

Microeconomic
equilibrium

statics
confusing
continuity
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EQUILIBRIUM

Economic analysis: static or dynamic.

963-75

Economic process: stationary, growing, evolving.

In general references are to J. A. Schumpeter's History of Economic Analysis, OUP, 1954¹, 1974⁸.

In Mrs Robinson's unsurpassably felicitous phrase, economic theory is a box of ^{analytic} tools.

Economic analysis has as one of its larger tools the notions of equilibrium and disequilibrium.

They are applied both to the operations of the economist and to the situations or processes which he studies.

Applied to the operations of the economist a distinction is drawn between statics and dynamics:

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The terms, static and dynamic, have nothing to do with a borrowing (legitimate or illegitimate) from the physical sciences. They are logical (cosmological) categories and as such as general as logic (cosmology) itself.

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We know that actually the concept of economic statics may be traced to zoology rather than mechanics and, what is more important, primitive and subconscious use of it has been made from the very beginnings of economic analysis.

A contrary view has been suggested by attributing the notion of economic equilibrium to an engineer, A. N. Isnard, but his influence seems to have been small indeed. HEA pp. 217, 242, 243, 301, 306-7, 955.

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Statics attempts to establish relations between elements (prices and quantities of commodities) all of which refer to the same point of time (have the same temporal subscript, not P_t and $Q_{(t-4)}$, but P_t and Q_t).

Dynamics takes into account elements from distinct times, e.g., past and expected future values, lags, sequences, rates of change, cumulative magnitudes, expectations, and so on.

Statics is more abstract than dynamics: it omits consideration of ~~the~~ other times. Also it is particular case of dynamics: any dynamic equation can be changed into a static equation by giving all variables the same temporal subscript.

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While statics and dynamics divide the different ways in which economic processes may be considered, stationary and evolutionary are the common terms for considering objectively different states or processes.

This distinction however commonly leads to subdistinctions and it will be simpler to substitute a threefold division.

An economic process is stationary when it simply keeps on reproducing itself.

A stationary process is said to be stable when it reacts to disturbances by reverting to the original position. E. g., a ball in a shallow bowl will settle in the lowest point inside the bowl; agitating the bowl will make the ball move about the lowest point. NEUTRAL UNSTABLE 970 f.

Growth is conceived by Schumpeter as a process that may be described in terms of continuous variations of rates within an unchanging framework of institutions, tastes, or technological horizons.

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Similarly, Marshall and others take into account an extension of the stationary state that consists in a balanced progress, that is, the case of a society in which population and wealth grow at about the same rate, and in which 'methods of production and the conditions of trade change but little; and above all the character of man himself is a constant quantity', a conception which has acquired additional interest in our own time owing to its bearing on the problems of full employment in the models not only of a stagnating but also of an expanding economy.

An evolutionary state adds elements denied to the stationary state and to growth. It is not simple reproduction, nor oscillation about a mean; its variables change but rates of change are not continuous; its framework of tastes, institutions, and technological horizons is not fixed. In brief, the economic process is being carried along by human history. One might say that interdisciplinary studies become particularly important.

HEA, Equilibrium Analysis

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More generally, and at the same time more simply, we say that we have determined a set of quantities (variables) if we can

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indicate relations to which // they must conform and which will restrict the possible range of their values. If the relations determine just a single value or sequence of values, we speak

A,i

of unique determination -- a case that is, of course, particularly satisfactory. The relations may yield, however, more than one possible value or sequence of values -- which is less satisfactory but still better than nothing. In particular, the relations may determine only a range....

A#

If the relations which are derived from our survey of the meaning of a phenomenon are such as to determine a set of values of the variables that will display no tendency to vary under the sole influence of the facts included in those relations per se,

A,v

we speak of equilibrium: we say that those relations define equilibrium conditions or an equilibrium position of the system and that there exists a set of values of the variables that satisfies equilibrium conditions. This need not be the case, of course -- there need not be a set of values of variables that will satisfy a given set of relations, and there may exist several such sets or an infinity of them. Multiple equilibria are not necessarily useless but, from the standpoint of any exact science, the existence of a 'uniquely determined equilibrium (set of values)' is, of course, of the utmost importance, even if proof has to be purchased at the price of very restrictive assumptions; without any possibility of proving the existence of uniquely determined equilibrium -- or at all events, of a small number of possible equilibria -- at however high a level of abstraction, a field of phenomena is really a chaos that is not under analytic control.

