The Emergence of Marshall's Period Analysis

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Alfred Marshall's period analysis was arguably the most important and lasting theoretical innovation presented in his *Principles of Economics* when that book first appeared in 1890.1 So familiar is it, and so integral a component of the economist’s toolkit does it remain, that the originality and synthetic power manifested on its first appearance are easily overlooked. Period analysis marked a distinctive advance in economists1 ability to integrate diverse phenomena within a unified framework, and did much to alleviate any remaining conflict between approaches to value stressing one-sidedly either cost of production or utility. Marshall himself was convinced of the centrality of the period analysis to his work. Writing in 1891 to the Dutch economist N.G. Pierson he observed of the *Principles*

The attempt to work all existing knowledge on the subject of value into one continuous and harmonious whole, by means of a complex study of the element of Time permeates every book almost every page of my volume. It is the backbone of all that, from a scientific point of view, I care to say.2

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The early development of Marshall's treatment of the role of time in equilibrium analysis has been little examined.3 My main purpose here is to trace the evolution of his views on the subject in his pre-1890 writings. A straightforward chronological approach seems most effective, and best reveals the gradual emergence of his ideas.4

The succeeding sections deal with the treatment of the period analysis and related issues in

I: The Early Essay on Value (c. 1870)
II: The Pure Theory of Domestic Values (c. 1875)
III: The Economics of Industry (1879, 1881)5

6Free Press, New York, 1975), Vol. I, pp. 97-11. The two volumes of this work will hereafter be denoted as *EEW I* and *EEW II*.


8The attribution of a thematic organization, although it might raise a more logical structure, is evident to apply to this case and thus historical perspective.

9The Early Writings is reproduced in *EEW I* (pp. 33-139) and the Pure Theory in *EEW II* (pp. 186-216). A facsimile reprint of the privately-printed 1870 version of the Pure Theory was previously published by the London School of Economics. The *Economics of Industry* (Macmillan, London, 1879) was jointly authored by Alfred and Mary Paley Marshall, but the ideas were clearly his (for background see *EEW I*, pp. 5-83). The 1881 reprint had an important new preface.

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A final section (IV: The Cullination in the Principles) considers the method's final version in the Principles in relation to the earlier background. I take it for granted that the reader has some rough acquaintance with the mature version of Marshall's period analysis, although a brief account is given in section IV.1.

I: The Early Essay on Value

The essay in question, Marshall's earliest writing on the theory of value, seems to predate the appearance in 1871 of Jevons's Theory of Political Economy. What was to prove one of the dominant themes of Marshall's subsequent work is already clearly enunciated in this remarkable piece when he observes that:

The circumstances which determine the supply and demand of a commodity are widely different for different cases, the differences depending mainly on the length of the period of time to which the investigation applies. (134)

Marshall's first attempts to synthesize demand and supply into a more general and systematic framework seem to have been provoked by the blatant need, exemplified in John Stuart Mill's Principles, to elucidate the implicit role of demand in classical value theory and reconcile apparently discordant approaches to "market" and "natural" values. These issues had come to the fore in the course of W.T. Thornton's 1869 onslaught on the wages fund theory. Certainly, Thornton's work seems to have influenced Marshall's early attempt at a synthesis of market and natural values. The theoretic H.D. McLennan's criticisms on "the unqualified statement that cost governs value" were also cited (much later) as an early influence in this direction. (136)

Although both demand and supply conditions are admitted to depend on "the length of time to which the investigation applies," this dependence is treated in detail only in the case of supply. While recognizing that "considerable time is often required" for the full response of demand to price, Marshall merely observes that there "is room for considerable error in making allowance for this disturbing cause." (143n.) Formally he assumes the same demand curve to apply irrespective of the period involved, unless there is a change in underlying circumstances, such as wealth, tastes and the availability of substitutes. In considering supply, however, he carefully delineates the assumptions appropriate to periods of different length.

The basic distinction between market and natural values is made to turn on the adaptability of supply. (139) Market value deals with situations where "the time is not long enough for fresh commodities to be produced in order to eke out the supply" or with "Periods such that no appreciable additional amount can be produced in time to meet alteration in demand." (142) The two conditions differ, as will be emphasized shortly. Natural value, on the other hand, is concerned with average price over a period "sufficiently long for any additional amount required to be produced as the demand alters and for all casual variations to be neglected, average results alone regarded." (139n.) Natural value thus deals with a flow equilibrium rather than with disposition of a fixed stock.

