphasis on the determination of value in the long-period context.

67 As is outlined below, Sraffa (1925) highlighted that constant returns arose not from the 'balancing' of two opposite tendencies, but rather the absence of both.

68 Clapham's (1922b,p.562) frustration at Pigou's unwillingness to respond to his questioning in this point is clearly evident; "I assume, therefore, that he agrees with me that exclusion [of inventions] will condemn the boxes to perpetual emptiness."

69 See Principles, p.240 for example.


71 Maneschi (1986) provides both a summary of the issues raised in Sraffa (1925) and a comparison of this earlier paper with Sraffa (1926).

72 The passages from Sraffa's letter to Keynes have been taken from the extract contained in Roncaglia (1978,p.11).

73 This conclusion is stated more directly in Sraffa (1925).

74 Sraffa (1925,p.307), as translated by, and quoted in, Maneschi (1986,p.6).

75 Marshall (1920a,p.188). As Sraffa (1926,p.540) also points out, a similar conclusion is implied in much of Marshall's discussion in Principles; see for example Principles, p.441.

76 See the passage from Sraffa (1925,pp.306-307) in Maneschi (1986,p.6).

77 Sraffa's interpretation of the role of external economies in Marshall's analysis was similar to that of Stigler (1941). This interpretation appears to be experiencing a 'resurgence' in support in the works of some recent writers such as Harris (1988) and Thrall (1987). Harris (1988,p.164) argues; "Marshall...shrewdly sought to get around the problem by assuming, for no good reason, that increasing returns are external to the firm and internal to the industry". Harris fails to demonstrate where Marshall made any such assumption.

78 Stigler (1957,p.1) notes that the meaning of competition, "as pervasive and fundamental as any" to the whole structure of economic theory, was "long treated with the kindly casualness with which one treats of the intuitively obvious". It was Cournot (1838, esp.pp.90-98) who was first to address formally the conditions required for price taking and price adjustment for the individual firm, a notion further refined in particular by Pareto, Edgeworth, and J.B.Clark, with the 'complete' formulation of the conditions necessary for the achievement of perfect competition presented in Knight (1921), and concisely summarized in Robinson (1934b).

79 See also Newman (1960) who is specifically critical of what he believed to be Sraffa's failure to
recognise that Marshall's representation of long-period equilibrium and associated competitive process differed substantially from that usually associated with the 'Cournot' static stability conditions.

80 While Pigou had not played a significant role in developing the notion of perfect competition, he was as Stigler (1957,p.11) observed, a highly influential figure in popularizing the concept. In Pigou (1912,p.180) the definition of what was there referred to as "simple competition" clearly set out that the number of firms was sufficiently large to ensure that each individual firm took the industry price as given.

81 This conclusion is particularly strongly stated in Sraffa (1925), as is illustrated by the extracts contained in Maneschi (1986).

82 The distinction between the 'extensive' and 'intensive' margins in Ricardo's treatment of rent is further discussed in Dobb (1973,pp.68-9).

83 Significantly, the path chosen by Marshall meets the approval of Blaug (1962,p.403); "It was not until the 1880's, however, that it suddenly dawned on economists that the Ricardian theory of differential rent is really a special case of a much more general theory".

84 Sraffa (1925) was highly critical of Palgrave's Dictionary of Political Economy, where constant costs were said to arise when an 'exact balance' was achieved.

85 Bharadwaj (1988,p.81) is particularly critical of Marshall's interpretation of Ricardo's theory of value as outlined in Appendix I of Principles, claiming that "Marshall in fact ignored altogether the role labour theory played in Ricardo".

86 H.M.Robertson (1970,p.7), in tracing the origins of Marshall's distribution theory, noted that Marshall had claimed that his theory of distribution had in the 'first instance' been based on 'Adam Smith, Malthus and Ricardo'. If this is the case, the following passage from the Preface to the First Edition of Principles (p.vii) where Marshall demonstrates his commitment to a demand and supply treatment of distribution, further highlights his lack of understanding of classical value theory; "As, in spite of the great differences in form between birds and quadrupeds, there is a Fundamental Idea running through all their frames, so the general theory of the equilibrium of demand and supply is a Fundamental Idea running through the frames of all the various parts of the central problem of Distribution and Exchange".

87 See Garegnani (1983,p.310). A prior and more detailed discussion is contained in D.Levine (1978, esp. pp.231-241) and similar issues are also raised in Bharadwaj (1978b,pp.253-71).

88 Once again, Roncaglia's (1978,p.12) reference to "Marshall's theory of perfect competition" (emphasis added) indicates a lack of familiarity with Marshall's treatment of competition; 'perfect competition' belonged to the 'simplified Marshallism' framework.


90 As Robinson (1978,p.xxii) observed, the "Walrasian doctrines" were to come into vogue at the London School of Economics, where it became customary "to mock at the logical inconsistency in Marshall's method of treating markets 'one at a time'". However it was difficult to discount the practical advantages of the 'one at a time' approach.

91 In addition to his discussion of the firm's 'particular demand schedule', Marshall's 'net product' of an agent of production derived in the Mathematical Appendix to Principles (p.849) also contained the mathematical properties of a marginal revenue function. However the concept did not play a significant role in Marshall's general treatment of value theory in the main text of Principles. An interesting account of the development of the marginal revenue concept is contained in Shackle (1967,pp.22-42).

92 Robbins (1928,p.386) could find only "one or two instances" of the usage of the 'Representative Firm' since Marshall. The example discussed by Robbins was by D.H.Robertson, the one follower of Marshall who clung steadfastly to Marshall's biological analogy.

93 Wolfe (1954,pp.337) for example began his paper by stating "It is now more than twenty years since Professor Robbins' famous article on the representative firm finally drove the concept from the
pages of economic textbooks”.

