A STUDY ON THE THEORY OF INTERNATIONAL ECONOMIC ORGANIZATION

by

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May 8, 1951

Professor Joseph S. Newell
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Dear Sir:

Submitted herewith is a thesis entitled:

"A Study on the Theory of
International Economic Organization"

in partial fulfilment of the requirement for the degree of Doctor of Philosophy from the Massachusetts Institute of Technology.

Respectfully submitted,

Octavio Augusto Dias Carneiro

A STUDY ON THE
THEORY OF INTERNATIONAL ECONOMIC ORGANIZATION

Octavio Augusto Dias Carneiro

Submitted for the degree of Doctor of Philosophy in the Department of Economics and Social Sciences on May 11, 1951

This study is intended as a contribution to the integration of modern economic analysis of general equilibrium into a conceivable system of praxiology encompassing the broad field of the social sciences. It happens that the specific problem of economic organization, which is customarily studied as welfare economics, is so strategically situated as to constitute a central subject upon which to concentrate analytical attention throughout this investigation. The object of this dissertation is to trace from their philosophical roots the value judgments required for the deduction of the conditions of optimum stable equilibrium of economic action. The thesis starts from a phenomenological conception of consciousness as a manifestation of the intentionality of a subject in relation to an object, and proceeds by way of a theory of action as a normative process of orientation of social conduct from an initial

situation to a desired end. From the application of this theory of social action to economic processes, the conclusion emerges that an economic system, whether national or international, and static as well as dynamic, as long as it is considered a form of social activity and not a pure mechanism, cannot reach a uniquely given optimum position or path of equilibrium in the absence of explicit or implicit assumptions concerning the politically determined and juridically implemented ethical decisions on the ultimate ends of the economic action in question. This theory is finally translated into policy, and a minimum set of such ethical decisions is proposed as a general but sufficiently inclusive basis for possible, effective and adequate, international economic organization of national efforts towards economic expansion, stability, and peace.

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I. INTRODUCTION

A. Statement of thesis

1. The problem. This study attempts positively to analyze the problem arising from the conflict between conflicting economic ideologies of national sovereignties and the general interest of the international community towards economic stability and peace.

2. The assumption. It assumes that nations are generally interested in achieving order in their international economic relations, but that such coincidence of interests does not always indicate willingness or ability of governments nationally to implement the specific measures that the international situation requires.

3. The solution. Finally, this study examines the possibility of a normative solution in independent sovereign states spontaneously agreeing to create and support an effective and adequate international economic organization capable to make and execute a legal norm for international economic action.

B. Development of thesis

1. It was characteristic of the classical doctrine of international economic relations the belief in the harmony of the market economy as stemming from a divine, natural or

rational order, and thus being good, right and just. This doctrine was found inadequate by the end of the nineteenth century, and was replaced by the modern doctrine which affirms that international economic relations are created, maintained or discontinued by human will. The natural, automatic order became a deliberate, artificial organization, and the tremendous moral responsibility of taking economic decisions was thrown upon the half-willing shoulders of the state. In the absence of rules directly flowing from nature, God or reason, and requiring no official vigilance or conscious effort for their realization, "every action became permissible" in Dostoevski's phrase, that is, the state found itself condemned to freedom, and was confronted with the arduous task of setting its rules for national and foreign economic policy. Governments everywhere faced the problem of moral authority of having to justify its measures not only in terms of right and wrong but also in terms of good and evil.

2. The international economic organizations which exist or have existed were created by consensus of national sovereignties on the necessity of international cooperation and consultation for the attainment of harmony in international economic relations. This consensus occasioned freely agreed norms for national economic conduct that constitute the treaty upon which were built each one of these international economic agencies. Sovereign states pledge observance to those

rules in the moment their governments ratify the basic treaties, and their membership in each organization. The existence of a ratified agreement regulating the international economic conduct of sovereign states proves that there is a coincidence of national views as to the necessity of obtaining a more satisfactory state of international economic affairs, as well as that there is such coincidence as regards the appropriate norms for national economic behavior in pursuing the common objective. The reconciliation of national sovereignty and international authority was even made possible by the wide acceptance of the doctrine of original agreement by which the state may consent to the future operation upon itself by majority vote of international authority, and even coercion. It might go so far as voluntarily to surrender its entire sovereignty without violating the doctrine of sovereignty.

3. To that extent there is no conflict. The conflict arises when general norms are to be applied to specific, crucial instances of national economic reality. Such rules are juristic, not factual, that is, they designate social norms which are the aims of social action, they do not specify concrete facts of the existent economic systems. Internally, a conflict of applicability of the law is solved by legal interpretation and coercion, but since the normative authority of international economic organizations is

based rather upon the evidence of the necessity for international cooperation than upon a coercive power or an interpretative capacity that they do not possess, both their effectiveness and adequacy depend upon the ability or willingness of member governments domestically to implement specific recommendations issued by these organizations. Although the observance of the norm is technically, and even sincerely, warranted with the member government's ratification of the terms of agreement, a specific recommendation of the organization may not in all cases be internally applied by the member government if it does not conform with the national economic ideology of the country concerned.

4. Then, either international economic organizations pronounce their recommendations in conformity with national economic systems of member countries, and they will lose in normative effectiveness to the same extent that they gain in positive adequacy, betraying consequently the very objectives for the fulfilment of which they were created, or they maintain their integrity as normative organisms, and recommend in authoritative mood, but may not be obeyed. Either they operate improperly, and their success is measured by their failure, or they run the risk of not operating at all.

5. Assuming that nations have a preference for international economic harmony, but that this preference does not imply willingness or capacity of member governments to

implement exotic measures, the only possibility for international economic organizations to perform effective, adequate, normative international economic action in a world of independent, but interdependent, sovereign states is seen in sovereign nations internationally agreeing to a set of economic presuppositions

a) not based exclusively upon the assumptions of a particular national economic ideology, but large enough to include at least some of the institutions and doctrines of the major economic systems;

b) precise enough to permit the norms derived from these presuppositions to be specifically applied by national economic policies, in such a way that their acceptance or rejection be not based upon imposition or necessity, but upon free inspection and choice;

c) and, finally, verifiable enough for them not to constitute a simple compromise but to serve as a foundation and basis for passing dispassionate judgment upon the value of national economic policies which are incompatible with the pursuance of a stable and peaceful international economic order.

6. It is the final task of this investigation to examine the possibility of realization of a solution in these terms as well as to appraise the available means to create a functional international economic organization to be built upon an international contract embodying in a juristic instrument such presuppositions and derived norms.

II. FUNDAMENTAL CONCEPTS OF ANALYSIS

A. Theory and reality

1. Definition of theory. Etymologically the term theory comes from the Greek noun "theoria," derived from the verb "theorein" which means to look at something (from a distance). "Theoria" meant, for Plato, a contemplation of an essence, that is, the contemplation of the hypothetical universal aspect of anything, and, for Aristotle, a pure knowledge as opposed to practical, or a systematically organized knowledge of relatively high generality.[1] The criteria implied in these two definitions are both subjective, but nevertheless violently contrast the two extreme philosophical positions of idealism and realism with regard to the nature of reality. In order not to commit ourselves to one of these two subjective positions at the exclusion of the other, we shall adopt an operational[2] definition of theory, based on its etymological meaning, and suggesting theory as being a structure of human action consisting of an observer, his intention, preoccupation or dissatisfaction,[3] and an object

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[1] The Dictionary of Philosophy, ed. Dagobert D. Runnes, 2nd. edition, Philosophical Library, New York, 1942, "Theory."

[2] P. W. Bridgman, Logic of Modern Physics, Macmillan Co., New York, 1927, pp. 5-6.

[3] "Sorge" as in Martin Heidegger, Sein und Zeit, 1st. vol., Halle, 1929, pp. 48-49.

the nature of which confronts the observer as a riddle. This object of intent scrutiny, which may be an idea, an illusion, a physical event, a Kantian phenomenon or noumenon,[4] will be called fact. By fact, therefore, we shall hereafter understand that which is intended by an observer, a conceptual statement about what is given.[5] Theoretical inquiry, then, starts always with an intention of an observer in face of the problem given him by reality, i.e., by facts. Inquiry is oriented by a method towards the explanation of these facts in a system of logically interrelated concepts of empirical reference.[6] It aims at prediction of future occurrences,[7] which, if verified, will reassure the observer in his predisposition[8] at the initiation of the inquiry.

2. A classification of concepts. The definition of fact as the object of preoccupation of a subject, that which is

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[4]Immanuel Kant, Critique of Pure Reason, Macmillan Co., London, 1933, chap. III, p. 265.

[5]L. J. Henderson, "An Approximate Definition of Fact," University of California Studies in Philosophy, passim.

[6]Talcott Parsons, The Structure of Social Action, The Free Press, Glencoe, Ill., 1949, p. 6.

[7]Bertrand Russell, Religion and Science, Oxford University Press, Oxford, 1947, p. 8.

[8]J. A. Froude, The Lives of the Saints as cited by H. L. Mencken, A New Dictionary of Quotations, Alfred A. Knopf, 1942, "Theory."

intended by an inquirer,[9] always subjective, relative, propositional, a statement of a conceptual scheme, point out to a classification of concepts as facts, in accordance with their intended aspect.[10]

3. Concepts as synonymous with facts are perceived and apprehended out of something. It is something to which a meaning has been assigned. Concepts fall into different types according to the different sources of their meaning. There are two major ways in which this assignment can be made. This something out of which concepts or facts are extracted will here be called pure reality, and it will mean simply the assumption, proposition, belief or judgment that something exists, a continuum, a substance, an order, a divine ground in which the sensorial perception and the conceptual apprehension of the observer sculpts that which is perceived as the pure facts of empirical reality, and the otherwise meaningless term which may be associated denotatively with some datum or set of data which is given immediately as pure fact of empirical reality will here be called <u>concept by induction</u>. Pure facts, or facts of empirical reality, matters of fact,

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[9]Consciousness as intentionality, as in Marvin Farber, <u>The Foundation of Phenomenology</u>, Harvard University Press, Cambridge, Mass., 1943, pp. 11ff., 227ff., and passim.

[10]F. S. C. Northrop, <u>The Logic of Sciences and the Humanities</u>, Macmillan Co., New York, 1948, pp. 39-57, 77-100.

actual occurrences, brute events which are simply there, regardless of their value, are called concepts by induction: they are patches of color, zones of smell, etc., space-time sensorial representation of pure reality.[11] Described facts or apprehended facts are already, tacitly or explicitly, a statement involving a conceptual scheme by postulation, a state of affairs having categorial, syntactical structure, sense and value. These described facts shall here be called concepts by postulation, or, since described facts are the only facts that will concern us in this study, described facts, or facts. When the term fact is mentioned it will mean, unless otherwise stated, inpure, described, postulated fact or concept.

4. Tentatively classified in accordance with their intended aspect described facts or concepts by postulation may be grouped into (a) facts which are semantic concepts of an already reflective knowledge of that which is given by empirical reality, signs, modes of signifying: "the sun," "le soleil," "o sol" into which that patch of dazzling yellow light turns out to be, after some months of social life, to the American, French or Brazilian child; or then the individual So-and-So which is given to "my" senses as a spatial

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[11] M. Merleau-Ponty, Phénoménologie de la Perception, Librairie Gallimard, Paris, 1945, chap. 1. Charles Morris, Signs, Language and Behavior, Prentice-Hall, Inc., New York, 1946, chaps. I and III.

configuration having temporal permanence; (b) facts which are empirically described conceptual essences artistically arranged by a temperament:[12] Hamlet, Mona Lisa, Beethoven's Fifth, Cellini's Perseus, etc.; (c) facts which are inferred concepts of positive theoretical knowledge of what is given by empirical reality: that three dimensional spherical celestial mass, which is subject matter of astronomy, which in everyday life is called "the sun"; or that manifestation of a Freudian inferiority complex, which is the subject matter of psychiatry, and who is known to "me" as Mr. So-and-So; (d) facts which are the postulated concepts of technology, or ideology, which say how action should be oriented towards given ends, that is, which are norms indicating a procedure to transform what is given by empirical reality into what ought to be given by empirical reality at some future date:[13] the production function for economically harnessing the solar

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[12]Hippolyte Taine's definition of art as "nature seen through a temperament," Philosophie de l'Art, Paris, 1880. Clive Bell, Art, Frederick A. Stokes, New York, s.n., chap. I. Otto Rank, Art and Artist, Alfred A. Knopf, New York, 1932, chaps. II and III. Northrop's definition of aesthetic concept as a concept by intuition is valid only for certain forms of art. It may be noted here that this classification of concepts essentially differs from the classification he proposes.