These distinctions apply most naturally to a commodity like "corn" (i.e. wheat) whose output appears at a distinct sequence of harvest dates, so that market value refers to the price determination in the interval between successive harvests, while natural value refers to the average over a run of harvests. The corn case features prominently in Marshall's discussion, as does the case of fish (a daily harvest delivered each morning) which is analogous except for extreme perishability. But Marshall also intends to cover the case of manufactures, where production is more of a continuous flow. This might be accomplished by assuming a fixed gestation period and counting the given stock as that either already produced or already started and currently in the pipeline. Thus, new production might be admitted to "eke out the supply" but its rate could not respond "in time to meet alterations in demand" over a period at least as long as the production gestation period. However, at this early stage, the harvest paradigm seems to have been the dominant one in Marshall's thinking.

Marshall offers a sophisticated theory of market value, with an emphasis on expectations probably owing something to Thornton. (145) If the good involved is storable, like wine, its sellers will have a speculative storage demand, "looking forward to what are likely to be the relations between supply and demand" in the future. (135) This speculative demand, regarded as a function of current price, is subtracted from the total available stock to obtain the current market supply schedule facing final buyers, which is then paired with their demand schedule to determine current market price. (146) Marshall assumes that expectations are generally secure, apart from the effects of random harvest variations, so that in tranquil conditions market price will tend to equal the (marginal) cost of production that has been incurred and changes in the amount stored will be small. The sudden expectation of change in future conditions will, however, bring speculation into play and move current price toward an appropriate parity with expected future market price. In this way, longer-term considerations influence market values indirectly through storage decisions. However, for a non-storable commodity these complications disappear and the market supply curve is vertical at the level of the total available stock (135-7).

In the treatment of natural value, two cases are distinguished. Both deal with long-period equilibrium in which capital and labor are fully mobile, and both rest on the assumption of free competition. (145) The difference between the two cases is fundamentally a question of the organization of production. For the shorter periods "no change in the mode of production is contemplated but the periods are sufficiently long to enable the supply to be regulated so as to meet the demand" (137-8).


In the case of the entire section all unannotated page references are to EWW.


[6] The term "market value" is never used in the Essay, which instead refers to periods A, B, C, D, Periods C and D are said to deal with natural values. Period A is rendered a special kind of little interest—elsewise similar in price approximately by rule of thumb and meant demand. Period D deals with the market equilibrium described below.


The supply curve will be rising in such cases.8 For longer periods, changes in the mode of production are admitted "among which will be prominent systematised division of labour and the application of machinery already invented but which previously to the change [in output] it has been inexpedient to employ," but with "all changes in methods of production being rigidly excluded which do not follow as a direct consequence from the changes in the amount produced" (140). Supply curves in this case will often be falling, especially for manufactures.

There will be "an upper limit to the periods which can be considered," for appreciable "changes in the general habits and skill of the people and in their command over mechanical resources" cannot be admitted (139). Cases involving "that gradual development of commerce and economy of labour which is effected during generations of continuous social progress" are, Marshall claims, best handled by "a special course of reasoning," with the important exception of the case of agriculture as a whole (139). The connections between social conditions and the surplus of agricultural production over subsistence are so intimate that a supply curve embodying the effect of increased agricultural output on social conditions can reasonably be constructed (143). Such a general-equilibrium or reduced-form style of agricultural supply curve could slope negatively, and Marshall grasps this possibility as a means of resolving the conflicting views of Americans such as Carey and the British classical economists on the relationship between population growth and food prices. Carey, Marshall explained, was envisaging a longer period than Ricardo and admitting induced social changes that the latter implicitly excluded (144).

The Early Essay has only brief remarks on "that resistance or friction which has to be overcome before capital will move from one employment to another" (147). By making supply adapt less rapidly this friction "causes the oscillations in production to be smaller and slower than they otherwise would be. It sometimes keeps down prices at the expense of producers and sometimes contributes to that artificial monopoly which occasionally enables them to realize very large profits" (147). Here, surely, the germ of short-run analysis and the quasi-rent concept may be discerned. Marshall also hints that capital may be slower to leave than enter an industry, an asymmetry he was to emphasize in the Pure Theory of Domestic Values.