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Determinateness, Equilibrium, and Stability. From the

workshop of Walras the static theory of the economic universe emerged in the form of a large number of quantitative relations (equations) between economic elements or variables (prices and quantities of consumable and productive goods or services)

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that were conceived as simultaneously determining one another. As soon as this great feat had been accomplished -- as soon as the Magna Carta of exact economics had been written, -- which we shall presently study in some detail -- a type of research began to impose itself that had been unknown in pre-Walrasian economics. Pure theory there had been from the first, or almost. But its technique had been a simple affair. The Walrasian system of simultaneous equations, however, brought in a host of new problems of a specifically logical or mathematical nature that are much more delicate and go much deeper than Walras or anyone else had ever realized. Mainly they turn upon determinateness, equilibrium, and stability. They are much too difficult and especially too technical for us....

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Thus we may consider stationary and evolutionary processes and we may analyze both of them by either a static or dynamic method. The simplest and for most purposes the most important case is that of static equilibrium. Suppose we have settled the question, what elements in an economic universe we wish to determine and what are the relations and the data by which to determine them. Then the question arises whether these relations that are supposed to hold simultaneously (simultaneous equations) are just sufficient to determine sets of values for those elements (variables) that will satisfy the relations. There may be no such set, one such set, or more than one such set, and it does not follow that our system is valueless if there are several. But the most favorable case... is uniqueness of the set. Such a set or such sets we call equilibrium sets and we say that the system is in equilibrium if its variables take on the values thus determined. It goes without saying that these values are very much more useful for us if they are stable than if they are neutral or unstable. A stable equilibrium

HEA, Part IV, ch. 7, sect. 3 (b), con'd.

971 is a value that, if changed by a small amount, calls into action forces that will tend to reproduce the old value; neutral equilibrium is an equilibrium value that knows no such forces; an unstable equilibrium calls forth forces which tend to move the system farther and farther away from equilibrium values. A ball that rests at the bottom of a bowl illustrates the first case; a ball that rests on a billiard table, the second; and a ball that is perched on a bowl, the third case. Naturally, the conditions which insure stability and the absence of which produces instability are of particular interest in order to understand the logic of the economic system. In this sense it has been said that it is the stability theorems that yield our theorems.

[BL. To the stability theorems we shall make our appeal]

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In this section we shall analyze the logical structure of Walras' system of the conditions or relations (equations) that are to determine the equilibrium value of all the economic variables, to wit: the prices of all products and factors and the quantities of these prices and factors that would be bought, in perfect equilibrium and pure competition, by all the households and firms. Let us notice at once that, since the determination of these quantities includes the determination of individual as well as group and social incomes, this theory also includes all that is covered by the concept of Income Analysis and that the conditions or relations to be considered, though they are fundamentally microanalytic in nature (they refer fundamentally to the quantities bought and sold by individuals and firms), also include macroanalytic aspects, for example, as regards total employment in the society. It cannot be too strongly impressed upon the reader that it is not correct to contrast income or macroanalysis of, say, the Keynesian type with the Walrasian microanalysis as if the latter were a theory that neglects, and stands in need of being supplemented by income and macroanalysis.

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Competition: Abstract Theory and Effective Reality

Begin at next page 17, WEA 973
Schumpeter 974 f.

On Marshall: Just as Walras, more than any other of the leaders, was bent on scraping off everything he did not consider essential to his theoretical schema, so Marshall, following the English tradition, was bent on salvaging every bit of real life he possibly could leave in. As regards the case in hand, we find that he did not attempt to beat out the logic of competition to the finest leaf. On the first pages of his Principles he emphasized economic freedom rather than competition and refrained from defining the latter rigorously.

Schumpeter 975: If we are the opinion, on the one hand, that, from all the infinite variety of market patterns, pure or perfect monopoly and pure or perfect competition stand out by virtue of certain properties -- of which the most important is that both cases lend themselves to treatment by means of relatively simple and (in general) uniquely determined rational schemata -- and, on the other hand, that the large majority of cases that actually occur in practice are nothing but mixtures and hybrids of these two, then it seems natural to accept pure competition and pure monopoly as the two genuine or fundamental patterns and to proceed by investigating how their hybrids work out. This renders the attitude of the theorists of monopolistic (Chamberlin) or imperfect (Joan Robinson) competition.

But instead of considering the hybrid cases as deviations from, or adulterations of, the fundamental ones, we may also look upon the hybrids as fundamental and on pure monopoly and pure competition as limiting cases in which the content of actual business behavior has been refined away. This/much more like the line that Marshall took. Should the reader feel I am laboring to convey a distinction without a difference, he is requested to ask himself whether the definition of/competition that has been given above[p. 973 f] really fits what we mean when talking about competitive business. Is it not a fact that what we mean is the scheme of motives, decisions, and actions imposed upon a business firm by the necessity of doing things better or at any rate more successfully than the fellow next door; that it is this situation to which we trace the

technological and commercial efficiency of 'competitive' business, and that this pattern of behavior would be entirely absent both in cases of pure monopoly and pure competition, which therefore seem to have more claim to being called degenerate than to being called fundamental cases? This, if I am not mistaken, is beginning to be widely felt today

973 [Cournot, Walras] The all-round rise of the level of scientific rigor eventually produced if not the term yet the substance of what we now call pure or perfect competition.