[13]For the technological meaning of normativeness see R. Carnap, Philosophy and Logical Syntax, Routledge, London, 1935, pp. 22ff.

energy, or the legal norm which is imposed upon So-and-So in order to condition his social behavior in a Fascist State; (e) facts which are also postulated concepts of positive ethical theory making possible the formulation of a system of ethics with independent validity, but endowed with the potentiality of application to concrete situations: the "rule of reason" for interpreting the Sherman Act, or the imperative "do not kill," therefore, So-and-So should not kill;[14] (f) facts which are postulated concepts of social ideologies, Paretian "residues" of existent ethical or social systems, which give them public validity and recognition: So-and-So should be a successful business man, or a dutiful commissar, or a contemplative yogi, or an "honnête homme," or a Prussian officer,[15] etc.; or the sun should be worshipped instead of commercially exploited, or should be avoided at midday in summer time; (g) finally, at the extreme, facts which are the result of an essentially irrational choice, and which appear when a no longer theoretical decision is taken by the

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[14]Hans Kelsen, General Theory of Law and State, Harvard University Press, Cambridge, Mass., 1949, p. 45. Roscoe Pound, "Rule of Law," Encyclopaedia of Social Sciences, Macmillan Co., Chicago, Ill., Vol. 13.

[15]Vilfredo Pareto, Mind and Society, Harcourt Brace, New York, Vol. 1, pp. 3-60. Aldous Huxley, Ends and Means, Harper Bros., New York, 1937, p. 2. Levin L. Schücking, The Sociology of Literary Taste, Oxford University Press, Oxford, 1944, chap. 1.

observer in relation to the nature of pure reality, a religious, dogmatic, categorial, absolute decision which captures pure reality as rational order, as God operating on sufficient reasons, as a togetherness to be understood by mathematical means, Spinoza's Substance, Aristotle's Unmoved Mover, Whitehead's pluralistic Eternal Objects, Santayana's Essences, etc. Thus it is seen how one and the same pure fact may be apprehended by many of its aspects. The division of knowledge into sciences, art, religions, etc., is nothing more than a didactical device for exploring pure reality.

5. But how, among this bewildering multiplicity of aspects, shall the observer navigate? Theory has been defined as the action of theorizing, and, implicitly, every action seems to be a sort of theorization. Scientific theory is nothing but cognitive action, a direction in search of orientation. Pure reality behind empirical reality "makes no sense" because it is inconceivable by the relational essence of reason. That there must be something, God or Nothingness, is only an ineffable object of mystical intuition, urge for Unity, "Angst," medieval Accidia, or Baudelarian Ennui. It is an assumption never to be empirically verified, since it is proposed after someone's "five senses" have already particularized the universe, irretrievably, and imposed a pattern to that chaos. But even after the senses, at this plan of immediate existence, everything is sudden, incongruous,

fortuitous. It is reflexion that which elevates us to levels where intelligibilities appear. Abstraction, selection of facts, and then the imposition of logical correlations between these facts are the two most elementary stages of the inquiry to be followed by verification leading to prediction, which are the final stages. By these means the direction of the speculative action has found its orientation in a norm for speculation, or a method.[16]

6. Positive and normative cognitive actions. As in the definition of fact, the definition of theory points to an operational definition of scientific method as a norm of orientation for cognitive action. Previous conceptualization and reflexion are its necessary, though insufficient, conditions. Scientific theory is never made by those who start with an open mind,[17] or, in our own terms, those who are unintentioned. In order to find something we must look for it, and in some way anticipate the solution of the problem before solving the problem.[18] This guessing has been called the intentionality[19] of the inquiring consciousness. It guides

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[16]References for scientific method see P. Duhem, La Théorie Physique, son Object et sa Structure, Paris, 1906.

[17]Morris R. Cohen, Encyclopaedia of Social Sciences, Macmillan Co., 1948, "Scientific Method."

[18]Bertrand Russell, The Principles of Mathematics, W. W. Norton, New York, 1948, Introduction to the Second Edition.

[19]Etymologically the term intentionality comes from the Latin noun intentio, and verb intendere, to stretch, to reach for something.

the observer to the selection, by induction, of those relevant facts to be hypothetically generalized. Scientific guessing is distinguished from dogma or creed by its being recognized as a guess, and by the organized way of testing, through systematic doubt,[20] its chances of being true. This methodical doubt takes care, explicitly, of the influence upon the theoretical system of those facts which were left out of account as residual,[21] and it tries to correct the natural fallacy of selection which consists in taking the sample as characteristic of the class rather than of some unrecognized variety.[22] From this Cartesian notion of scientific method we may define theory as an organic structure of the cognitive action of an agent who recognizes his condition of radical subjectivity, but who, by questioning his own propositions, strives for neutral objectivity[23] in order to attain public validity of explanation, verification, and prediction.

7. We have seen intentionality of consciousness as the essence of speculative theoretical action, how it guides the

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[20]E. J. Chevalier, Descartes, Textes Choisis, Egloff, Fribourg, 1944, pp. 65-74.

[21]Talcott Parsons, op. cit., pp. 16ff.

[22]M. R. Cohen and E. Nagel, An Introduction to Logic and the Scientific Method, Harcourt Brace, New York, 1934, pp. 382-390.

[23]Max Weber, The Methodology of the Social Sciences, The Free Press, Glencoe, Ill., 1949, chap. I, where the expression is "ethical neutrality."

inquirer to the discovery of relevancy in facts, and how facts are apprehended by their intended aspect. Now we make intentionality itself the object of inquiry, and we apprehend it as the preoccupation of an agent confronted by empirical reality. Facts, then, will appear to the agent, in accordance with his way of looking at them, as what is given him by empirical reality (a) when he intends to forecast what will supervene if the predictable trends of the situation are allowed to take their course without active intervention, or (b) when he intends to know how action should be oriented, or what means should be chosen, in order to realize or approach a predetermined state of affairs which differs in whole or in part from that which will probably occur without active intervention. Cognitive action is thus characterized, on one extreme, by a positive speculative attitude of mind of the observer, and, at the other extreme, by a normative (technological or teleological) prescriptive attitude of man "in the ordinary business of life."[24] As this study is concerned with the analysis of the international conflict of economic ideologies, our mental position will consistently try to be that of the positive, objective inquirer, whereas that of our object of investigation will consistently be maintained as normative and subjective. This norm of objectivity, which is required by the scientific character of this thesis,

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[24]A. Marshall, Principles of Economics, Macmillan, 1948, p. 1.

operating within a frame of subjectivity, which is required by the social nature of this investigation, necessitates a careful definition of basic concepts, as well as a detailed description of the adopted method.

B. Method and basic concepts

1. Scientific methods. By scientific method we mean, within the conceptual frame of this thesis, a norm for the orientation of the cognitive action. Positive theory being defined as speculative theoretical action methodology will mean the normative prescriptive theory of positive scientific speculation. The elements of speculative action are the following:[25] (a) an agent, i.e., the scientist; (b) a problematic situation, confronting the scientist, and analyzable into conditions, that is, those elements of the problematic situation which the scientist cannot alter, or prevent from being altered, and to the examination of which he has to limit himself to bare observation;[26] and means, or those elements over which he has control of experimentation; and (c) an end, which has been variously defined as the correlation of the logical consequences of hypotheses with the consequences of the interaction of external objects,[27] or the adaptation of

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[25]Talcott Parsons, op. cit., pp. 44ff.

[26]A. Wolf, Textbook of Logic, Allen and Unwin, London, 1948, p. 151.

[27]Heinrich R. Hertz, Principles of Mechanics, Methuen, London, 1899, p. 1.

thought to facts,[28] or the construction of a symbolical transcendent reality:[29] there has been, however, a general opinion that the ultimate goal of speculative theoretical action is the prediction of events.[30]

2. There are two principal types of scientific method :[31] (a) technical methods, or research techniques of manipulation and measurement of phenomena, which are very numerous and peculiar to every science, and with which this study is not concerned; and (b) logical methods, or methods of drawing inference from conditions under which the phenomena investigated occur, so as to interpret them as accurately as possible. Of the few logical methods we shall be concerned here with the inductive-deductive variety only. This inductive-deductive logical scientific method[32] is characterized by the following sequence of mental activities:

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[28]Ernst Mach, Erkenntnis und Irrtum, Hoepffner, Leipzig, 1905, p. 12, and Die Mechanik in ihrer Entwicklung, Hoepffner, Leipzig, 1908, Introduction.

[29]Henri Poincaré, La Science et l'Hypothèse, Calmann Levy, Paris, 1903, Preface.

[30]P. W. Bridgman, The Nature of Physical Theory, Dover Publications, New York, s.d., p. 16.

[31]A. Wolf, "Scientific Method," Encyclopaedia Britannica, Encyclopaedia Britannica, Inc., Chicago, Ill., 1946.

[32]J. S. Mill, A System of Logic, Routledge, London, 1936, vol. 1, book III.

a) initiation of inquiry.[33] Inquiry starts, as we have already seen, with an intention, preoccupation, or dissatisfaction of the observer. The problem appears as nothing but a feeling, a state of mind. The apprehension of the problem is already its clarification, its statement. The problem, then, becomes a fact, an object of observation, the ensemble of things and events, their attributes and concrete relationships, within a problematic situation;

b) inductive inference:

(1) analysis or formation of concepts: the aspect of the problematic situation is already the problem broken down into seizable blocks. Cartesian dissection[34] is then applied which reduces the parts and aspects of the problematic situation to their easiest and simplest fragments, which are the raw material from which conceptualization starts. This conceptualization pro-

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[33] F. S. C. Northrop, op. cit., pp. 1-19. John Dewey, Logic: The Theory of Inquiry, H. Holt Co., New York, 1938, passim. Morris R. Cohen, Reason and Nature: an Essay on the Meaning of Scientific Method, Harcourt Brace, New York, 1931, passim. The initiation of inquiry as intentionality of preoccupation is suggested by Martin Heidegger, op. cit., pp. 34ff.

[34] E. J. Chevalier, op. cit., pp. 149-152.

cess consists in the choice of a frame of reference within which concepts may be postulated. As an example of conceptualization at three distinct frames of reference we may point out[35] (a) the dissection of the three-dimensional spatial reality into single partial bodies, each forming an intuitive, spatially isolated, relatively constant unit; (b) the conception of an intutively experienced event as a spatio-temporal coincidence of several single phenomena; (c) the classification of similar things, the subordination of groups to ideal-types, which are concepts by postulation, and finally the hypostatization of frequencies of appearances;

(2) synthesis or formation of hypotheses: the reduction of groups, by imagination, to concepts by postulation, or to limiting types is already a process of hypostatization which consists in concepts by postulation or ideal-types being synthetized in some kind of supposed order or body of propositions; this

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[35]Hermann Weyl, Philosophy of Mathematics and Natural Science, Princeton University Press, Princeton, N. J., 1949, pp. 145-146.

is similar to the drawing of equations from interrelations between variables;

c) deductive inference: formation of theory. From these hypotheses, and by formal implication, their logical consequences and interrelations are deduced in such a way that concepts are organized in a structural system[36] in which the principles of symbolic construction are carried through completely.[37] The result is a logically closed theoretical system where each proposition, though independent, finds its statement in another proposition of the system. The typical example of a closed theoretical system is a determinate system of simultaneous equations where there are as many independent, though interdependent, equations as there are independent variables;[38]

d) verification of theory. Coupled with the aprioristic construction of a logically closed system we must have experience and its analysis by experiment.

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[36]Thomas Hobbes, English Works, VII, pp. 183ff. as cited by Hermann Weyl, op. cit., p. 151.

[37]Dingler, Die Grundlagen der Physik, 1923, p. 135, as also cited by ibid.