Before leaving the Early Essay, a few further germane aspects may be briefly noted. In natural equilibrium (of either variety) price equals cost of production at the margin when "all temporary disturbances are neglected" (143). If the supply curve is rising, "the cost of production . . . of the dearest portion governs the price of the whole; while the extra profit which some producers obtain is remuneration of special skill or the fruits of a natural or artificial advantage which partakes of the nature of a monopoly" (147). With a falling supply curve, however, no such attempt to unscramble rent elements is made. Indeed, the Cournot problem of the consistancy of free competition with a falling supply price is clearly observed. It is judged to be most serious "in those trades in which the final manufacture is not dependent for some of its stages on subsidiary trades in which increased economy of labour is not readily induced without an increase in the total amount demanded" (151). Marshall's solution at this stage is through the existence of market imperfections which prevent a firm from rapidly increasing its market share: "the smaller the total amount produced be, the more difficult it is to start and to keep the latter, he assumes a period "sufficiently long to eliminate the casual disturbances which arise from the failure of producers so as to adjust the supply to the demand, that the amount supplied may be just sold off at a remunerative price" (206). But the period must not be so long as to admit substantial changes in demand or supply conditions. Among the fundamental changes excluded on the demand side are changes in "prosperity and purchasing power," tastes, or the price of substitutes (206). Excluded on the supply side are inventions of fundamentally new processes or the opening up of new sources of supply. But "such extended applications of known processes and machinery, and such economies in conveyance and distribution as are direct consequences of an increase in the scale of production" are admitted and may cause the supply curve to be falling (207). The intersection of the demand and supply curve representing average conditions for the period in question will (if unique) represent "approximately" the averages of market price and quantity for the period (208). In other words, "average" demand and supply curves abstract from both temporary disturbances and changes in underlying conditions, but predict accurately actual average prices providing the period involved is long enough for disturbances to cancel out and short enough for underlying conditions not to change appreciably.

The average price or value thus determined will equal expenses of production at the margin, the new term being introduced to describe the monetary compensation for the efforts and abstinences which comprise the real cost of production.31 On intramarginal units of output there will generally be a surplus above these expenses of production. This surplus is absorbed partly as rents to the suppliers of efforts and abstinences and partly

8See for example EEW II, pp. 198-204, Fieschi, pp. 346-7, 855-8. Thus, was first published in Marshall's 1879 paper to the Cambridge Philosophical Society (EEW II, pp. 283-5).
9For this section see EEW II, pp. 57-66, I, pp. 3-7, 181-6. Note that the discussion of the Pure Theory is explicitly based on free competition (186).
as rents to the owners of land and other natural agents. The division between these two classes will depend "not only upon the nature of the commodity in question, but also upon the length of the period for which its average price is estimated" (225). For the shorter the period involved, the more rapidly supply price will tend to increase with output because of the difficulty of rapidly adjusting specialized supplies of efforts and abstinence (skilled labor, management, machinery, etc.) and the greater the share of any surplus which will accrue to their owners. If the work of production requires specialized skill and habits which cannot be acquired rapidly, a smaller increase in demand will entice the employment of unskilled workers. It will be necessary to pay these men well in order to induce them to enter upon an occupation that is new to them. . . . Similar cases will raise the wages of superintendence of employers and others engaged in the task of management much above their usual level. Also the profits derived from buildings, machinery and other capital specialized to the trade, will be abnormally high. But the exceptional wages thus obtained by specialized capital and specialized skill can generally speaking endure only for a few months or years (225).

This passage is notable as the first unambiguously stated position of the quasi-rent notion. In the converse case of an unanticipated reduction in demand, "gradually the surplus supply of skill and capital will dwindle away, until wages and profits rise to their normal level" (226). A special case occurs if the period considered is sufficiently long to justify taking specialization and abstinence as perfectly elastic supply, so that any surplus accrues wholly to owners of natural resources. The "landlord rent" is then measured by the usual area above the supply curve—but only if there are no economies or diseconomies of scale in production (226-7). The pioneering discussion of tax-subsidy schemes uses such long-period supply curves (226-36).

The treatment of falling supply curves due to scale economies is marked by two novel features. External economies, clearly described but not yet named, are invoked to reconcile scale economies with the persistence of many competing firms (195-6) and the notion of irreversibility of supply is introduced (202-3). In effect, supply price is made a function of two variables: actual output and past-peak output, supply price being lower for a given output the higher is past-peak output, providing the latter is the larger.

Two bases for the irreversibility are suggested. The first is that the fact that "Development of mechanical appliances, of division of labour and of organisation of transport, when they have been once obtained are not readily abandoned" (202). This suggests that, as irreversibility with the learning by doing engendered by higher output being permanently retained. The second is that specialized capital and labor "cannot quickly be converted to other occupations" and will remain in the industry for a long time even if their incomes fall (202). Strictly speaking, this involves an asymmetry between the speeds of ingress and egress of factors rather than a true irreversibility. Marshall appears to be suggesting in this second case that when ingress in rapid and egress slow, compared to the period whose average price is to be ascertained, then the analysis can proceed on the assumption of a full adjustment of factors if an expansion in output is involved, and no, or a limited, adjustment of factors if a decline in output is involved (the initial position in both cases being one of full adjustment). Such a mode of analysis would be defensible, but is treacherous and in need of more careful explanation than Marshall provides.