The notion had been made explicit by Cournot at the end of chapter 7 and the beginning of chapter 8 of his Recherches: after having started from the case of straight monopoly (p. 975) he first introduced another seller and then additional ones until, by letting their number increase indefinitely, he finally arrived at the case of unlimited competition, where the quantity produced by any one seller is too small to affect price perceptibly or to admit of price strategy. Jevons added his law of indifference which defines the concept of the perfect market in which there cannot exist, at any moment, more than one price for each homogenous commodity. These two features -- excluded price strategy and law of indifference -- express so far as I can see what Walras meant by libre concurrence.... This does not however dispose of all the logical difficulties that lurk behind the concept of the competitive market, and some of these must now be noticed briefly.

The mechanism of pure competition is supposed to function through everybody's desire to maximize his net advantage... by means of attempts at optimal adaptation of the quantities to be bought and sold. But exclude strategy as much as you please, there still remains the fact that results will differ according to the range of knowledge, promptness of decision, and 'rationality' of actors, and also according to the expectations they entertain about the future course of prices, not to mention the further fact that their action is subject to additional restrictions that proceed from the situations they have created for themselves by their past decisions. ... Walras was very much alive to these difficulties and in places... he clearly saw the necessity looming in the future of constructing dynamic schemata to take account of them. For himself, however, he saw //974// not less clearly that, absorbed in the pioneer task of working out the

the essentials of the mathematical theory of the economic process, he had no choice but to simplify heroically (Eléments 479). Thus, he postulated at first that the quantities of productive services that enter into the unit of every product (coefficients of production) are constant technological data; that there is no such thing as fixed cost; that all the firms in an industry produce the same kind of product, by the same method, in equal quantities; that the productive process takes no time; that problems of location may be neglected.

For us, the question arises: how much of this did he mean to include in his 'free competition'? It has been held (by Professor Knight among others) that Walras, and the theorists of that epoch generally, intended to make omniscience and ideally rational and prompt reaction attributes of pure competition; deviations from this pattern would then find room in the folds of an entity called 'friction'.... It is submitted however that there is no point in overloading pure competition like this, and that it is quite possible to separate, in interpreting the writers of that epoch, their concept of pure competition, as defined in the preceding paragraph (p 973) from any further assumptions they may have made ... even in those instances in which they did not carry out this separation themselves.

Notes re Walras

IX

975 ~~competititon and monopoly of 1026 n. 72~~

998 f. equilibrium values ^{to} all the variables

1016 savings as in Keynes

1020 of all its logical beauty

the four floors of integrated markets

1052 f the vanishing of pure profits ~~under~~

on the way to perfect equilibrium ~~in~~ in perfect
competition

WALRAS

975 ~~motives, decisions, actions imposed upon a firm by the necessity~~
of doing things better or at any rate more successfully than the
fellow next door; that ~~is~~^{is} this situation to which we trace
the technological and commercial efficiency of competitive business,
and that this pattern of behavior would be entirely absent both
in the cases of pure monopoly and pure competition, which there-
seem to/ fore/have ~~more~~ more claim to being called degenerate than to
being called fundamental cases.

cf. 1026 n. 12
Note 9: analysis of competition may exhibit its elements and
~~yet miss what is essential to the compound pattern.~~ BL.

WALRAS

#7 998

999/ In this section we shall analyze the logical structure of
Walras' system of the conditions or relations (equations)
that are to determine the equilibrium values of all the economic
variables, to wit: the prices of all products and factors and
the quantities of these/factors and products that would be
bought, in perfect equilibrium and pure competition, by all the
households and firms.

(This is comprehensive). It cannot be too strongly impressed
upon the reader that it is not correct to contrast income or
macroanalysis of, say, the Keynesian type with the Walrasian
microanalysis as if the latter were a theory that neglects,
and stands in need of being supplemented by, income and macroanal-
ysis.

Note 2: .. Walras defined capitiaux, in a wider sense, as
all goods that serve more often than once and, in a narrower sense,
as durable goods that are themselves produced (capitiaux proprement
dits)....

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As we know, the Walrasian entrepreneur is the agent (a
physical person or a corporation) that buys raw materials from
other entrepreneurs, hires land from landowners, personal
aptitudes from workmen, capital goods from capitalists, and sells
the product that results from the cooperation or combination
of their services for his account. Into this ~~is~~^{is} meaning of
the concept of entrepreneurs who, as such, neither ~~lose~~^{gain} nor lose....

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A crippling assumption yet necessary (technologically
fixed and constant coefficients of production).