[38]Talcott Parsons, op. cit., pp. 9-10. On the computational difficulties occurring in solving a large number of linear equations see V. Bargmann, D. Montgomery and J. von Neumann, Solution of Linear Systems of High Order, Princeton University Press, Princeton, N. J., 1946, passim.

> The scientist should not be satisfied with the mere counting of equations and variables, since the essential function of theory consists in the guidance it affords to new observations by which the conjectural picture is either confirmed, refuted or modified. This regulation of scientific imagination by experience is the most difficult task of methodology.

3. The verification of theory leading to new inquiries hints at a dialectical hypothesis of theoretical evolution. The testing of theorems extends the verified explanation to other facts, not included among those initially selected by induction, and which, if not fitting the newly formulated theory, will require the reconstruction of the whole system upon more inclusive hypotheses. Traditional beliefs are found inadequate[39] to take care of the facts of actual evidence, or innovations of a theoretical character may uncover new facts which crack the old theoretical structure. A problem appears urging for a solution. Someone proposes new assumptions giving prominence to hitherto neglected facts, or connects already known facts in more inclusive hypotheses thereby integrating reality in a new theoretical structure which becomes a doctrine, school of thought or sentiment. After some years

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[39]Francis Bacon, Novum Organum, and René Descartes, Discourse on Method, as cited by F. S. C. Northrop, op. cit., pp. 5-9.

or some centuries the brilliant new idea loses in "charismatic"[40] charm, is routinized into a method, a ritual, a cliché, becomes tradition, falls behind evolution, decays until it is again clear that it no longer fits conditions, and a sense of intellectual insecurity starts a new inquiry which may give a new specific content to the doctrinal function.[41]

4. The logical method of the social sciences. The above described sequence of mental activities finds its most characteristic example in the logical method of the natural sciences. In the social sciences, however, it may not be thoroughly followed. The superficial reasons for that are obvious: the social investigation is not amenable to laboratory treatment under which physical experiments are made, controlled and repeated; basic concepts of social analysis cannot be quantified, and are apt to be given by introspection, instead of inspection; social phenomena depend upon a larger number of more intricately interrelated variables; historical time, for instance, cannot be reduced, without mutilation, to a dimension of space, etc. As far as we can see these difficulties originate from the fact that in the social sciences the agent of cognitive action, i.e., the social scientist is

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[40] Max Weber, The Theory of Social and Economic Organization, William Hodge, London, 1947, pp. 96ff, 334-342.

[41] C. J. Keyser, "The Nature of the Doctrinal Function and its Role in Rational Thought," Yale Law Journal, March, 1932.

to a much larger and deeper extent caught or engaged into the means and conditions of the problematic situation than the physical scientist. The sociologist, or the economist, must pursue, at the same time, two divergent courses of cognitive action: (a) he must keep the positive scientific status of his investigation by struggling for ethical neutrality in his attempt to discover, by observation and reasoning based upon it, particular facts about society, and then laws connecting those facts and making possible to predict future occurrences;[42] and (b) in striving for objectivity he must also go beyond mere description of empirical facts, and for that, sooner or later, he will assume that events are connected in certain ways, and this means an avowed or tacit theory of social causation.[43] At one extreme the sociologist, like the physicist, attains the peak of positive speculative cognitive action in mystical, perfectly objective, ineffable contemplation. At the other extreme both scientists also reach the deep of normative prescriptive cognitive action in artistic, perfectly subjective and communicable expression. At both extremes of cognitive action the social scientist as well as the physical scientist will lose scientific knowledge to acquire religious or artistic insight. Theoretical statement of concepts and hypotheses as well as direct experimental or differential observation will tell the physicist when is

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[42]Bertrand Russell, Science and Religion, loc. cit.

[43]Morris R. Cohen, "Scientific Method," loc. cit.

appropriate for him to exercise restraint in his design to draft a model for nature.[44] Verification of theory by experiment is the indicator that tells the physicist where is that margin in which positiveness and normativeness overlap each other and attain theoretical validity by epistemological correlation.[45] It will tell him where is that narrow strip in which is both possible to predict what will be the future aspect of a certain situation under certain conditions, as well as to determine what technological recipe should be chosen in order to select alternative means towards a theoretically possible, and scientifically advisable end.

5. It is evident that the social scientist must also theorize. Theory is synonymous with cognitive action. The social scientist must recognize that theorization is not eliminated, nor his investigation made more objective and ethically neutral, by his making theorization tacit or unconscious. Therefore, the first step to initiate fruitful social inquiry will be for the sociologist clearly to analyze the problematic situation by including himself in it, that is, by recognizing that it is the way he regards facts that determines which

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[44]Suggested by Goethe's sonnet Natur und Kunst.

[45]F. S. C. Northrop, op. cit., p. 119, defines an "epistemic correlation" as "a relation joining an unobserved component of anything designated by a concept by postulation to its directly inspected component denoted by a concept by intuition."

are, for him, the leading and most significant ones. He must begin by frankly confessing that when he initiates inquiry he has himself already, that is, he has already a preconceived idea of social causation, and that this preconception is unavoidable. After so confessing, and if he persists in aiming at objectivity, then he must face the methodological question of when he must begin to distrust pure theory, that is, when he must stop introducing himself in his theory as an example of general theory, when he must reject a basic concept of analysis because he is generalizing too much a trait which is peculiar to him, to his friends, to his social class, or to his country. This is indeed an unavoidably philosophical problem to the social scientist, a problem which his colleague of the physics department does not have to face as a scientist. But before examining in what consists this particular problem of the social scientist, we must note here in which way the logical method of the social sciences differs from that employed in the natural sciences.

6. We have already seen that both the sociologist as the physicist, to the measure that they act qua scientists, attempt (a) to make the chaotic diversity of their sense experience correspond to a logically uniform system of thought; and then (b) they attempt to correlate, within the system, the theoretical structure to their sense experience in such a way that the resulting correlation is unique and con-

vincing.[46] The same inductive-deductive logical method may be employed in both types of investigations, the difference in procedure residing rather in the sequence of mental activities at the stage of the formation of concepts, and at that of the verification of the theory. Both scientists face reality as a riddle, but whereas from the apprehended problematic situation the physicist extracts, by inspection, the concepts by induction, such as color, form, etc., upon which he will base his analysis of the problem, the sociologist, or economist, confronted by a social or economic problem, will extract from it, by introspection, the basic intuitive concepts of analysis, such as, for instance, the subjectively introspected concept of utility, upon which he will base his theory of economic value.[47] The formation of theory, by deductive inference, is similar in the two cognitive processes, but they again differ at the stage of verification. There the economist or the sociologist identifies the postulates of his

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[46]Albert Einstein, "Considerations Concerning the Fundaments of Theoretical Physics," Science, 1940, n. 91, pp. 487-489. Einstein's definition of science is "operational" and emphasizes that "it is by means of epistemic correlations that unobservable entities and relations designated by concepts by postulation take on an operational meaning and thereby become capable of being put to an experimental test," F. S. C. Northrop, op. cit., pp.122-123, also in Albert Einstein, The World as I See It, Covici Friede, New York, 1934, p. 60.

[47]Lionel Robbins, An Essay on the Nature and Significance of Economic Science, Macmillan Co., London, 1946, chap. IV.

deductively formulated theory with his primitive intuitive concepts by introspection, and having declared that this correlation is evident generically he proceeds to declare that the logical consequences of these postulates, to the measure that they are correctly deduced, must also be true. The physicist, on the other hand, establishes his hypotheses, deduces their consequences by formal implication, and then he demonstrates the validity of his theory by checking its theorems against directly observable external entities and relations, or, in the terminology of this study, by showing that the immediately given correlates of those theorems do not differ from what is experimentally observed. This simple description of the two procedures shows how much more easily the physicist attains public validity for his theories. He makes generic the material which has been given him by his senses, which are a much more easy means of intersubjective transmission. Moreover, in order to make this communication still more easy he quantifies his data, whereas the social scientist has made generic what may not be more than specific. He assumes that human nature is what is given him by his nature. He declares himself a prototype of human being, and therey precludes all possibilities of agreement between himself and those who do not partake of the same qualitatively given initial basic theoretical concepts by induction.

7. At this point, aware of the ideological conflict he has started, the social scientist is apt to perceive that his theory was based upon the unconsciously assumed postulate of a deterministic social order. He repeats the reasoning of the nineteenth century theoretical physicist. If it is assumed, with Leibnitz,[48] that there is a pre-established harmony which justifies the opinion, not immediately evident to the senses, that the world is far more accurate than it appears, or even that it is absolutely accurate, then what is required in the social sciences to make them exact is the perfect knowledge of the number of the variables involved as well as of the interrelationships existing between them. The social world is reduceable to a closed theoretical system, a determinate system of simultaneous equations. However, in order absolutely to ascertain the nature and degree of this universal harmony, the observer should have to wait to the advent of static equilibrium at the end of time. This, for instance, is the philosophical assumption upon which is based the Walrasian general equilibrium system. Short of verification at the threshold of divine omniscience, the social scientist may turn away from Leibniz, and suppose, with Hume,[49]

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[48]Hermann Weyl, op. cit., pp. 142-143. Die Philosophischen Schriften von G. W. Leibniz, ed. C. J. Gerhardt, Halle, vol. VII, p. 87.

[49]David Hume, Treatise of Human Nature, Everyman's Library, J. M. Dent, London, s.d., Book I, Part II, Section 1.

that the world may be no more accurate than it appears, and then he will fall, in practice, in an statistical observation of behavior, which consists of observing similar groups of people at different times and under different circumstances, and declare, tentatively, that the change in circumstances has caused the change in behavior.[50] This will be again a new way of tacitly presupposing a social causation of some kind. And the old dilemma again emerges: either the social scientist, in order to establish a criterion for human motivation, introspects deeply and may come up with an evidence which is only valid for himself and perhaps for those whose conditions are similar to his, and which may seem to others who do not partake of the same insight as worth of serious attention as any insane construction; or, in trying to avoid asserting himself unduly, he may stare at facts, and limit himself to the observation of decisions <u>after</u> they are taken, and even to arrange these behavioristic manifestations in statistical time series, but then he must be prepared not to be capable of answering those who challenge his work as fallacious, since its theoretical causation has not been previously proposed as true.

8. <u>Positive and normative social theories</u>. The broadest classification of scientific theories divides them into (a)

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[50]Kenneth E. Boulding, <u>Economic Analysis</u>, Harper and Bros., New York, 1941, pp. 12-13.

"model" theories, which imply an imagined hidden mechanism explaining the observable phenomena, and (b) abstractive theories, which make use of relations abstracted from the phenomena actually observable.[51] Both types have been applied to the natural sciences and to the social sciences. In the social sciences the "model" theories imply an essence, a meaning, an ideal-type within the object of observation. Following the Platonic definition of theory model theories when applied to the social sciences will be called idealistic. Abstractive theories may also be applied to the social sciences by implying inquiry about the appearances of social phenomena and their relationships. According to the Aristotelian definition of theory they will then be called realistic. Both the idealistic as well as the realistic social theories may be subdivided into normative and positive in accordance with the intended purpose of investigation. In order to study this classification in detail it is convenient to summarize the argument of this thesis in regard to the concept of theory.

9. By defining consciousness as intentionality theory has been understood as a cognitive action consisting of an

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[51]Morris R. Cohen and E. Nagel, op. cit., pp. 397-399. Edwin R. A. Seligman, "What are the Social Sciences?", Encyclopaedia of Social Sciences, Macmillan Co., New York, 1948, Vol. I, Introduction to the Development of Social Thought and Institutions. Auguste Comte, Cours de Philosophie Positive, ed. P. Lafitte, Paris, 1830-1842, passim., and 2nd. ed. with preface by E. Littre on the classification of sciences.

observer, his situation or standpoint for observation, involving conditions and means of which his intention of inquiry is the dynamic element, and an intended object of observation (II,A,1). Aside from other forms of action, such as the vegetative, the instinctive, the affective, etc., scientific theory has been envisaged as cognitive action resulting in a closed theoretical system the formation of which follows definite mental patterns in the observation of facts, and the discovery of laws connecting them with one another (II,B,2,c). Since facts and their relationships have been defined as synonymous to concepts (II,A,2), i.e., as that which emerges for the observer when his cognitive interest is focused upon that particular aspect of reality, two types of cognitive theoretical actions have been distinguished in accordance with the intention of the inquirer (II,A,6), the positive and the normative cognitive theoretical actions, the definitions of which we are now in a position to present in more formal terms.