The companion Pure Theory of Foreign Trade suggests that a similar irreversibility might apply to demand, because any temporary increase in consumption leaves behind it "a permanent effect in an increased familiaritiy" with the good involved (163). But this idea was not developed further. This entire treatment of irreversibility of supply and demand was transferred to the Principles without significant alteration or amplification, eventually appearing in Appendix II.

The special "Carrey" case of an ultra-long-period supply curve for agricultural products is largely echoed in the Pure Theory from the Early Essay, but with an interesting shift in interpretation. The supply curve is no longer regarded as a reduced form (albeit derived from an unusually general structure involving social institutions etc.) but only as a historical relationship, dependent on the particular paths by which agricultural output and the other elements involved change together under the joint influence of other variables. Thus the supply curve allows "not only for the influence of those economic which spring directly from the increase in the amount produced, but also for those inventions and other improvements which were caused by the growth of civilisation that was concurrent with the increase of population" (208, stress added). Such a supply curve can "express the result of statistics as to past history or of conjectures as to future history" but cannot be paired with a demand curve to determine an average price for the period (208). Underlying demand conditions too will be shifting and the price of agricultural products will be changing secularly rather than fluctuating about a constant level. One can see here the beginnings of the "secular" analysis to which the Principles looked forward and even tentatively commenced in Book VI, Ch. 12 on the "General Influences of Progress on Value." (202)

"See Textbook I, pp. 178-80; II, pp. 74-6. To formalize the difference described in the text let $p = f(q)$ be the supply price of agricultural output when the quantity produced is $q$ and the "state of civilization" is $k$. The Early Essay implies $s = \frac{d}{dq}f(q)$, so that $p = f(q)$ is given a reduced-form supply curve. In the Pure Theory, the assumption is that $s = \frac{d}{dq}f(q)$ and $q = q(k)$, which involves endogenous influences. Given $q(q) > 0$, the time path for agricultural output may be inferred to $q = q(k)$ and hence $p = f(q(k))$. But the "historical" or "statistical" supply curve is not converted to alternative positions $q(k)$ are considered. Such formal arguments are echoed, not entirely accurately, in the Principles (Textbook I, p. 890; II, pp. 81-2, 804-5).

"See this section all uncapitalized page references are to the second, 1881, edition of the Economics of Industry.

"The need for redefinition had already been hinted in the 1972 review of Marx and the 1876 essay on "Mr. Mill's Theory of Value." See Memorials, pp. 93-4, 419-33.

The preference for "normal" is explained as follows. "Adam Smith and the other Economists . . . used the word 'Natural' to mean that which is according to man's nature when competition is free. But it has been found best to use 'Normal' for this purpose, because the word 'Natural' has been used loosely too often call an arrangement 'Natural' merely because they approve it" (66-7).
nent in the Pure Theory of Domestic Values. The exposition is deepened, however, by a careful consideration of the (macroeconomic) determinants of the normal returns to efforts and shiftings which underlie "normal excesses of production," and a more explicit treatment of the role of utility. The normal value of a good equals its normal expenses of production at the margin and, at the same time, the marginal utility to each buyer. In this case, most favorable to classical doctrine, the desired reconciliation is lucidly attained and supply conditions receive due, but not excessive, credit as determinants of value.

The new definition of "Market result" greatly extends the scope of the theory of market value. No longer is it restricted to considering the allocation of a fixed stock (as in the Early Essay) or the determination of price on a particular day (as in the Pure Theory). Now any situation is included if it involves one or more of temporary disturbance, "frictions," or departures from free competition. To some extent the shift is only a semantic one. No substantial retraction of earlier views is necessary in regard to the effects of temporary disturbances, or those frictions preventing the rapid adjustment of output or factor supplies. The fragmentary earlier discussions of these matters are deepened and amplified rather than overthrown. For example, the role of the trade cycle as a possible source of market disturbance is analyzed, and the factors inhibiting rapid adjustment of inputs are laid out in detail.

22 Matters are otherwise for the effects of departures from free competition. These may arise in many ways: from inertia, custom, cooperation or monopolistic combination, for example. Such departures raise new questions, and Marshall is unable to resolve satisfactorily a tension they introduce between two competing conceptions of the role the theory of normal value is to play.