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Difficulty of lack of parallel between decisions to
sell products brought to ~~the~~ market and decisions to be reached
so as to bring about in time equation of supply with demand.

1015 Schumpeter's mitigation of the difficulty.

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Hence, exactly as in Keynes' General Theory, current saving is tautologically equal to current investment. Saving here is merely a word that identifies a particular kind of demand, namely, the demand for capital goods.

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Hence, equality of current saving and current investment is an identity and not an equilibrium condition. The equilibrium condition is that the sum total of saving in a given period should be equal to the costs to the capital-goods-producing firms of the capital goods produced (sold) in the period....

Now -- and this is not as in the system of Keynes' General Theory -- the only motive that capitalists can have in this set up for demanding capital goods is in the net revenue expected from them... From this follows another equilibrium condition which must be fulfilled by their prices: these prices must under ideal conditions be proportioned to their net yields or else arbitrage operations would set in to enforce this proportionality. But this may be expressed by saying that our capital-goods market is really a market of streams of perpetual net revenues, from which standpoint all capital goods are on the same footing irrespective of their physical shapes.

This... enables us to endow each household with a marginal utility and a demand function for perpetual net revenue, and to replace all the (unknown) prices of the capital goods ~~by~~ by a single price....

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Thus the single net price is simply the reciprocal of the rate of 'perpetual net revenue,, and readily identified -- as long as there is no money -- with the rate of interest.

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Suppose that the new capital goods have risen above their costs. If for the sake of argument we assume that the expected net yield of the capital goods has not changed, this implies that the rate of perpetual net return will be more expensive for the capital-goods purchasing capitalist than it was before: it is this rise in the numeraire prices of new capital goods which brings home to the capitalist the implied fall in his rate of net return... it is not the fall in the rate of interest which plays any direct causal role, but it is the rise in the value of capital-goods which reduces tautologically the rate of interest.

larger
investment
proportionately
smaller
rate of return

Walras' Transition from numéraire to money: HEA 1020-26.

his/ 1020: At last, we introduce money and monetary transactions. .. we must see right now how he fitted money into/schema of the economic process, how he determined absolute prices in money as well as in numéraire, and whether he was right in claiming that his monetary economy enjoys the same properties of determinateness and stability that may be attributed to the numéraire economy.

1021 [For this purpose it will suffice to deal with the case of a money of given quantity that consists in a material of negligible use value, and to note briefly that Walras, who in his first edition (1874-7) of his Eléments had based his monetary analysis on the concept of the economy's monetary requirements, adopted in the second edition the concept of the amount of cash people desire to hold (encaisse désirée), which was not however made part and parcel of the pure theory of general equilibrium -- not fully amalgamated with it -- before the fourth edition (1900). It is there that //1021// the whole of the Walrasian structure of pure theory appears in all its logical beauty.]

The ground floor of this structure is the theory of the market of consumers' goods. On the second floor we find the theory of production and the market of production services, not separated from, but integrated with the first market. On the third floor we have the market of capital goods similarly integrated with the two others. And on the fourth floor there is another market, integrated with the other three, of circulating capital, that is, of the stocks or inventories of goods -- new capital goods for sale at the establishments of their producers, and consumers' and producers' inventories of all kinds -- that are necessary to keep things going.

... Walras... presupposes that households and firms are from the outset in possession of stocks of goods (inventories) which are now introduced among the data of the general-equilibrium problem. ... Walras treated them formally as he had treated capital goods: there are the stocks themselves and, in addition, there are the services they render currently, namely, les services d'approvisionnement. Hence stocks and services have to be priced separately, but the price of each stock stands to the price of its service in the same relation

Cf Guide
pp 90f.
surplus

the
/service of/ as the price of each capital good stands to the price of the capital good itself. Note that the introduction of stocks and the services of stocks constitute Walras' method of synchronizing the economic process: on condition of paying the price of the service -- that is, an interest charge on the circulating capital involved -- households are now enabled to 'transform' their productive services immediately into consumers' goods. But this is evidently no mere detail but an essential feature of the general equilibrium system to which, by way of anticipation, Walras already adverted in his theory of production (Eléments, p. 215).

With the stocks enters money. It is simply a particular item in the list of inventories and also renders a service d'approvisionnement, which acquires a price, like any other service, by virtue of its marginal utility functions.. This 1023// price emerges in a special market, which Walras called the capital market (marché du capital) -- in distinction to the market of capital goods (marché des capitaux) -- and which is an annex of the market of all productive services (Eléments 245). All suppliers of services are now paid, and buy products, in money. Capitalists save no longer by exchanging productive services against capital goods but they save in money and we have a quantity called monnaie d'épargne in addition to the two quantities of transaction money (monnaie de circulation) in the hands of firms and households. The former borrow money and buy new capital goods. The equilibrium price of the 'commodity' in this marketnamely, of money's service d'approvisionnement, is determined by the condition that people's demand for this service -- represented bytheir encaisse désirée -- be equal tothe total amount of money in existence. Having determined the equilibrium price, we may choose money itself for numéraire and then restate the condition by saying that the rate of interest should be such as to equalize the encaisse désirée and the total amount of money in existence.