10. By positive scientific theory we mean the cognitive action of a scientist who speculates about a problematic situation by trying to detect the systematic relationships connecting variables, under well defined parameters, in order accurately to predict the aspect of that system at any given moment in the future. By normative theory we mean the cognitive action of a scientist who, by applying his positive knowledge to a specific situation, tries to prescribe, under well

defined conditions, the appropriate restrictions to be placed upon controllable means in order deliberately to obtain a previously selected state of affairs at a certain moment in the future. As already pointed out purely positive, speculative action is mystical insight, impersonal, objective contemplation into the nature of pure reality. It has also been stressed that purely normative, prescriptive action is artistic performance, personal, subjective expression concerning what pure reality ought to be. Between these two extreme positions, scientific cognitive action is that scalar space where theory is verifiable by reference to the epistemological correlation of thought to experience. Within this margin positive as well as normative theories may be applied to both the natural sciences as to the social sciences. Theoretical physics and mathematical economics are instances of positiveness in physics and economics. In the same way a cooking recipe, an industrial technique, an ordnance rule, a legal norm, or a divine commandment are instances of normativeness in the applied natural or social sciences of cooking, technology, balistics, jurisprudence, policy, and catechism. The scientific, positive, speculative theorist is concerned with determining what is given him by empirical reality in order correctly to forecast what will be given him, under certain circumstances, by empirical reality in the future. His investigation is characterized by a desire correctly to predict what will be verified

by epistemological correlation in the future provided there is no external intervention, that is, no introduction of variables without additional independent equations, in his isolated, closed, systematically arranged problematic situation. The scientific, normative, prescriptive theorist is concerned with applying positive theory to specific situations, and, by working backwards from a given solution, correctly to prescribe a norm for selecting the appropriate means which, under explicit conditions, will realize at some given moment in the future the previously chosen final end. His investigation is characterized by a desire correctly to select the appropriate means for the realization of a given, final, state of affairs which would not have occurred but for this deliberate, external, selective intervention into the structure of the system. It must be noted forthwith that a scientific normative theory, no less than its positive counterpart, must form a closed system in order to be logically determinate. Thus, the normative intervention consists in giving specific teleological content to the "empty" positive theoretical system by predetermining its future state of affairs, and then in going back to ascertain what means will bring it up at the predetermined future moment. This end, as an already given future state of affairs, must be understood as final in the specific, closed system of normative theoretical action in which it is proposed as an end. It must not be regarded as a

means towards a further end in the same system. To the extent that an end is not final, within the specific theoretical system in which it occurs, its choice or selection may always be scientifically or logically ascertainable as a choice among possible means towards a further, final end in the particular system of cognitive action under consideration. As for the appropriate selection of a final end among possible and eligible final ends, which is the central problem of ethics, our belief is that a final end of a certain system is scientifically or logically ascertainable to the extent that it may be integrated as a possible and eligible means in a broader system which will include this final end and other final ends of a narrower system as positively interdependent, specifically determinate elements. As for final metaphysical ends it is our belief that science as long as it remains scientific and does not wish to become art or religion cannot tell Good from Evil. Science can tell what is true and what is false within a given conceptual scheme, and only metaphorically can it be said that something false is also bad, or to equate by convention a certain true end with a desirable end, without leaving the theoretical system within which that evaluation occurs. Thus, for instance, unemployment which may not be bad within the system of preferences of a lazy individual, may become bad at a governmental level when the aim of policy is to prevent social unrest, and this may again be a desirable state of affairs for revolutionary purposes.

11. Positiveness and normativeness may be applied to the social sciences within a realistic or an idealistic frame of reference. The field of science has been traditionally divided between the study of physical nature and that of the phenomena of mind.[52] The natural sciences deal with the phenomena of matter, including those taking place in the human body. The social sciences study the phenomena of mind in man as an isolated individual or as a member of a group. This division by reference to the nature of the subject matter is unsatisfactory not only for obvious psychophysiological reasons but also for the less obvious Protagorean reason that "man is the measure of all things,"[53] that is, all phenomena are, strictly speaking, phenomena of mind. The distinction, however, is didactically useful, and may perhaps be maintained upon firmer grounds by a slightly different interpretation of the Protagorean doctrine "each man is the measure of all things." The reference now is to the degree of engagement the inquirer feels he is tied to, or dependent upon, his subject of inquiry. In dealing with the objects in the physical world the physicist, chemist, or biologist may choose to limit his observations to abstracted uniformities and regularities, as did Ostwald, Duhem, and Rankine,[54] or he may imagine an

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[52]Edwin R. A. Seligman, op. cit.

[53]Bertrand Russell, A History of Western Philosophy, Simon and Shuster, New York, 1945, p. 77.

[54]W. J. M. Rankine, Miscellaneous Scientific Papers, ed. E. Tait, Scottish Press, Edinburgh, 1881, p. 210.

inner mechanism, a "model" or an essence to explain the observable phenomena, as did Lord Kelvin, Faraday, Lodge, and Maxwell.[55] In the first, abstractive choice of a theoretical frame of reference, the scientist has chosen realistically to abstract his self, other people's selves, as well as the hidden essence of things from his analytical frame of reference, whereas the latter, existential choice, the scientist has chosen idealistically to look for essences, and meaning, to look for concepts by postulation and not exclusively for concepts by induction of appearances, and relations among "raw" facts. The idealistic observer must, then, imagine hidden mechanism by postulating his own self as an absolutely given existent the essence of which is to be intended towards an inquiry, to be scientifically interested in a problem, or a riddle. The choice of a frame of reference is not as significative or pregnant with limiting effects in the natural sciences as in the social sciences. Matter can be quantified or reduced without serious structural mutilations to the categories of space, whereas the "essence" of mind, its hidden mechanism, is organic meaning, is motivation, wants, interests, or qualities, not quantities. But even in the natural sciences, where this subjective influence is negligible, research techniques have been devised to correct personal distortions in the observation of the phenomena of

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[55] M. R. Cohen and E. Nagel, op. cit., loc. cit.

matter. And even in the applied natural sciences this influence is already sensible and may become a serious obstacle in the way of cognitive action oriented towards technological norms, as the biographies of innovators demonstrate. As for the social sciences the dependence of subject on object is generally recognized as very strong, and two norms have been advocated to remedy the situation. The first norm advocates that the social scientist should imitate the realistic or abstractive method of the physicist, and limit his observations to the inspection of appearances of social phenomena dealing with human beings as if[56] they exhibit all their relevant motivations, intentions, and interests, externally, through unmistakably patent decisions reduceable to indexes. As we have already seen the only obstacle in the way of complete objectivity is that, in order to be able to read the meaning of these indexes and signs, the social scientist must finish by having to postulate some mechanical law of causation, thereby losing his detachment in implicit, often unconscious, fallacy of misplaced concreteness.[57] The second methodological norm advises that the social scientist should look for meanings, intentions, and motivations in mental life of man, that is,

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[56]H. Vaihinger, The Philosophy of "As If", Kegan, Trench, Trubner and Co., London, 1935, pp. 78-134.

[57]Alfred N. Whitehead, Process and Reality, Social Science Publishers, New York, 1941, p. 11.

he must explicitly postulate a law of social causation, an essence for human nature, which essence he must find nowhere but within his self, through the immediate, Cartesian evidence of the introspected "cogito." The trouble is, then, that he must finish by having to hypostatize that which he captures by introspection as the hidden mechanism of individual and social behavior. The moment the social scientist wishes to investigate beyond appearances and into human motivation he must primarily postulate his "ego" as immediately and absolutely evident to himself. And the problem is to determine whether and to what extent this evidence is valid for other people.

12. This epistemological problem of a subject inquiring about an object, which has been already placed in subjective terms by both Plato and Aristotle in their respectively idealistic and realistic definitions of theory, is again placed in subjective terms by modern psychology. The subjective point of view is the one that is adopted throughout in this study by our close adhesion to the phenomenological method, which envisages the epistemological problem of objectivity and subjectivity as a problem of vectorial orientation. When "I" say that "this chair or that man is real" it is meant either, idealistically interpreted, the prediction of a multitude of discordant impressions expected in response to certain intentions of will, or, realistically interpreted,

the statement or concept that a thing exists which stands in a certain epistemological correlation to the given chair or man phenomenon.[58] The problem may also be couched in geometrical terms by stating that, the idealistic observer assumes that "I" is the absolute basis for the coordinate system in which objective reality is determined: the Schopenhaurian "the world is my idea," or the Cartesian "cogito" assign to the reality of the "I" a precedence in principle over the reality of the external world, including the "thou." The methodological decision of the realist observer is that of eliminating the "I," of striving directly for public validity in his judgments upon facts unbiased by personal feelings,[59] and of considering only appearances, not essences, as open to his investigation. For the realist observer object and subject, the "I" and the "thou," the "ego" and the "alter ego" belong for him to the same world of phenomena. In fact, as we have already seen, the postulation of the "ego," the "alter ego" and the external world is without influence, or at least seriously disturbing influence, upon the knowledge of what <u>is given</u> by empirical reality in the relationships between phenomena of matter. And to the extent that the social scientist reduces motivations, values, meanings, life and death, suffering and joy, his own and those

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[58]Hermann Weyl, <u>op. cit.</u>, p. 122.

[59]Karl Pearson, <u>The Grammar of Science</u>, Everyman's Library, J. M. Dent, London, s.d., p. 11.

of his fellow men, to the geometrical categories of objective space and time, time itself being reduced to a dimension of space, that postulation is not required. It does not matter for the realist observer whether the object of his observation is really what it actually appears to be. What is essential for him is the hope that the frequency of appearances be such that he fails to find in experience any elements intrinsically incapable of exhibition as examples of general theory.[60] But once he chooses to adopt the idealist attitude in order not only to penetrate into hidden meanings but also to prescribe appropriateness to choices it does matter, indeed, for the scientist to know whether that gas is poisonous, or that law contrary to the interests of his country. Since the social sciences are concerned with objects that are also subjects in their own systems of individual preferences, involving meaning and value, the social scientist who attempts to understand them must necessarily do so by means of categories which in turn depend on his own values and meanings.[61] The ambiguity of the social sciences, which afflict so much the geometricians lost among the finesses of the mind, is that the social

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[60]Alfred N. Whitehead, op. cit., p. 67.

[61]Louis Wirth, Preface to Karl Mannheim, Ideology and Utopia, Harcourt, Brace, New York, 1949, pp. XX-XIV. V. F. Calverton, Introduction to The Making of Man, The Modern Library, 1937, pp. VII-XI, 1-11, and also in "The Compulsive Basis of Social Thought," American Journal of Sociology, XXXVI, 5, 1931, pp. 689-720.

scientist is bound to be concerned with qualities perhaps more than with quantities, with truth and falsehood as well as with good and evil. And in order to perform that double-edged function he is condemned to the teleological freedom of having to set, by postulated bias, that which shall be the example of general theory.