On one view normal value is to be regarded as a useful fiction which isolates certain important elements in a complex situation and analyses the hypothetical effects they would have if predominant. The results serve as a first approximation to the explanation of a more complex reality. This first interpretation is the one suggested when Marshall observes that the theory of Normal value is the starting point from which we must set out to explore all the various irregularities and unevennesses of Market values.... It puts us in the right position for examining how man's action is modified by custom, or apathy, or generally by motives other than the desire for wealth.

25 There is an obvious parallel here to the use of the abstraction of "economic man," as expounded by J.S. Mill for instance. Indeed, there is more than an analogy, since the two concepts reinforce each other and emanate from the same methodological urge.

26 The other possible view of Normal value is as an indicator of actual long-run tendencies; a predictor of what will tend to emerge given enough time, providing background conditions remain uniform. This view appears to be the dominant one in the Economics of Industry (at least in the 1881 introduction) where we read, for example

"The normal action of economic forces is hindered, or even overridden, but never destroyed by friction, by combination or by those passing events which exercise a remiss influence on Market values (vi, stress added)."

Marshall appears to be claiming here that even entrenched custom and monopolistic advantage will be gradually eroded by the "active principle" of competition so that:

"Normal results... would be brought about in the long run by this active principle, if it had time to overcome—even it necessarily would in sufficient time—custom, inertia, ignorance, and all the other passive elements which make up economic friction (vi)."

Thus it is that "Normal results are those which competition would bring about in the long run" (vii) and normal value is "that to which the Market value continually tends" (146).

28 See for example 92, 104-18, 150-67. Fixed capital is specific and so will not be attracted by a high price unless there is reason to expect that the price will be sustained for a long while" (A2). Similar considerations apply to skilled labor, extra supplies of which must normally be recruited from new entrants in the work force, so that full adaptation may require many years. The peculiarities distinguishing fixed labor from slave, and the rate of its depreciation are entailing distorting competition, all consequent to slow adjustment further. On the other hand, business management is increasingly versatile and mobile.


This apparent belief that competition must triumph in the end is not really substantiated in detail. Although Marshall stresses the mutability of custom and the difficulties of enforcing cartel arrangements, or maintaining union monopolies, he is not able to claim that impermanence of such arrangements is inevitable. And he certainly had much hope for the future of that departures from competition which is cooperation.

Even if the normal theory can legitimately be regarded as dealing with actual tendencies, there remains the question of how these tendencies are to be ascertained in the historical record. Since there is no reason to expect temporary disturbances ever to cease, there is no reason to believe that the supposed tendency of market values to converge on normal values will ever be realized by an actual convergence of market values to a sustained stationary normal equilibrium. Market values can be expected instead to continue to deviate haphazardly from the corresponding normal values. The best that can be hoped for is that the average of all market values of a variable, over a prolonged period during which background influences remain uniform, will be approximately equal to the corresponding normal value. Even this requires a presumption of the unbiasedness of market deviations so that, like harvest variations, we may "regard these alternating changes in opposite directions as neutralizing one another" (vii). Marshall seems generally willing to assume such averaging out, but his ambivalence about the interpretation of departures from free competition is again manifest in the qualification if competition were perfectly free, the average value of a thing would be the same as its Normal.
value. But since in fact competition is not perfectly free, the average value of a thing may differ from its Normal value; although the two seldom differ much (66).

Of course, changing background circumstances will always invalidate any precise identification of normal values with average values. The more general situation is that the Normal price of a commodity is not fixed, but may rise or fall slowly...—meanwhile the Market price oscillates with comparative rapidity up and down on either side of the Normal price (93).

Even in cases—usually hypothetical—where background circumstances such as tastes and technology remain unchanged after they suddenly shift, there must be considerable uncertainty as to how much time will be required before market averages again reflect the new normal levels. For "there are several difficulties in the way of a precise definition of the period of time to which normal results apply" (vii). The slowness with which knowledge of inventions or market conditions drifts through the economy delays adjustment in complex ways, the whole question remaining "one of the most important of the unwritten chapters of Economics" (vii). During the diffusion process systematic departures of market values from the ultimate normal would appear likely.

The market theory, like the normal theory, is meant to be extended to cover income distribution as well as production, exchange and consumption. Marshall's treatment of "market distribution" remains fragmentary, but his quasi-rent concept does begin to emerge as a general means towards resolving doctrinal controversy.

The Law that Normal value is determined by Normal Expenses of production is consistent with the fact that market fluctuations of value are the cause and not the consequence of market fluctuations of Expenses of production. If Ricardo and Mill had taken more pains to make clear the distinctions between the theory of Normal value and that of Market value, there could not have been as much controversy as there has been on the question whether value is governed by Expenses of production, or Expenses of production by value (166-7).