So far, the 'existence' of a unique set of solutions or of equilibrium values for the Walrasian system is not affected at all by the introduction of money: the situation in this respect remains, qualifications included, much as we found it in the case of the numéraire economy. (pp. 998-1019). This could be proved but should be intuitively clear from the fact that

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Walras fits in money by a device that amounts to setting up its service d'approvisionnement as just one more service (of no direct utility) to be traded in -- which evidently no more changes the logic of the situation than would the introduction of any other additional commodity or service. It should be added however that owing to the nature //1024// of the service that money is supposed to render, the price of its service enters into the demand and supply equations that determine the prices of all the other commodities and services in a peculiar way. This may be seen most easily by observing the variations in the price of the service of money -- or, choosing money for numéraire, interest -- affect directly the prices of capital goods and stocks (inventories) and through these all the other prices and quantities in the system, including those of productive services such as wages and the quantity of labor demanded and offered. This is important to keep in mind; any variation in any price affects all other prices, offers, and demands, but variations in the price of money have an additional influence of particular importance. Hence money prices are not simply translations of prices expressed in a numéraire that is not money into prices expressed in another numéraire that is not money: money prices are not proportional to numéraire prices; they are prices adjusted to a new condition, that is, the condition that governs equilibrium in Walras' capital market. We may still formulate the monetary equilibrium condition as we did above, namely, that total encaisse désirée should be equal to the total quantity of money in existence, but we must keep in mind that the encaisse désirée depends, among other things, on the total numéraire value of transactions and that the latter also depends on the price of the service of money and cannot remain constant if this price -- or the rate of interest -- changes. In other words, we cannot fulfil the monetary equilibrium condition by treating as given not only the existing quantity of money but also the total encaisse désirée, and letting monetary equilibrium come about by appropriate variations in the rate of interest alone. If this fact is realized and acted upon, then we may aver indeed that the Walrasian argument determines a consistent set not only of relative but also of money prices or, if you wish, the price level.

Gordon p 108

 $(M/P)^d =$ $Q/2 - 40r$

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Walras himself realized this situation and must therefore be credited with having created a theory of money that is complete, consistent, and perfectly adequate, within its own assumptions, to determine absolute prices in terms of money. But at the critical point he failed to go through with it. On the ground that the influence of variations in the rate of interest upon the sum total of transactions, hence upon the *encaisse désirée*, is only indirect and feeble (*Eléments*, p. 311) he decided to neglect it altogether and then proceeded to base //1025// much of his reasoning about applied monetary theory on the simplifying assumption of its absence. This assumption, quite apart from the question whether it is factually justifiable or not, would change the whole situation if we were to take it as part of Walras' rigorous theory. Then as Walras himself observed, the equation of monetary correlation would indeed be 'external to the system of equations that determine economic equilibrium' (*ibid.*), and then there would be some warrant for saying that Walras' system is essentially a 'real' or *numéraire* system, complete as such, on which he threw, as a separate piece of apparel, the 'veil of money' (see however next chapter [on production function]). Money interest and money prices would then be no longer determined simultaneously with the relative prices and would in general be inconsistent with them.⁷⁰ In view of the spirit as well as the wording of Walras' text, it is, however, much more natural to say that, for purposes of applied monetary theory, Walras decided to abandon his method of general analysis and to adopt that of partial analysis. This means that he decided to adopt an approximation to which the standards of rigorous analysis do not apply.

But the question of stability (and of the presence of a tendency in the system to realize the equilibrium values of its elements) is now much more difficult to answer than it was before. This is not owing to any change in the logical situation that the introduction of money has brought about -- which is much as it was in the *numéraire* economy -- but to the fact that in a money economy it is more difficult to accept Walras' general pattern of the economic process. Of this Walras was perfectly aware. Proof of it is his emphasis upon the instability of bank credit (e. g., *Eléments* 354 f). Apart from this it stands to reason that the insertion of

of a monetary capital market offers the economic engine new opportunities for stalling which are absent in a numéraire economy: we may exclude uncertainties in obedience to Walras' directions; but in the case of a 'commodity' which is as volatile as money and which can be //1026// so easily redirected at a moment's notice, we cannot help thinking of them all the same. Under these conditions the practical/of the final result at which we arrive nevertheless is no doubt much reduced.. It reads: both for a numéraire and for a money economy, Walras' system of the economic process is determined and stable, though he did not quite succeed in proving this rigorously; for a process which is stationary except for positive or negative investment on traditional lines, it is hitchless in the sense defined above, and full employment of resources is in fact one of its properties; conclusions other than these can be arrived at only by introducing hypotheses at variance with those of Walras. If in the last analysis Walras' system is perhaps nothing but a huge research program, it still is, owing to its intellectual quality, the basis of practically all the best work of our time.