13. By combining these two methodological norms for the application of the scientific method to the social sciences with the already defined distinct orientations of cognitive action as positive and normative, a classification of social theories based, firstly, upon the scientist's choice of a frame of reference, and, secondly, upon his intention in inquiring, may be suggested as follows:

a) he chooses a realistic frame of reference, and thereby eliminates his self, other people's selves and the absolute existence of the external world from his analysis; he looks for appearances and relationships among appearances;

(1) his intention is to be positive, to produce a positive, realistic social theory; like the mathematical economist or the theoretically "pure" jurist he starts with concepts by induction, which are (a) intuitive concepts by introspection, which the social scientist, explicitly, or more often

implicitly, hypostatizes as generic concepts by postulation from which he infers by deduction a logically closed system which he tries to adapt to reality by an ever unsuccessful process of "successive approximations": as examples of this type of theory we may cite the Walrasian general equilibrium theory, the Austrian and Jevonian marginal utility theory, the sociological positivism of Comte, Pareto, and Durkheim; and (b) where the concepts by induction are intuitive concepts by inspection we have the extreme type of theory which is exemplified by the Hicks-Allen indifference-preference analysis, and the statistical behaviorism of Wesley C. Mitchell and his group;

(2) or his intention is to produce a <u>normative, realistic social theory</u> which we shall call an utopian[62] social theory; given a

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[62]We shall, in this context, qualify as <u>utopian</u> every normative, realistic social theory resulting from the prescription of a norm for selecting means towards a realistically and positively deduced, "purely" theoretical, future state of affairs. This definition of <u>utopian social theory</u> may be <u>idealistically</u> interpreted, either in the Marx-Engels sense as naive, unhistorical, and anti-scientific, or as revolutionary wish-dreams, inspiring the collective action of opposition groups which aim at affecting an entire transformation of a certain society, as in Karl Mannheim, <u>Ideology and Utopia</u>, Harcourt, Brace, London, 1949, pp. 173, 176-177.

positive theory as a "doctrinal function"[63] the normative realist places universally valid constraints upon its variables (a) either by postulating that the social order is atomistic, that human nature is instinctively oriented towards the maximization of individual satisfaction, and, to the extent that these satisfactions are left unspecified, that individual ends are random, independent, but interdependently circumscribed by constant scarcities; i.e., that the economic system is regulated by "perfect competition"; then the social scientist prescribes the utopian norm of laissez-faire the "natural order" of the social system which will automatically pick up the most appropriate means for social or economic action; (b) or by postulating that, although the social order is atomistic and

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[63] By "doctrinal function" we mean a "theory" as structurally consisting of a manifold of interrelated propositional functions called "postulates," with all the consequences following from them called "theorems." A "doctrine" is a doctrinal function with specific content. See Cassius J. Keyser and R. D. Carmichael as cited by Alfred Korzybski, Science and Sanity, International Non-Aristotelian Library, Lakeville, Conn., 1948, p. 144.

individualistic, individual action is entirely rational, that is, to be completely exhausted by scientific explanation, and scientifically grounded ethics, discrepancies from rationality being explained by ignorance and error, any departures from stable equilibrium being theoretically followed by its immediate restoration, delays being explained by the existence of "friction"; i.e., that the economic system is regulated by "pure competition"; then he prescribes the utopian norm of effective competition, mild state intervention in the choice of means, and simple, quasi-mechanistic "rules of the game"; (c) or, finally, by postulating that human nature, although not entirely rational, and may be not inherently rational, can be socially oriented through the manipulation of conditions by an authority which is sovereign in respect to the individual, that is, capable of implementing, through coercion, its final ends, however they might have been chosen, and which knows "better than the individual" which choice is better "for the individual"; i.e., that the economic

system is no longer an order but a deliberately controlled organization; then the social scientist prescribes the utopian norm of "collective welfare," which is ultimately based on the postulate that human nature, specially the nature of moral authority "gets better all the time," i.e., the ethical direction points towards moral progress by historical, scientific, and economic determinism towards "a better future," and that this is the law of social causation which ties the independent, final ends selected by authority into a closed system of mutually interdependent final ends, where postulated, not inherently rational individual ends are translated into social means oriented towards an authority chosen, deliberate, planned, closed system of ends;

b) or the social scientist chooses an idealistic frame of reference; he begins his investigation by postulating the absolute existence of his own self; then, instead of inferring, as does the realist social observer, the existence of his "ego" and of "alter ego" as only possible objectively, within the mundane sphere where both are compossible and

coexistent, and the "alter ego" becomes manifest for the "ego" through concordant behavior, communication, expression, etc., the idealist social observer infers the possibility of a coexisting "alter ego" constituted within and by the activities of the ego;[64]

(1) if his intention is to be positive, to produce a positive, idealistic social theory he will, like the institutionalist economist or the organicist sociologist, start with concepts by induction which, contrarily to the positive realist observer, he does not hypostatize as generic concepts by postulation but as historical concepts by postulation, i.e., specific, historical, not absolute but relative, "emanations" or "expressions" of ideals, social embodiments of

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[64] See for a condensed presentation of the idealist point of view as here defined, Herbert Marcuse, "Existentialism: Remarks on Jean-Paul Sartre's L'Être et le Neant," Philosophy and Phenomenological Research, Vol. VIII, pp. 309-326, also, Alfred Schuetz, "Sartre's Theory of the Alter Ego", Philosophy and Phenomenological Research, Vol. IX, pp. 181-199, and "Scheler's Theory of Intersubjectivity and the General Thesis of the Alter Ego", ibid., Vol. II, pp. 323-342. See also as general reference: Georges Gurvitch, Las Tendencias Actuales de la Filosofia Alemana, Editorial Losada, S. A., Buenos Aires, 1943, passim.; José Ferrater Mora, Unamuno, Editorial Losada, Buenos Aires, 1944, passim., but specially pp. 119-155; also Ortega y Gasset, La Rebelión de las Massas, Arnold J. Toynbee's "challenge and response" in Study of History, O. Spengler's "cultural physiognomy" in Decline of the West, Max Scheler's "sociology of knowledge" in Die Wissensformen und die Gesellschaft, etc.

meanings; in other words, the positive idealist social observer feels free to present his own categories to which he attaches values and meanings, and which, in order to reach general scientific recognition, he also relates in a closed system, based, then, on postulates the validity of which is "dated" and dependent for verification upon test, by epistemological correlation, to the biographical, factual situation of its author within the problematic situation: as examples of such positive, idealistic attitude of observation we may cite the social and economic works of Max Weber;

(2) he may also intend to produce a normative, idealistic social theory which we shall call an ideological[65] social theory; given a

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[65]We shall here qualify as ideological every normative, idealistic social theory resulting from the application to a national reality of an utopian social theory. This definition of ideology may be realistically interpreted, either in the Marx-Engels sense of those aspects of the social reality which are open to scientific scrutiny through a law of social causality, such as historical materialism, or economic determinism, or in the Napoleonic derogatory, but idealistic, sense of those philosophies whose influence was republican, or even as a mental fiction, whose function is to veil the true nature of a given society, and which originate unconsciously in the minds of the members of those groups who seek to stabilize a social order, as in Karl Mannheim, op. cit., pp. 111ff, 278 and passim. See also Vilfredo Pareto, Traité de Sociologie Générale, Lausanne and Paris, two vols., 1917-1919, and Les Systèmes Socialistes, M. Giard, Paris, 1926, two vols.

> normative, positive social theory as a social doctrine the normative idealist places nationally valid constraints upon its variables, that is, prescribes norms for selecting means conducive to the realization of existentially given, socially accepted or embraced, or imposed, historical, national ideologies which define the state of affairs not yet realized, rather than the de facto character of existent social organization: as examples of such national ideologies we may mention Stalinism, American New-Dealism, British Labor socialism, German Nazism, Italian Fascism, Latin American Militaristic Caudillism, etc., as well as Anglo-American laissez-faire capitalistic democracy, Roman Catholic Christianism, etc., which are characterized by the fact that they cannot be completely in accord with existent governmental organizations, since by definition they are ends of the social action, rather than means or conditions of the actual political or economic situation.

14. Idealistic, normative economic theories, or national economic ideologies may be applied internationally the moment

a general preference of the international community manifests itself towards a definite, final end for international economic action. It is assumed, in this thesis, that a preference for peaceful and stable national economic action is implied in every national economic ideology, and that this national preference has manifested itself, repeatedly, throughout history, in various attempts towards bilateral, oligolateral, or multilateral international economic cooperation. We believe that it is scientifically impossible to justify the reason why economic peace and stability have always been considered, by such otherwise divergent social thinkers as Isaiah, St. Augustine, Thomas Hobbes, Burke, Lamartine, Karl Marx, Lenin, and Justice Holmes as the national, if not international, economic summum bonum. We, however, believe that it is feasible scientifically to prove that it was the taking of national economic ends as final ends that made such consensus at the national level often result in international conflict and instability, and that, the moment there is a generally manifested desire for international economic stability and peace it becomes ipso facto scientifically possible, by translating national ideological ends into means towards a further and broader international ideological end, to work out a set of norms to which national ideological ends may be made adaptable, and by which other national ideological ends may be judged as to their validity towards the selected final end for international economic action.

C. Formal restatement of thesis

1. Theoretical purpose of inquiry. The theory here exposed is not committed to any one of the above sketched types of socio-economic theories at the exclusion of the others. It attempts (a) from a realistic point of view to integrate, and not merely to juxtapose, a positive theory of international economic order and conflict, and a normative theory of international economic organization, within what might perhaps have been called an outline of a monopolistic competition theory of international welfare economics; and then (b) from an idealistic point of view to apply this theory to an international economic pattern consisting of certain well defined types of national economic ideologies the economic interactions of which may be seen as a sequence of "war" and "contract"[66] leading to new norms and "recontract," in order to investigate the possibility of a norm or set of norms conducive to a peaceful and stable organization of international trade and capital movements.

2. The shifting over from an Aristotelian or realistic to a Platonic or idealistic point of view does not imply a

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[66]When the agent acts without, or with, the consent of others affected by his actions we call the first species of action war; the second, contract, as in Francis Y. Edgeworth, Mathematical Psychics, C. Kegan Paul & Co., London, 1881, p. 17.

change from an objective to a subjective frame of reference. The subjective frame of reference is consistently adhered to thoroughout this study by the phenomenological method[67] here adopted from the very beginning, and the shift means nothing else than a methodological device separating two successive phases of the same approximation to the solution of the problematic situation presented by contemporary international economic order as it is given us by our intended inquiry in that direction. This unfamiliar frame of reference of subjective action was chosen because we do not see any other mental position from which it would have been possible to integrate within a theoretical unity the double-edged, positive-normative purpose of this inquiry. It seems, indeed, that there is no other mental attitude with which to undertake both the causal, functional analysis, which is necessitated by the deterministic, mechanistic, utopian view of international order and conflict, as well as the symbolic, meaningful synthesis of the idealistic investigation which is so essential to the voluntaristic development of an ideological, international organization. The subjective frame of action is simply a common

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[67] On the phenomenological method see Marvin Farber, op. cit., pp. 521-536, and also Dorion Cairns, "An Approach to Phenomenology," in Philosophical Essays in Memory of Edmund Husserl, Harvard University Press, Cambridge, Mass., 1945, loc. cit.

foundation, as the spatiotemporal framework of classical mechanics, upon which it becomes possible to shift, purposely and explicitly, from a realistic to an idealistic standpoint in such a way that the resultant theory becomes an operational epistemological articulation of static to dynamic analysis, of positiveness to normativeness, of a Kantian "pure" emphasis on the cognition of systematic relationships between phenomena to a no less Kantian "practical" emphasis on the intuition of total, noumenal, system of meanings.

3. Static and dynamic, subjective theory of action. Figuratively speaking the performance of an action, for instance, a dramatic action, may be seen from two, and only two, mutually exclusive viewpoints: that of the spectator, and that of the actor himself. The former is the objective point of view; the latter, the subjective. But both spectator and actor may choose, when confronted by the dramatic action, to take either the realistic or the idealistic framework, or both in succession, simply by watching or acting detachedly or sympathetically. Excluded from the objective attitude of mind by the closely vital nature of our subject we are undertaking the cognitive action of this thesis definitely from the actor's standpoint by observing realistically and idealistically the play of modern conflict in which we serve. We have already seen that the

epistemological problem of a subject inquiring about an object has been placed in subjective terms by both Plato and Aristotle (II,B,12). After three centuries of misplaced Baconian empiricism modern science again placed the problem in subjective terms, as two orientations of the intentionality of the inquiring consciousness.

4. In order to clarify this often mentioned concept of action as an intentional experience, we must sketch in a few words what Husserlian phenomenology[68] regards as the characteristic of the psychological experience and the psychical data it provides. To discover what <u>is given</u> in any immediate experience we must revert the ordinary outwardly turned attitude of inspection, and concentrate our attention in the act of experience itself in which empirical facts of our environment, thoughts, and values of the moment are apprehended or appear. The nature of values, goals, utilities, etc., is to be a consciousness of these values, goals, and utilities, real or unreal as they may be. This character of reference of consciousness has been called intentionality. All consciousness of an observer as to his situation, and as to the goal to which he aims, is intentional, and all his acts are intentional experiences.