There is an interesting parallel, here, between Marshall's earlier resolution of Carey's differences from Ricardo and his resolution now of the doctrinal conflict between the classical school and its marginal utility critics. In both cases Marshall argues that the two parties have in mind periods of different length, but now it is the classical school which is seen as assuming the longer periods.

Before leaving the Economics of Industry we may note the appearance of one of the final ingredients for Marshall's ultimate synthesis of value theory in it. This is the invoking of a natural life cycle for the firm as a means of reconciling internal economics of scale with sustained competition. Writing of industries where "a large capital can avail itself of great economies" Marshall observes that "These industries would rapidly be concentrated in the hands of a few wealthy firms" if it were not that there are "very few instances of private firms which have been managed with eminent genius for three generations in succession" (141). From there to the representative firm was only a short step.

IV: The Culmination in the Principles

By 1881, the basic ingredients for the period analysis of the Principles were fully assembled. Yet the later treatment did much more than reconceive them. It has a richness and generality hardly foreshadowed in the earlier versions. In the Principles period analysis is elevated into a general method—a particular application of that comparative-static, partial-equilibrium approach with which Marshall's name is permanently associated. Of this general approach he remarked that:

the most important among the many uses of this method is to classify forces with reference to the time which they require for their work; and to impose in Caetera Paribus those forces which of minor importance relatively to the particular time we have in view (II 87).

The analysis of the equilibrium interactions of appropriately selected subsets of variables thus proceeds by disregarding changes in both those variables which move sufficiently more slowly and those variables which bounce around sufficiently rapidly. The method is more of an art than a science and sometimes it cannot be used at all because absolutely no basis exist for sensibly categorizing variables into the necessary subsets. When it can be employed, however, it may assist in predicting values of appropriate averages, and more generally may give rough insight into the character of paths through time. But it is not itself concerned with evolution through time, dealing only with hypothetically-sustained equilibria, whether of stocks, or flows, or both.

I think it can be said that this more general interpretation of period analysis emerged only gradually in the early editions of the Principles, culminating in the methodological statement of the 1898 article on "Distribution and Exchange." In any case, though its source must lie partly in Marshall's early familiarity with classical mechanics, it seems fairly clear that in arriving at it he proceeded from the

particular to the general, rather than vice versa. The period analysis which already begins to emerge in the Early Essay appears to be an entirely ad hoc response to certain puzzles and imperatives latent in Millian economics, rather than a self-conscious espousal of a new general method.

In the Principles, Marshall draws a general distinction between temporary (or market) and normal values. Temporary values are those in which "the accidents of the moment exert a preponderating influence." Normal values are those which "would be ultimately attained if the economic conditions under view had time to work out undisturbed their full effect." There are potentially many varieties of normal equilibrium, depending on the range of influences taken "under view." Marshall had by now definitely abandoned the identification, developed in the Economics of Industry, of the normal concept with the ultimate effects of undisputed free competition—and with it the cognitive concept of "economic man." Indeed, in complete reversal of his previous position, he warned that a "misunderstanding to be guarded against arises from the notion that only those economic results are normal, which are due to the undisputed action of free competition." The tension implicit in the Economics of Industry had finally been resolved by setting on an "actual-tendencies" interpretation of the term normal to the exclusion of the "ideal-type" alternative. He explained:

the term has often to be applied to conditions in which perfectly free competition does not exist, and can hardly ever be supposed to exist; and even

2See especially the fishing example (I 369-71, II 67-8).
3See for example II 393. One can regard the period analysis as indicating the main tendencies at work over periods of different lengths and then piece the separate items of information together to obtain some overall impression of the possible transition paths.
where free competition is most dominant, the normal conditions of every face and tendency will include vital elements that are not a part of compet-
itive or monopolistic structure. 1

In the Principles the normal theory has two roles. The first is to provide a predictive and explanatory tool of applied analysis which can be brought to bear on specific markets and circumstances. The second is doctrinal; to isolate understanding on a more philosophical level of the mode of operation and inter-
dependence of a competitive economy—the general or neoclassical economics, one might term it. This more philosophical function is concerned in part with integrating and recon-
ciling apparently conflicting approaches to the explanation of value and distribution and emphasizing that the longer the period the more dominant do factor-supply influences become. This second function is emphatically brought out in the 1891 letter to Pierson already quoted in the introductory section above.