Footnote 72 p 1026

... It should be added again that economists, who wish to establish a tendency in the capitalist economy to produce perennial unemployment, have nothing to fear from a proof that, on so high a level of abstraction, perfect equilibrium in perfect competition would involve full employment.

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But since the subject of profits is still more than are others infested by confusions, it will be well to restate first a few propositions that will serve disentangle the points that interest us now from others with which they are habitually associated. Marshall as a rule considered the profit item of the balance sheets of business practice -- and especially the balance sheets of owner-managed firms -- rather than anything that // 1049 // has any claim to be called 'pure profit,' and he considered this profit item as it is rather than as it would be in (static) equilibrium of a stationary process. Though careful analysis, in this as in other cases, can no doubt unearth the contours of a comprehensive schema in which everything finds its appropriate place -- but of a schema that is Ulysses' bow to less powerful minds -- the ordinary reader simply finds a fricassee of such things as: earnings of management of all possible kinds, including also the earnings of better-than-common management; gains from successful risk-taking and uncertainty bearing, that is the sort of thing that gives a favorable bias to the relation between expected and actual results; gains from advantages incident to the control of particular factors, some of which would, in other firms, not so much contribute to results as they do where they are; chance gains that go to the owner as residual claimant, due regard being paid to the wisdom of Goethe's dictum that only the able enjoy consistent luck; and, among other things, gains that accrue to a firm as it grows, or else, because it has grown, relatively to its competitors or absolutely or both; an element of monopoly entering implicitly or explicitly wherever required. Evidently, these items do not constitute a logically homogeneous whole, in the same sense as do for instance wages, in spite of all the qualifications that have to be added also in their case. Nevertheless, Marshall created a sort of normal profit out of this compound -- warily treading his way through the dangers of circular reasoning -- which he associated felicitously with the representative rather than with the marginal firm. This normal profit may be loosely defined as the rate that makes it worth while to enter, and to stay in, business (these expressions mean the same thing in the end), and thus acquires a distinction from the managerial salary that is easier to justify in a common-sense manner than in strict logic. Somehow all of this has grown into the simplified normal profit of Marshall's followers and then into the marginal efficiency of Keynes's General Theory.

1049 f Since Marshall's normal rate is geared to phenomena of change or growth that static equilibrium excludes, and since the elements of monopoly (while not excluding equilibrium) do exclude perfect competition, it follows that it does not contradict Walras' entrepreneur ne faisant ni x bénéfice ni perte.

1051 For this purpose we cannot do better than borrow the argument of Marx. As we know, he made investment of industrial exploitation gains -- which ~~he~~ are not profits though he called them so but capital gains -- the main motor of economic evolution. If we press this process into a schema of cost curves that fall owing to internal and external economies and ~~xxxxxx~~ incidentally to increasing the size of firms, we immediately realize two things.

First, this process while it does not benefit the individual firms or the bourgeois class as a whole ultimately, is attended at every step by temporary gains that are profits in our sense and accrue to firms that grow in this manner more quickly and more successfully than others. Disequilibrium prevails throughout, but Marx saw that this disequilibrium is the very life of capitalism, and it is with this disequilibrium on the one hand and with decreasing costs in this sense on the other that pure profits are chiefly associated.

Second, Marx's process, as he did not fail to notice, must in strict logic lead to monopolies or oligopolies of those firms that have once gained an initial advantage. Marshall's treatment of the same set of problems in general and decreasing costs in particular, really comes to the same ~~xxxxxx~~ results on both points, due allowance being made for his superior technique and his anxiety to do justice to all the facts, frictional and otherwise, that prevent those individual trees growing into the high heavens.

1052 From what has been said above it should be clear that there is a perfectly good way of satisfying ~~us~~ ourselves that on the way toward perfect ~~x~~ equilibrium in pure competition... pure profits tend to vanish.

1053 Hence pure profits are zero in perfect competition. This may be unduly 'abstract.' But there is nothing wrong with it in logic.

From HEA on Utility, 1053-69

1060

5. Cardinal Utility

.. in the beginning, utility, both total and marginal, was considered a psychic reality, a feeling that was evident from introspection, independent of any external observations -- hence .. not to be inferred from those externally observable facts of behavior in the market which were to be explained by it -- and a directly measurable quantity. I believe that this was the opinion of Menger and Böhm-Bawerk.