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[68]For an excellent summary of the phenomenological movement in philosophy see Edmund Husserl, "Phenomenology," <u>Encyclopaedia Britannica</u>, Encyclopaedia Britannica, Inc., Chicago, Ill., 1946, vol. XVII.

The elements of an act, such as its situation, end, and orientation or norm, are given to the agent, or to the subject of an action, as an integrated, conceptually unbreakable, subjective unity which is his action as seen, as it were, from the closed, determined system of his "cogito" which is the immediate experience of his self. Conceptually, however, an action may be seen as an organic[69] summation of acts, and each unit act may be analysable into a situation, consisting of conditions and means, an end, and a norm connecting the end to the means.

5. Moreover, unit acts may be seen as operating in different levels of psychical existence in the world of empirical reality,[70] and according to the nature of these levels unit acts may be classified into five pure types: (a) the vegetative act[71] is characterized by the absence of a freely chosen final end, as well as of controllable means, and a norm; the act is an all inclusive biological condition, such as sleeping, digesting, breathing, etc.; (b) the instinctive act is also characterized by the absence of a freely chosen final end, as well as controllable means, but it already possesses a norm, an orientation, a

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[69] An important term to be defined later.

[70] Max Scheler, Die Stellung des Menschen in Kosmos, Darmstadt, 1928, chap. I.

[71] Ibid., pp. 16ff.

rhythmical, innate, hereditary singling of specific sensations and perceptions out of diffuse complexes of experiences;[72] (c) the associative memory act[73] is characterized by the presence of a specific, individual, final end irrationally chosen by the actor, and which manifests itself to the observer as random in the special statistical sense of a numerical measure of probability in sampling;[74] the frequency of "hits" in this random choice of ends as means to further ends is the basis of habit formation, and perhaps, as the essence of ancestral experience, of logical reasoning and methods;[75] (d) the "practical" act in the Kantian sense of the intelligent act is characterized by the rational application of experience to the choice of ends as means to further ends through implied insight into the "togetherness"[76] or "interconnectedness of empirical phenomena"[77] in space and in time; (e) the intentional act[78] is characterized by the presence of the conceptual elements of the unit act plus the relational meaning that gives it

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[72] Ibid., p. 24ff.

[73] Ibid., p. 31ff.

[74] Harold Jeffreys, Theory of Probability, Clarendon Press, Oxford, 1939, p. 48.

[75] As in Felix LeDantec's definition of intuition as ancestral experience.

[76] As in Alfred N. Whitehead, Process and Reality, op. cit., passim.

[77] Max Scheler, op. cit., p. 39ff.

[78] Ibid., p. 44ff.

a value, as an action, to its agent, i.e., the agent's intuitive perception of the essence of his action as interest, preoccupation, love, repentance, awe, etc., the self-constituted integration of acts, where an unit act, or a summation of unit acts becomes an action, and the actor, or agent, a person.[79]

6. At these inextricably interconnected five levels the action of an individual appears to him as an organic whole, not as a mere summation by addition of discrete, fictional, abstract unit acts[80] operating at different levels of consciousness, but as a unity which is a matter of immediate evidence for him. Thus, the "I do" of a person must be sharply distinguished from the action of an agent, in the same way that a concept by induction was distinguished from a concept by postulation (II,A,3). The immediately experienced "I do" is the result of an immanent act which cannot be objectified. Thus, other people

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[79] Ibid., p. 58ff.

[80] The definition of an organic whole is a totality within which the relations between the parts determine the properties of these parts, as in Talcott Parsons, op. cit., p. 31-32. The classical statement of a part of an organic whole is that of Aristotle, that a hand separated from the living body is no longer a hand "except in an equivocal sense, as we would speak of a stone hand," as cited by Talcott Parsons, loc. cit. The same definition of an organic whole is given by J. Loeb, Comparative Physiology of the Brain and Comparative Psychology, The Organism as a Whole, and also by H. Piéron, Thought and the Brain, and C. J. Herrick, Neurological Foundations of Animal Behavior.

are not objectifiable in so far as their persons are in question. Being merely the locus of acts the totality of which co-determines each single act, a person is accessible only for another person by co-achieving these acts, by thinking with, feeling with, willing with the other.[81] The "I do" of Mr. So-and-So can only be experienced by "me" through my performing that action in the same way as the pure fact of "the sun" as given me by my senses can never be exhausted by analytical, scientific description, but which can be silently "described" by me through my pointing towards it there. So when "I" describe an action of "mine" "I" am presenting a described fact that was given me by the immediate evidence of its organic totality, and which "I" have to break down at least into logical, syntactical elements. In the same way the belief in the existence of other people's selves is constituted in the "ego" (II,B,13, b) not by acts of theoretical cognition, or by "practical" acts, but by intentional acts of love, hate, will, etc., which cannot be expressed scientifically, in terms of blood pressure, for instance, without having their meaningful totality broken down to concepts by postulation, and thereby losing their organic meaning and value to acquire mechanical expression as an object located in space and in

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[81]Alfred Schuetz, "Schueler's Theory of Intersubjectivity and the General Thesis of the Alter Ego," loc. cit., p. 325.

time. When realistically describing either the actions of other people or our own actions, in scientific terms, we must break down the organic integrity of the action into an explanatory system acts. But we must have in mind that neither positively nor negatively does this methodological device exhaust the significant subjective elements of action. It is with this reservation in mind that we now turn our attention to the formal definition of the concepts of action, act, and its elements.

7. Static elements of action. An action, A, subjectively defined as an intentional experience of an individual or a collective agent, may operationally or conceptually be decomposable into one or more hypothetical unit acts. An act, a, is a concept by postulation, a hypothetical fiction, which may be operationally defined by a description of its structural elements: a situation, s, and an ultimate or final end, e. The situation is analyzable into conditions, c, over which the actor has no control, and means, m, over which he has such control. Connecting, in an act, the means and the conditions of the situation to the final end there is a normative selective standard of evaluation of alternative means to the given final end, and this is called the norm, n, of the act.[82]

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[82]Talcott Parsons, op. cit., p. 44 and note B, pp. 77-79.

The most general symbolical formulation of the concept of act is, therefore,

$a=a(s(m;c);\ n,\ e)$, where $m=m(s;c)$, (1)

and where the following closed, determinate system of three "variables": a, s, and m; three "parameters": e, c, and n; and three implicit relationships or "equations" obtain:

$f^1(a,\ s;\ e)=0$ (2)

$f^2(s,\ m;\ c)=0$ (3)

$f^3(a,\ m;\ n)=0$ (4)

and A may be introduced as

$A=a_1+a_2+a_3+\ldots+a_r$ (5)

where, of course,

$A=\int_1^r f(a)da$, approximately. (6)

8. The situation is the state of affairs presented by the complex body-environment, as it appears to the actor, revealed by his intention in acting, as a combination of circumstances consisting of the conditions of action and the means for that action. The conditions of action are a series of restrictions placed upon the actor by physical, mental, social, and cultural elements, which he cannot alter, or prevent from being altered, in order to make the state of affairs of the situation conform to the state of affairs at the desired end. The means for action are those elements of the situation which are subject to the control of the actor, and among which may be selected the only appropriate means, or the correct set of means,

such that, in organic combination with the set of conditions, will occasion, at a certain moment in the future, that state of affairs which is desired as the end. The situation may be classified in accordance with the relative importance of conditions and means within it: (a) the situation is all condition: that is the combination of circumstances known as "state of grace" in mystical contemplation, where there is not even the possibility of a choice between accepting God's visitation or closing your soul at His face; this situation is also present whenever circumstances are absolute, such as under a "state of war," or suspension of civil rights due to a national emergency, or even normally, under absolute monarchy, or party dictatorship, where individual freedom is completely suppressed; at the opposite extreme (b) the situation is all means: this is the state of affairs of absolute freedom of expression, in "artistic inspiration," for instance, which culminates into "pure expression" of streams of consciousness, such as poetic "dada" and plastic surrealism, or, politically, into the anarchism of the Hobbesian "natural state," where the choice of means is completely random, leading to randomly chosen ends, and the life of man is "solitary, poor, nasty, brutish and short";[83] this situation, of course, at the

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[83]Thomas Hobbes, The Leviathan, Everyman's Library, J. M. Dent and Son, London, s.d., p. 65.

limit is indistinguishable from that in which the situation is all condition;[84] between these two limiting examples conditions and means co-exist, and then either (c) the situation is dominated by the conditions: this is the state of affairs under determinism based upon rationalism, utilitarianism, evolutionism, and whenever a law of causation is stated a priori, such as when human nature is postulated to be rational, or hedonistic, or molded by environment, etc., but where there is the possibility of making mistakes in the choice of alternative means through error, ignorance, aberration, etc.; this state of affairs prevails in the sciences, as when the physicist creates, artificially, a laboratory situation where conditions dominate in order to discover the relationships between these conditions; a pertinent example is found in the economic theory of perfect or of pure competition; (d) or, finally, the situation is dominated by the means: this is the state of affairs which will prevail whenever the possibility of "free" choice is recognized, whenever qualities, values, meanings, preferences are introduced in the system of action, whenever the agent, as a body functioning as a pure mechanism according to the laws of nature, becomes a person

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[84]That is the "utilitarian dilemma": either the agent is absolutely independent, and his choice of means becomes pointless, i.e., meaningless, or the agent is absolutely dependent and his determined choice becomes meaningless.

who knows by direct introspection that he is directing the motions of his body and takes full responsibility for them,[85] whenever the organic system of decision closes around a hard core of free choice where simple reaction flowers into action, and the final choice is random in the sense that it is never absolutely predictable in a scientific sense, but it may be approximately predicted on the basis of statistical observation or physiogomic intuition, as when we say, for instance, that Mr. So-and-So never did such an action in a certain way, and does not "look" like as if he ever will, but then comes along Mr. So-and-So and breaks the label by demonstrating his freedom from the laws of nature through an intrinsically irrational, Socratically free choice of means.

9. On the basis of this last consideration the element of preference as to the means, p_m, and as to the norm, p_n, must be introduced into the symbolical formulation of an act:

$$a = s\left(c + m + (p_m)\right) + n(p_n) + e \qquad (7)$$

which may be illustrated by a simple geometrical puzzle: suppose we are confronted by the "state of affairs" denoted by configuration s, and the problem is to transform this configuration into an equilateral oblong parallelogram, the

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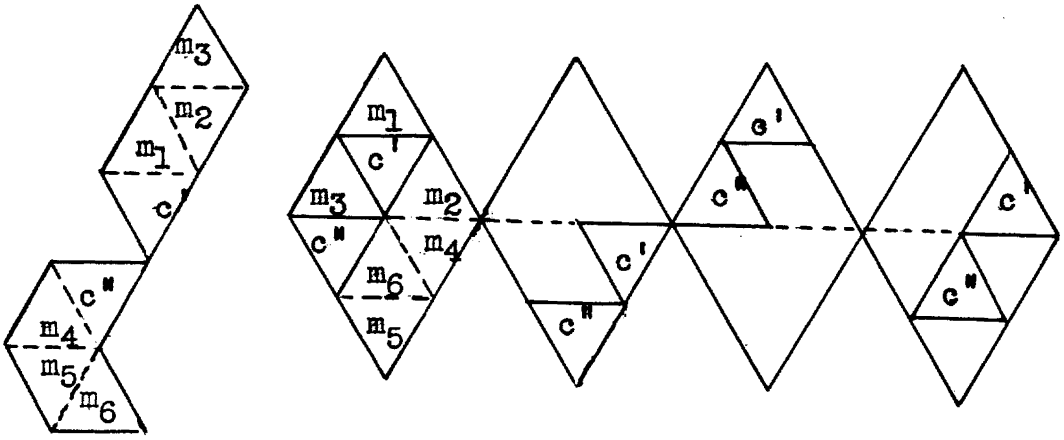
[85] Erwin Schrödinger, What is Life?, Cambridge University Press, Cambridge, 1945, pp. 87-88.

condition being that equilateral triangles c' and c" be maintained in the same position in relation to each other. In accordance with the different ways, or norms, for combining



the means, m_1, m_2, m_3, ...there are many different valid solutions, which satisfy the end in view, n_1, n_2, ...n_r. Let us suppose that we prefer, for aesthetic motives, or because we have ulterior purposes in mind, to combine the means in accordance to the norm indicated by the arrows, and that we try to justify this choice in terms of (a) publicly valid arguments of Euclidean geometry; (b) privately valid rationalization correctly formulated from our belief that this is the only scientific way of attaining the end in view, of correctly deduced from "cubistic" tastes; and, moreover, (c) that this choice of ours develops into a mania and is recorded by our psychoanalyst in terms of statistically random frequencies of behavior.