The book was written to express one idea: & one only. That idea is that whereas Ricardo & Co. maintain that value is determined by cost of production, & Malvas, MacClosky, Jesusa & (in a measure) the Austrians that it is determined by utility, each was right in what he affirmed but wrong in what he omitted. I think, sufficient attention to the element of Time. That I believe holds the key of all the paradoxes 2 & this longer controversy has raised. When Ricardo spoke of cost of production as determining value he had in mind periods as to which cost of production is the dominant force; when Jesusa emphasized utility he had in mind shorter periods. 3

Now the switch to a relativeistic usage of the normal concept, admitting all tendencies actually present whatever their basis, was both necessary and desirable for meeting the first goal, the predictive one. Yet, for the second, more didactic goal it did impair clear communication. It is a pity in some ways that Marshall was unwilling to extend the analysis of the ultimate effects of free competition, commenced in the Economics of Industry’s discussion of normal value, into a full treat-
ment of the question on a hypothetical level, leaving the introduction of realistic qualifications and emendations to a later stage. Much fruitless controversy and tedious dismessen-
gling of intertwined threads might have been obviated thereby. 4 The ambiguities become particularly acute when analyzing those tendencies which can reveal themselves only if permitted to operate unobstructed for long periods. Marshall is clear that the predictive value of analyzing such equilibria is minimal—background influences such as tastes and technology, which have to be assumed constant while the tendencies work themselves out will not, in fact, remain approximately unchanged for a sufficiently prolonged period. Yet, the analysis of such long-period equilibria has a central role in the Principles, a role which, for want of a better word, must be seen as doctrinal. 5 Thus, less than halfway through the volume, the reader is told that “The remainder of the present volume is chiefly concerned with the normal relations of wages, profits, prices, etc., for rather long periods” (I 380). In many cases these periods will have to be measured in generations rather than years, yet Marshall confesses that “violence is required for keeping broad forces in the pound of Caesars Fartbus during, say, a whole generation, on the ground that they have only an indirect bearing on the question in hand” (I 379n.). The analysis of long-period equilibria is hypo-
tetical after all yet overlain by complications aimed at increasing its (dubious) effective-
ness as a tool of applied analysis. 6

This brings us at last to that particular application of the general method of period analysis which gets predominant emphasis in the Principles and is perhaps the book’s best-
known feature. This application isolates these three broad distinguishing periods for treating supply conditions: “if the period is short, the supply is limited to the stores which happen to be at hand; if the period is longer, the supply will be influenced, more or less, by the cost of producing the commodity in question; and if the period is very long, this will in its turn be influenced, more or less, by the cost of producing the labour and the material things required for producing the commodity” (I 330). Those three cases for supply give rise, respectively, to temporary equilibrium, short-period normal equilibrium, and long-period normal equilibrium. The distinction between the latter two is that “For short periods people take the stock of appliances for production as practically fixed. In long periods they set themselves to adjust the flow of these appliances to their expectations” (I 274). 7

It is also true that the actual price of production may be affected by the growth of capital in the long period, though this is not Marshall’s concern (though he did think the question a great one). 7

Thus, temporary equilibrium rests on a given stock of output, short-period equilibrium rests on given amounts of supplies together with an equilibrium flow of output, while long-period equilibrium rests on the equilibrium of both the flow of output and the stocks of appliances, the latter sustained by equilib-
rium replacement flows. 8 As already implied, temporary-equilibrium value is not directly influenced by the cost of producing either output or its factors of production. In short-
period equilibrium, value is directly influenced by the cost of producing output, but not by the cost of producing its factors. While in long-period equilibrium, value is directly influenced by the cost of producing factors, which now determines the cost of producing output.

It will be obvious that Marshall uses the term “value” in a special way to mean not only the price at which an economic good will sell but also the rate at which it will be used to produce other goods and services. In this special sense, the term “value” is to be understood as including the cost of producing the good and the cost of producing the factors of production, which are necessary to produce the good.

Thus, temporary equilibrium rests on a given stock of output, short-period equilibrium rests on given amounts of supplies together with an equilibrium flow of output, while long-period equilibrium rests on the equilibrium of both the flow of output and the stocks of appliances, the latter sustained by equilibrium replacement flows. 8 As already implied, temporary-equilibrium value is not directly influenced by the cost of producing either output or its factors of production. In short-period equilibrium, value is directly influenced by the cost of producing output, but not by the cost of producing its factors. While in long-period equilibrium, value is directly influenced by the cost of producing factors, which now determines the cost of producing output.

Marshall emphasizes that differences between the three categories of equilibrium are not really differences in kind, but only differences in degree, passing into one another by continuous gradations (I 546). It makes this to mean, primarily, that the period for which one category of equilibrium gives the best prediction of average output is not sharply defined, and that often none of the categories offers more than a rough approximation or compromise, perhaps capturing the dominant features but matching only imperfectly the detailed case. Thus, a “rigid division” between short and long-period normal cases cannot be made because “the periods required to adopt the several factors of production to the demand may be very different” (I 376).