Marshall, though he spoke boldly of utility as a measurable quantity, adopted the weaker assumption that, though we cannot measure utility or motive or pleasantness and unpleasantness of sensations directly, we can measure them indirectly by their observable effects, a pleasure, for instance, by the sum of money a man is prepared to give up in order to obtain it rather than to go without it.

.. we shall henceforth merge both these theories of utility measurement into one conception which we shall call (the theory of) Cardinal Utility. Both present difficulties and are open to objection. But neither is simply nonsense.

1061

.. there was plenty to do.. None of the founding fathers, not even Walras, had bestowed adequate care on fundamentals. The theory badly needed rigorous restatement. This was done, in a manner that anticipated many a later performance, by Antonelli. Edgeworth did away with the assumption that the utility of every commodity was a function of the quantity of this commodity alone, and made the utility enjoyed by an individual a function of all the commodities that enter his budget. Marshall attempted to make the measurement of utility operational by means of the concept of Consumer's Rent [cf. Samuelson p 437 fig 22-4].

6. Ordinal Utility

useful

Ordinal utility distinguishes more ^{useful} from less useful but does consider such questions as how much more, how much less.

1063

References to papers on implication of cardinal in ordinal U.

1065

Indifference curves discovered for purposes that had nothing to do with ordinal utility. "Confining ourselves to the two commodity case, we can then lay off the quantities of these commodities on two of the coordinates of a three-dimensional diagram

and represent by the third coordinate the varying amounts of total utility enjoyed that correspond to all the possible combinations of the two commodities. The result is a utility surface that rises from the origin as the quantities of the two commodities increase, and possibly flattens out later on, presenting a shape not unlike that of a loaf of bread (Pareto called it la colline du plaisir). A succession of horizontal planes (parallel to the plane of the two-commodity coordinates) will cut out from this loaf curves along which total utility is constant, the quantities of the two commodities varying in such a way that the increase of one just compensates the individual for the corresponding decrease of the other. These curves, the meaning of which seems to rest on the assumption that utility is measurable, are what Edgeworth called indifference curves. If we project them on the commodity plane, we get the familiar indifference map. Edgeworth used it very elegantly in his theory of barter [delimiting the range of possible barter exchange-ratios].

But as soon as as we project the indifference lines on the commodity plane, the utility dimension vanishes from the picture so that their meaning no longer is dependent on any hypothesis of measurability. Then they tell us that the individual (1) considers certain combinations of the two commodities equally eligible and (2) that he prefers combinations represented by any higher indifference curve to combinations represented by any 'lower' one. The first man to see the implications of this was Irving Fisher [it freed him from an assumption that each good depends only on its own quantity]... Accordingly, Fisher presented an analysis completely free from utility assumptions that worked only with indifference maps in the modern sense. With him -- as later on with Allen and Hicks** -- indifference curves were the starting points of the analysis; they were not, as with Edgeworth, derived from a utility surface.... This suggests the idea of doing without

R D G Allen & J R Hicks, "Reconsideration of the Theory of Value," Economica, February & May 1934.

1066 con'd

index functions, especially because they give rise to difficulties similar to those that Professor Fisher met in the case of utility functions. But it took until 1934 to give full effect to it and to develop a theory that is nothing but a logic of choice: the theory of Allen and Hicks that was published in that year was, as far as I know, the first to be completely independent of the existence of an index function and completely free from any lingering shadows of even marginal utility, which is replaced in their system by the marginal rate of substitution. In consequence, elasticities of substitution and complementarity are defined exclusively from the scales of preference and likewise divorced from utility. Beyond this we cannot go. It must suffice to mention the most important of the problems that are as yet unsolved within the range of the theory of choice: so far, indifference curves -- for example, indifference curves of a country -- which have been used in some of the most brilliant theoretical work of our time.

7. The Consistency Postulate.

1067

.. it has been pointed out, as early as 1902, by Boninsegni, and a few years later by Barone, that for purposes of writing the equations of equilibrium theory we do not need either [purely imaginary indifference curves or purely imaginary utility functions]. What then do we need for this purpose if we leave every other out of account? A little reflection shows that even the early theory of value never actually used any other postulate than this: faced with a given set of prices and a given 'income,' everybody chooses to buy (or sell) in a uniquely determined way. Everything else is idle decoration and justified, if at all, by such interest as may attach to it from the standpoint of other purposes. Barone had seen this but he had failed both to formulate the postulate exactly and to prove its sufficiency. Samuelson has done this [in his 'A Note on the Pure Theory of Consumer's Behavior,' Economica, February 1938; see also 'The Empirical Implications of Utility Analysis,' Econometrica, October 1938. Cf. N. Georgescu-Roegen, 'The Pure Theory of Consumer's Behavior,' Quarterly Journal of Economics, August 1936.]