This simple illustration shows that the elements of the situation and the norm, thus subjectively defined, become outwardly manifested by the expression of the actor (a) in terms of scientifically valid theories, t; (b) of individual rationalizations or collective ideologies correctly formulated from unscientific elements, t', such as errors purporting to be scientific facts, fallacies, ignorance, etc., and (c) in terms of statistical frequency of an essentially random choice.[86] The complete formulation of of an unit act may be presented as follows:

$$a=s\left(c(t,t'r)+ m(t,t',r)+ p_m(t,t',r)\right) + n(t,t',r,p_n)+ e \quad (8)$$

where r is the statistically manifested frequency of behavior in relation to the elements of the situation and the norm. The general formulation of an individual action, A_i, and a collective action, A_c, may be denoted as follows:

$$A_i = (a_1 + a_2 + a_3 + \ldots + a_r) + K_i \quad (9)$$

and

$$A_c = (A_1 + A_2 + A_3 + \ldots + A_r) + K_c \quad (10)$$

where K_i and K_c are, respectively, the physiognomic effect of the totality of discrete acts in an individual action, and collective, group or national, historical character of a community action. Of course, individual or collective

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[86]This operational description of an unit act was suggested by Talcott Parsons, op. cit., loc. cit.

action may form a biographical or historical system of actions such as the following:

$$A_i^b = (A_i^1 + A_i^2 + A_i^3 + \ldots + A_i^n) + K_i^b \qquad (11)$$

and

$$A_c^h = (A_c^1 + A_c^2 + A_c^3 + \ldots + A_c^h) + K_c^h \qquad (12)$$

where K_i^b and K_c^h are, respectively, the organic effects of the biographical and the historical systems.

10. Dynamic elements of action. The choice of a norm is the dynamic element of an act. We must now supplement our previous, static, definition of norm as the way means are selected when an end is given, with a more elaborate, dynamic, definition of norm.[87] The term norm has been employed in this thesis to indicate the way to arrive at the solution of positive problems; we have used the special term method to qualify this type of norm (II,A,5). Also the term norm has been used to denote the solution, or a solution satisfactory to the end in view, of a normative problem, that is, the set of rules indicating how action should be oriented, or how and what means should be chosen to realize a predetermined state of affairs (II,A,7). This definition is entirely satisfactory within a static notion

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[87] What is here called "norm," "end" and "conditions" is the same as it is called, respectively, "solution," "inputation" and "physical background" in John von Neumann and Oskar Morgenstern, Theory of Games and Economic Behavior, Princeton University Press, Princeton, N. J., 1947, pp. 31-45.

of act, but we must qualify it extensively to make it fit into a dynamic structure of action. Two main qualifications are particularly urgent. In the first place, we must repeat what has already been said (II,B,10) about the finality of ends. An end is here taken as given and final only within the system of the unit act in which it occurs. Going "downstream" in the current of actions it is always conceptually possible to translate a final end of an act into a unit, mean or condition, within the situation of the next act; rational planning is nothing but such a deliberate correlation of intentions. Moreover, it may be called attention now, although this point will be elaborated later, that as "all roads lead to Rome" so also many norms lead to the same end, and that the development of a norm for the evaluation of norms must be an essential part of this investigation. In the second place, we must stress the fact that, among the elements of a situation confronting an actor, there are his expectations concerning the probable actions of others. Rational planning of action by an individual is always built on the hope that these expectations will be realized, and, as rational planning, it must include not only the expectation of rational behavior of others but also the probability of their irrational conduct. If, through excessive optimism that others will behave rationality in every occasion, the actor is punished by not

being able to realize his desideratum, then his norm should be modified, and the possible superiority of others should be eliminated by the setting of the end at the level of the worst possible result. A norm, therefore, is not only a prescription on how to select the appropriate means to a final end, but it is also a prescription on how to select the most appropriate norm among all possible norms to that end. As, by definition, an action is an organic system of acts, the above stated concept of norm may be generalized to a set of rules for each agent which tell him how to behave in every situation which may conceivably appear in a stream of action.

11. This concept of norm, although dynamic, is only applicable to one subject of action. In order to be applicable to collective action it needs further qualification. This because individual preferences as to the desirability of certain norms over other alternative ones may not coincide. With the possibility of coalitions within a group the problem of development of a norm for group behavior becomes somewhat more complex. Thus, for instance, a norm for multilaterality in international trade should exclude the possibility for some participants to get greater advantages through autarky or bilateralism. If, therefore, a norm for a certain collective action does not dominate all other possible alternative norms to the same

end, there is always the possibility of the formation of a sufficiently influential group within the community which, by giving allegiance to another more advantageous norm, will subvert the prescribed rule, and bring about a dynamic evolution of cyclical dominations. This points out to a third definition of norm as a prescription on how to choose among actually possible final ends that system of ends, which, as elements of the immediately future situation, does not contain within itself the possibility of another, more advantageous choice of a different system of ends. It is the central task of this thesis to investigate whether such a norm is possible in international economic action, and, if it is possible, whether it shall prescribe a unique set of rules as a standard for international economic behavior.

12. Outline of inquiry. This study claims to be an approach to a positive theory of the conflict between conflicting national economic idiologies, and the general attempt towards international normative economic action ideologically oriented towards the objective of avoiding international economic friction and the international propagation of business cycles. As such the real world will be seen neither as one enormous economic unit nor as a congeries of closed systems, but as a very complex interrelation of economic actions of individuals and groups. We

shall approach this reality by means of the technique of successive approximations converging towards the structural analysis of the international economic order. Starting from cahos, total war, and no trade, with individuals hypothetically acting atomistically towards random ends, we shall figure how trade was ever considered advantageous, with the appearance of some ends in common. Then we shall see how these societies were integrated into states possessing sovereignty or power to make independent, national decisions. The elements of conflict will emerge within the international order. These elements will be traced down to their roots in the structure of action. This will lead to the principles which define "rational behavior" for an international economy, to the abstract, "empty" doctrinal function which will then be applied to a world of concrete, passionate nations bent to preserve the individuality of their own economic cultures, divided not only by categories of space, but also by time, by economic power, by meaning and values of their own, desiring international economic peace and stability but politically responsive only to divergent policies as determined by widely dissimilar physical and social situations, national norms and interests.

III. THE THEORY AND STRUCTURE OF SOCIAL ACTION

A. Systematic theory of action

1. The act. The most generalized static formulation of a unit act is as follows:

$$a = n \rightarrow (m,c)s \rightarrow e\ (=e') \qquad (13)$$

where the end, e, is the future state of the present situation, s, after a norm, n, has been chosen to select the appropriate means, m, which, in combination with the conditions, c, will result in the realization of the desired end, e'. A successful act, or an act of which the "value" is "good" for its actor, is that in which the desired end coincides, at the expected future moment, with the obtained end. The most generalized dynamic formulation of a sequence of acts (Seq. a) is as follows:

$$\text{Seq. } a = \ldots n \rightarrow (\ldots s_1 \rightarrow (e_1 = s_2) \rightarrow (e_2 = s_3) \rightarrow (e_3 = s_4) \rightarrow \ldots) \rightarrow e\ (=e') \qquad (14)$$

where a norm is chosen to select the means leading to an end as means to a further end. We have already seen (II,C,11) that this norm, in order to be stable, and, therefore, valid as a norm, must prescribe a choice of means such that no other more advantageous arrangement is possible. Each unit act in a sequence of acts is an occasion for a choice concerning the appropriate means to be selected. A norm is

valid when, at each act, the adopted choice is the best of all possible remaining choices. Such a valid norm is here called an order. When the norm is not valid as a solution for attaining the ultimate end of the sequence conflict may arise in the precedence between which of the intermediary ends, e_1, e_2, e_3, ... is to be fulfilled at the next act. The deliberate implementation by the actor of a valid norm is called organization. We now turn our attention to a clarification of the meaning of these terms.[1]

2. We have already seen also (II,C,5) that unit acts may be classified into five pure types, in accordance with the level of consciousness in which they operate. We are now in a position more precisely to qualify these types.

a) The vegetative act is characterized by the absence of a freely chosen end, as well as of controllable means, and a deliberate norm. The order is biological, the situation is all conditions, conflict is pathological, and the result, e, is fully determined by merely allowing the trends of the situation to work out their course without active intervention. It may be formulated as follows:

$$a_{veg.} = s(c) \rightarrow e \qquad (15)$$

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[1]This conceptualization has been inspired by the terminology of games as described in John von Neumann and Oskar Morgenstern, op. cit. p. 49, but the analogy between "order," "act" and "organization," and "game," "move" and "strategy" should not be taken too far.

and a (cyclical) sequence of such acts:

$$\text{Seq. } a_{veg.} = \ldots\ s_1 \rightarrow e_1 = s_2 \rightarrow e_2 = s_3 \ldots \quad (16)$$

such as sleeping-waking, eating-digesting, etc.

b) The instinctive act is characterized also by the absence of a freely chosen end, as well as of controllable means, but it already exhibits a physical, hereditary-environmental, foundation which, although not freely chosen by the actor, belongs fatalistically to him, and to no one else (n_1). Such are the automatic reactions to stimuli, which may be conditioned from the outside, by scientific manipulation of the situation of the actor. Behavioristic experiments on dogs are examples of such conditioning of reflexes.[2] The formulation of an instinctive act may be the following:

$$a_{ins.} = n_1 \rightarrow (c)s \rightarrow e \quad (17)$$

and a (discontinuous) sequence of such acts:

$$\text{Seq. } a_{ins.} = n_1 \rightarrow (\ldots\ s_1 \rightarrow e_1,\ s_2 \rightarrow e_2 \ldots) \quad (18)$$

in which the actor is "provoked" to react rather than to act.

c) The intuitive act, or the act of associative memory, is still characterized by the absence of

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[2] J. B. Watson, Behaviorism, Norton, New York, 1925, passim.

a freely chosen end. Its situation, however, consists not only of physical but also of social conditions, and by the presence of alternative means the choice between which (or the abstention from choice) is governed by chance, that is, by the norm of random choice, not of free choice (n_r).[3] This is seen whenever the actor cannot explain his decision to pursue a certain end, and not any other end, in logical or rational terms, but only in terms of "having tossed a coin," or of "having acted by hunch," etc. This type of <u>irrational act</u> may be represented by the following expression:

$$a_{int.} = n_r \rightarrow (m,c)s \rightarrow e \ (\gtrless e') \qquad (19)$$

and a (statistic) sequence of such acts:

$$\text{Seq. } a_{int.} = n_r \rightarrow \Big(\dots s_1 \rightarrow e_1 \ (\gtrless e'_1) \quad s_2 \rightarrow e_2 \ (\gtrless e'_2) \dots \Big) \qquad (20)$$

a formulation which expresses that the coincidence between the obtained result, <u>e</u>, and the "desired" result chosen at random, <u>e'</u>, is a matter of "luck."

d) The <u>positive, cognitive act</u> is characterized (a) by the absence of an ultimate end which is freely chosen by the actor, and (b) by the actor's use

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[3] A random choice is a meaningless choice.

of the scientific method as a norm for the pursuance of that given end. The ultimate end of a positive act is the attainment of public recognition of its validity through verification of prediction or coincidence, by epistemological correlation, between expected results and obtained results. The social counterpart of laboratory verification is the actor's attainment of socially, or culturally imposed aims for effort, such as prestige, fame, wealth, etc. Thus, the positive, cognitive acts may be subdivided into "purely scientific" acts and "practical" or "ideological" acts. In acting scientifically or ideologically the actor adopts, without the awareness of risk which is involved in every deliberate choice, modes of procedure, standards of behavior, a professional or methodological ethics which are imposed upon him by the society in which he lives, by the culture from which he draws his scientific knowledge, or by the religion or ritual which gives him a ready made pattern of conduct. The actor is then the embodiment of a function, he is not a person but a scientist, a bureaucrat, an entrepreneur, etc. Once the end is so adopted the actor acts rationally, that is, tries to

discover, by using a norm of rationality, how to fulfill his function under the established order, how to organize or to plan his choices in the selection of the most appropriate means, which, in combination with the conditions, will realize, in the future, the predetermined state of affairs. We may now precisely define a positive, cognitive act as that in which, when a certain ultimate end is given as desirable, a rational norm is followed as a solution for the problematic situation, such that, when publicly applied, i.e., when applied by other actors similarly situated, results automatically in a coincidence, by epistemological correlation, of prediction or expectation to experimental result.[4] It does not matter for the rationality of the adopted norm whether the actor assumes, as postulates, his own "affections," sentiments, beliefs, intuitions, etc., that is, whether he starts out with scientific premisses, or ideological premisses.[5] The most general

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[4]Vilfredo Pareto, Traité de Sociologie Générale, ed. by Pierre Boven, Payot et Cie., Paris, 1917-1919, pp. 149-169.