5See II 72–3, 361–2 for rather different perspectives on the hypothetical, theoretical character of the analysis. Marshall’s general relations to separate theory, appli-
cation and description has been noted frequently.

6See also II 364, 391. The familiar qualifications “short-
rung” and “long-run” are not used by Marshall and appear to have come into use only as a result of Veblen’s classic paper. (K. Veblen, “Cost Curves and Supply Curves,” Zeitschrift für Nationalökonomie, 3 (Sept., 1902), 60–83) and Veblen’s At the Crossroads of Political Economy, A.E.A. Readings in Price Theor (Blackiston, Philadelphia, 1933). However, in early editions, Marshall did use the terms “normal” and “normal” (I 381, 391, 394, 531, 539) which survive in the marginal notes in I 497.

7The term “value” is to be understood as including the cost of producing the good and the cost of producing the factors of production, which are necessary to produce the good.

8See also II 384. The presence of speculative storage activity gives the cost of producing goods an indirect effect on the long-period equilibrium. Hence, the fact of “sparking up the market” gives the cost of producing factors an indirect effect on short-period equilibrium. (See I 333–4, 337, 374–6, 458–9, 497–8, II 357–8.) No trace of the latter argument appears in the pre-Principles writings.
The solution will often lie in letting the choice of variables imposed by ceteris paribus conform especially to the case in hand, without restricting it to one of the three broad categories. Thus, as a general rule:

in each separate application of our general reasoning a clear indication has to be given as to what conditions are taken as fixed and what is variable, and as to the length of the period to which the whole inquiry relates (II 379).

Marshall's three-fold division is often regarded as synonymous with his period analysis but is better viewed as a leading and illuminating special case. Its rather perfunctory treatment of the time aspect of demand is probably to be explained by the greater doctrinal importance he attached to dismounting the time aspects of supply. The long-period normal and market analyses were similarly designed to subserve broad functions in connection with the general study of business fluctuations and employment problems. They were intended to "come into prominence when we discuss, in a later volume, fluctuations of prices and wages arising from quick changes in the state of commercial credit, and other causes; together with the allied problems of trade unions and combinations of employers" (II 396). Unfortunately, the proposed second volume of the Principles was never to be completed so that the carefully constructed short-period tools were never properly set to work.

The prehistory of Marshall's three categories of equilibrium has been traced through his earlier work in previous sections. Although the Economics of Industry contained much of the substance, it is remarkable that it is the first work, the Early Essay, which is closest in conception to the final version. This is especially the case for the first category of equilibrium, where Marshall finally reverted to basing it on a fixed stock of output. However, the early work's intermediate category, which relied on the difficulties of reorganizing production despite full mobility of labor and capital, was soon replaced by a version which relied on the frictions retarding mobility. These frictions were only loosely mentioned in the Early Essay but became increasingly prominent in the Pure Theory and the Economics of Industry. Nevertheless, the transition may be less striking than it appears at first sight, for it must be remembered that Marshall treated business organization as a coordinate factor of production along with labor and capital. The intermediate case of the Early Essay might, I think, be reasonably interpreted as based on a fixed stock of business organization—a fixed number of firms, each organized in a specific way by a particular owner-manager. So the case's ultimate basis may still lie in a difficulty of rapidly adjusting factor supply.

The long-period analysis remained fundamentally unchanged from the earliest version, although much effort was devoted over many years to refining the analysis of increasing returns and reconciling them to the persistence of free competition. The remarkable fact is that most of the clues for the final version were arrived at early, yet Marshall was to claim that the attempt to solve Cournot's problem propelled him on his "Wanderjahre among factories etc." and occupied him "a good deal" between 1870 and 1890. The reconciliation eventually essayed in the Principles was to remain controversial and unsatisfactory. Indeed, the period analysis as a whole, seminal as it was, is full of perplexities and ambiguities. This is in part due to Marshall's style, which is often vague to the point of mysticism, with different threads of argument complexly intertwined. But the difficulties also reflect the uneasy compromise inevitably present when using comparative statics to learn about time paths.

Marshall himself had better be given the last, and possibly best, word on this subject. The static solution has claims of its own. It is simpler than the dynamical; it may afford useful preparation and training for the more difficult dynamical solution; and it may be the first step towards a provisional and partial solution in problems so complex that a complete dynamical solution is beyond our attainment.64

64Memoirs, p. 312. See also Memorials, pp. 313-5 and 346.