Samuelson, Economics 9th.

441 The Indifference Curve

Fig 22-5 a indifference combinations: X food, Y clothing
b exhibited in convex-downward sloping curve

442 The Indifference Map

fig 22-6: a sequence of such curves of decreasing convexity
on each curve, constant total satisfaction
as one shifts to curve further on right, increasing total satisfact

443 The Budget Line

With food and clothing allowed \$6.00 a day, \$1.50 per unit of
food, \$2.00 per unit of clothing, the straight line through
points (0, 6) and (4, 0) exhibits all possible combinations.

444 The Equilibrium Position of Tangency

It is at the point of greatest satisfaction, i. e., where the
the budget line is tangent to the indifference curve (fig 22-8)

445 Effect of Income change on Equilibrium

Fig 22-9 when income is halved, max moves to indifference U_1

Fig 22-10 when price is doubled for food, budget line pivots
on unchanged point (0, 6), max is tangent to U_3

554 Intercommodity Substitution and Qualifications

Samuelson, 9th, Economics

379 Elasticity of Demand and Supply

Demand is

inelastic if 1% cut in P gives less than 1% increase in Q

elastic if 1% cut in P gives more 1% increase in Q

unit elasticity if 1% cut in P gives 1% increase in Q

380 Aliter

inelastic demand decreases the product, PQ

elastic demand increases the product, PQ

unit elasticity leaves PQ unchanged

381 Elasticity coefficient. E_d = not the slope of a straight line but
= percent increase of Q / percent decrease in P

383. $E_d = - (P \cdot dQ / Q dP)$

cf. HEA 992f (price elasticity of demand)

384 Supply is inelastic if no increase in P will increase Q

" infinitely elastic if the slightest cut in P makes $Q = 0$;

and the slightest rise in P makes Q increase indefinitely;

Intermediate cases are called elastic or inelastic as the percentage rise in Q is greater or less than the percentage rise in P.

Aliter: when the slope is unity (45°), P & Q rise at the same rate
when it is greater than 45° , the percentage rise in greater in Q;
when it is less, the percentage rise is greater in P.

When the ordinate is not Q but P (as in fig 20-4), a slope greater than 45° reveals inelastic supply.

385 Momentary equilibrium WHEN SUPPLY HAS NOT TIME TO ADJUST.

Short run equilibrium when some adjustments of labor etc occur.

Long run equilibrium when full adjustment of all factors, fixed as well as variable, have been effected.

387 Fig 20-6 incidence of \$1 tax pr bu. wheat orig. selling at \$3 per bu
if demand curve very elastic and flat, most of tax falls on producer
if supply curve horizontal, the whole \$1 tax shifted onto consumer
if tax causes supply curve to rise \$1 point for point, then
consumer pays 66.6¢ more and producer receives 33.3¢ less.

388 A sales tax will raise P most and reduce Q least when demand is most inelastic. When supply is most inelastic, P and Q to the consumer will change least, and P to producer falls most.

It is shifted forward to the consumer when dd is very inelastic;
it is shifted backward to the producer, when ss is relatively the more inelastic.

The Limitations of the Barter Economy

Schumpeter, HEA 1087 f.

1087 Walras, anticipated of course by all those authors who -- like A. Smith and Malthus -- had used labor as a standard of value, introduced the useful notion of keeping distinct the numéraire -- a commodity whose unit is used in order to express values and prices but whose own value remains unaffected by this role -- and monnaie -- the commodity that actually serves as means of exchange and whose value is consequently affected because its monetary role absorbs part of its supply..

1088 We have indeed seen that Walras' theory of money is fully integrated with his general theory of value and distribution. WE have noted and shall notice again other advances in that direction, in particular the one associated with Wicksell's name. On the whole however monetary theory remained in a separate compartment and the theory of value and distribution in another. Prices (including rates of income) remained" primarily exchange ratios, which money reduces to absolute figures without affecting them in anything except clothing them with a monetary garb. In other words, the model of the economic process was in all essentials a barter model, the working of which inflations and deflations might disturb but which is logically complete and autonomous. Practically all the most valuable work of the period -- so far as it was not concerned with monetary problems -- was Real Analysis, even where it expressed its concepts in monetary terms.

The situation found expression in a concept that emerged and vanished with it. If on the one hand the facts of value and distribution are logically independent of money so that they can be set forth with only a passing reference to it, but if, on the other hand, it is recognized that money may act as a disturber, then the problem arises of defining how money would have to behave in order to leave the real processes of the barter model uninfluenced. Wicksell was the first to see the problem clearly and to coin the appropriate concept, Neutral Money... Its creation induced a hunt for the conditions in which money is neutral. And this point eventually led to the discovery that no such conditions can be formulated.... an interesting case of a concept's rendering valuable service by proving unworkable.