94 In an earlier criticism of the Representative Firm concept, Silberling (1924,p.438) had used the words “misleading and superfluous”, being “for Marshall...nothing but an average firm”. This appears not to be consistent with Marshall’s own definition!

95 In a footnote to Robbins’ claim, it is hastily added “I do not, of course, suggest that Marshall himself could commit so gross an error...”.

96 This point was emphasised in Robertson’s (1930) response to Robbins’ critique, which concluded with the question; “Will Mr. Robbins tell us exactly how he proposes to tackle it, once he has cast the Representative Firm into the sea?”

97 In arguing that the Representative Firm was “not indispensable” Shove (1930) supported Robbins’ view that the concept was ‘unnecessary’. On the question of how the existence of internal economies can be reconciled with ‘competitive’ conditions without resort to Marshall’s biological analogies Shove attempted to revive the previously discredited notion of internal economies of industrial expansion being offset by equivalent diseconomies, the latter including marketing costs which are clearly inconsistent with ‘competitive’ conditions.

98 An additional difficulty is to be found in Young’s (1928,p.538) contention that the Representative Firm, along with the industry of which it is part, loses its identity when the extension of the division of labour amongst industries is considered.

99 This is not to say that no role can be found for the concept of a Representative Firm beyond the confines of acting as a tool used specifically to derive supply schedules in situations where internally generated decreasing cost conditions prevail. See Wolfe (1954) for a discussion of this point, which argues that the Representative Firm concept provides a powerful analytical tool which is “much more complete than any competitor” (p.348). An further example is provided by Kaldor (1985,pp.49-50); “When I mentioned a "group of firms" I had Marshall's concept of a "representative firm" in mind. This concept assumes that in each industry a large part of the output is produced by firms of average managerial efficiency, using equipment of average age, and workers of average ability”, (Kaldor’s emphasis).

100 Pigou (1927,p.188) begins with "In this article, the writing of which was suggested to me by reading Professor Sraffa's very interesting paper with a similar title...”

101 Described in Pigou (1928,p.240) as “conditions such that the outputs of the individual firms are small relative to the output of the whole industry”.

102 Given the obvious and considerable differences between Marshall’s Representative and Pigou’s Equilibrium Firm, Robbins’ (1928,p.387) view that the two were almost identical concepts indicates his lack of understanding of both concepts. 103 According to Robinson (1977,p.11), Pigou’s introduction of such concepts reflected his ‘innocence’ of any knowledge of industry. A summary of the theoretical criticisms and adverse analytical findings in relation to 'U' shaped cost curves can be found in Kriesler (1987,pp.17-20). Sylos-Labini (1988,p.277) ends his forceful critique of the continued usage of such curves by concluding; “So far, economists have remained unmoved by the impressive and increasing number of theoretical criticisms and empirical analyses which I have just referred to. The moment has come, I feel, to slough off this seraphic and untenable imperturbability”.

104 There were some notable exceptions, see for example Hotelling (1929, esp pp. 41-42).

105 The term was coined by J.M.Keynes in his editorial note to the 1930 Symposium on ‘Increasing Returns and the Representative Firm’ published in the Economic Journal.

106 See the comments in Sraffa (1930,pp.90-92). These included the ‘bones and the skeleton’, ‘waterdrops and the waves’, and ‘colour of animals’. Shove (1930,p.115) added “a cluster of variable stars” to Robertson’s imposing list.

107 Sylos-Labini (1988,pp.51-56) provides an insightful comparison of the treatment of the laws of return in the value theories of Smith and Ricardo, differences isolated as stemming largely from a distinctions in the purpose of analysis. It was Ricardo’s contribution which most directly influenced Sraffa’s critique, and it was Ricardo who had the major influence on Sraffa’s later work.

109 Knight (1925, p.333). It should be recalled that Young (1913) had himself hinted at this line of criticism. Knight’s views on these issues are currently being examined by Stephen Nash as part of a Master of Economics thesis at the University of Sydney.

110 “…in the normal case a change does not call forth countervailing changes but, instead, supporting changes, which move the system in the same direction as the first change but much further. Because of such circular causation a social change process tends to become cumulative and often to gather speed at an accelerating rate” (Myrdal 1957, p.13).

111 It is not only Smith’s representation of increasing returns which belongs to the theory of dynamics, for as Sylos-Labini (1985, p.58) and Pasinetti (1960) have highlighted, in interpreting Ricardo’s discussion of the tendency to diminishing returns it is important to realise that this analysis had also essentially adopted a dynamic approach. It is essentially the product of a process which occurred through time whereby an increasing population called into cultivation land which was less productive.

112 Pasinetti (1982, pp.138-139) traces the basis of this distinction to the differentiation made by Ricardo (1951) in the first two chapters of his Principles between ‘produced commodities’ and ‘scarce commodities’, the latter of which are neglected “on the grounds of economic irrelevance”.

113 See for example Marshall’s (Principles, p.357) discussion of the “primitive housewife” forced to contribute as much as possible to the well-being of the family with “a limited number of hanks of yarn from the year’s shearing”.

114 However, neither of these so-called ‘revolutions’ were successful in overthrowing the ‘old order’.

115 This point is highlighted by Sylos-Labini (1985, p.62). It is also probable that Sraffa’s appreciation of the significance of the shortcomings of the ‘Marshallian’ approach was further clarified in the preparation of his lectures delivered at Cambridge in the late 1920s. Young’s (1928) critique of the ‘Marshallian’ representation of increasing returns within a static equilibrium framework may also have strengthened Sraffa’s conviction that the ‘Marshallian’ approach to value theory had to be abandoned.

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