[5]Pareto's "sentiments" manifested as "residues" or privately valid postulates, from which "derivations" or theorems are correctly deduced, which are the verbal expressions explaining the "sentiments" or states of mind. See Vilfredo Pareto, op. cit. pp. 161-162. The notation is that employed

(continued)

formulation of a positive, cognitive act is as follows:

$$a_{pos.} = n\Big(t(f,l),t'(f',l',g)\Big) \rightarrow \Big(m(t,t'),c(t,t')\Big)s \rightarrow e'(t,t') \quad (=e) \qquad (21)$$

where t is the scientifically valid knowledge held by the actor, consisting of concepts, f, and logically correct deductions from them, l; t' denotes explanations of the act which have not yet been verified, based upon statements, f', which, though purporting to be scientifically valid facts, have not yet been confirmed as such; logical fallacies, l', and ignorance, g, that is, elements which are objectively knowable but without subjective manifestation. The ideal type of "scientific," positive, cognitive act is the theoretical model of the natural sciences; the ideal type of "ideological," positive, cognitive act is the theoretical model of the social sciences. A sequence of positive acts may be denoted as follows:

$$\text{Seq. } a_{pos.} = n \rightarrow s(\ldots m_1,c_1 \rightarrow e_1 = m_2,c_2 \rightarrow e_2 = m_3,c_3 \rightarrow e_3 \ldots) \rightarrow e' \ (=e) \qquad (22)$$

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by Talcott Parsons, op. cit., note B, pp. 177-179. See also for a brief sketch of Pareto's sociology, F. S. C. Northrop, op. cit., pp. 264-272. Some other more complete references to Pareto's work: Max Ascoli, "Pareto's Sociology," Social Research, Vol. III, February, 1936; Andrew Bongiorno, "A Study of Pareto's Treatise of General Sociology," American Journal of Sociology, Vol. XXXVI, November, 1930, pp. 349-370; and Morris Ginsberg, "Pareto's General Sociology," Sociological Review, Vol. XXVIII, July, 1936, pp. 221-245.

where, when the sequence is valid, the predicted results, e', coincides with the obtained results, e, and both are tied to the situation by a law of causation which, under certain conditions, connects the state of affairs of the present situation, s, to the future state of affairs, e.

e) The normative, cognitive act is characterized by the presence of an ultimate end which is freely chosen by the agent, and involving a deliberate intervention by the agent in the trends of the situation so that the end be realized. It is at this level that the act attains its full, human, intentional constitution, and acquires meaning. For an observer, who observes positively, an act may always be "thought away" on physiological, biological, statistical, economic, social, political, etc., criteria. But this explanation exhausts the content of an act only ex-post-decisione, that is, only after a choice is made, the act is done, the trigger is pulled, and the recession is reached. Then, and only then, the act appears as having been a priori determined by some kind of causality law, the exceptions being explained as interferences of another, hitherto unexplained law. A normative act may be represented as follows:

$$a_{nor.} = i(i_e)(t,t',r) \rightarrow n(t,t',r) \rightarrow \Big(m(t,t',r), c(t,t',r)\Big)s \rightarrow e \qquad (23)$$

where i_e is the verbal description of the ideal element, i, of the act, that is, what intention, interest, preference, mania, etc., which lies at the bottom of every subjective understanding of a situation, a desire, an expectation of the actor to realize a certain state of affairs. This ideal element is of a great variety but category is always that of setting a goal for effort. The setting of this goal is a personal matter, and, of course, it is conditioned to a great extent by physiological, biological, social and logical determinism, but there is a point at which it unmistakenly becomes personal, and this is where the actor begins to see risk, and to accept responsibility for his act, that is, where he recognizes that he could have acted otherwise if he so wished. But even for the actor, once the ultimate end is decided upon by him, his decision becomes as if objectified, and his motivation becomes explainable in terms of intuition, scientific theory, rationalization, etc. The moment of decision is always a silent moment, to be preceded by words at the stage of hesitation, and

followed by words at the stage of explanation. After a decision is taken concerning the ultimate end the actor falls back to rationality, or even to irrationality, in order to implement his decision by a plan or a norm with which to go through the positive act or sequence of positive acts linking the situation to the ultimate end in a normative act. There cannot be a sequence of normative acts, since the intermediary links in the means-end chain of relationships would consist in one act or a sequence of non-normative acts. Normative acts can only be arranged in sets where they are structurally interrelated in systems of ultimate ends. Thus, a normative act is always teleological, and not positive, speculative, heuristic. Its norm is always a technological, selective standard of orientation, regulating the choice of means to the already chosen end. Thus, for instance, St. Ignatius of Loyola's Spiritual Exercises is nothing but a technique for mystical contemplation, which should be carefully followed by the young Jesuit novice, after he had decided to devote his life to God.

3. We may now try to sum up the above mentioned observations concerning the dynamic structure of a unit act. We

call that structure dynamic because it will be described in terms of chronologically arranged mental operations.[6] Statically, objectively, and behavioristically an act may be defined as the external manifestation of a choice between various alternatives. But the choice characterizing an act may be a free choice, as well as determined, and random. A choice, to be meaningful, must be free, since a random choice is a purposeless mental or physical agitation, and a determined choice is a contradiction in terms. An act acquires meaning with the emergence within its structure of the element of decision regarding its ultimate objective. Thus, dynamically and subjectively defined every act is a normative act, i.e., the specific, meaningful manifestation of the intention of an actor. The dynamic structure of an act may be represented as follows:

$$a_i = d\left(\rightarrow n \rightarrow s(a_{nn})\right) \rightarrow e' \ (=e) \qquad (24)$$

where: (1) the act, a_i, is that specific attitude or activity which is picked up, among all possible alternative attitudes or activities, to be the object of the intentional consciousness of the actor; (2) the decision, d, is that mental operation by which the actor's interest defines the act as intentional, gives a destination to it, addresses it to an objective; (3) the end, e, is the actor's specification

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[6] "Dated" mental operations. See for that definition of dynamics J. R. Hicks, Value and Capital, Clarendon Press, Oxford, 1946, p. 115.

of the nature of the act as cognitive, affective, social, political, economic, etc.; (4) the norm, n, is the orientation of the act, the way to select the means or to plan the operations conducive to the end in view; (5) the situation, s, is that element of the act consisting in all possible, correct or faulty, sequences of vegetative, instinctive, intuitive, cognitive, non-normative acts, arranged as a set of variables the variation in the technical selection of which completely describes the conduct of the actor in acting; (6) and, finally, a single, non-normative act, a_{nn}, representing the set of variables which is the linear sequence of technical acts chosen by the norm.

4. The elements of an act are organically integrated within the dynamic structure of the unit act. The order of an act is that regulation of intentionality or normativeness by which the act acquires meaning. It is the result of the mental process by which the actor rules which of his wants are to be "repressed," which he will try to satisfy, and what shall be the hierarchy of value of those worthy of satisfaction. This essentially "political" way of establishing order by authority may be abortive when the actor cannot reach a decision concerning the grading of his interests, or, in other words, reaches ephemerous, unstable orders only. Then, there is a conflict of psychological sovereignty whenever the actor is unable to impose his will, and

hesitates, like Hamlet, between the various alternative wants and interests loudly claiming for preferential satisfaction.[7] The actor, however, may reach a decision on the gradation of ultimate ends. Then, the order is said to be legitimate.[8] The legitimacy of an order, like the intentionality of a consciousness, goes from a minimum of deliberateness, at the biological level of the act, to a maximum of intensity of free will at the normative level (III,A,2). The legitimacy of an order is, at first, arbitrary, i.e., imposed upon the actor by dictatorial conditions. Then it becomes traditional, when it is socially determined, and ideological, when it results from the rational, logico-transcendental necessity of social, political, moral, and religious doctrines. Finally, the legitimacy of an order attains its upper extreme at the private, mythical, and symbolical level of validity of conviction, belief, and faith.

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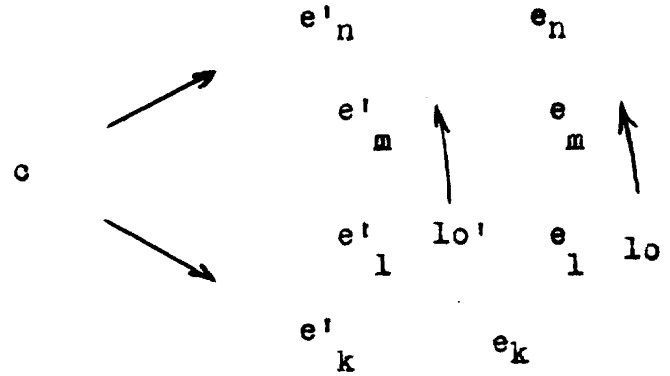
[7] This psychological, or, again, "political" conflict becomes most conspicuous when there are two, three, or few preferences requesting attention. When the number of conflicting tendencies becomes really great the personality collapses into insanity. But even then there is the possibility of partial psychic integration into conflicting complexes. Psychoanalytic treatment consists of the re-integration of the personality back to its former or to a better value order. Politically the process may be compared to a civil war fought around the adoption or rejection of a constitutional ultimate end.

[8] Max Weber, The Theory of Social and Economic Organization, W. Hodge, London, 1947, p. 113.

The order of an act may be graphically represented as follows:



(25)

where lo' denotes the actor's legitimate order; e'_k, e'_1, ... e'_n, the actor's ultimate ends arranged according to his criterion; lo denotes the legitimate order of the physical and social, hereditary-environmental milieu where the actor acts; and e_k, e_1, ...e_n, are the external ultimate ends, more or less divergent from those of the actor.

5. As the legitimate order of an act is the scale of evaluation of its possible ends, the organization of an act is the scale of evaluation of its possible norms, that is, the possible modes by which the actor may accomplish the ends enrolled in the order. After deciding about the order his ends are to be satisfied the actor faces the problem of choosing between the various ways to attain these ultimate ends. He begins by "censoring" some of these processes to overcome resistences, as immoral, illicit, illegal, inefficient, etc. Then the problem becomes essentially "economic": that of allocating disposable, but scarce, means between

various ultimate ends. The actor faces two sets of constraints with which his organization must conform: coherence with the adopted order, and adaptability to the "resistences" imposed by the conditions of the situation. Another type of conflict may, then, appear, a conflict between alternative, equally valid, or intrinsically uncomparable criteria to attain the ultimate ends of the adopted order.[9] When the actor cannot solve that problem, or when his solution is unstable, his efforts to establish an organization for acting are called incompetent. An organization is incompetent when there is a conflict, not between ends eager for satisfaction, but between different modes of conduct anxious to "lobby" their own ends. This simile between conflicting specific norms and competing pressure groups must not veil the essential difference between the "power" or "political" conflict of clashing ultimate ends, and the "economic" conflict of clashing normative competences, as for instance between technical, and economic efficiency, legal conformity, etc. But when the actor is capable to translate his set of ultimate ends or values into a code of procedure we shall say that the organization is competent. The competence of an organi-

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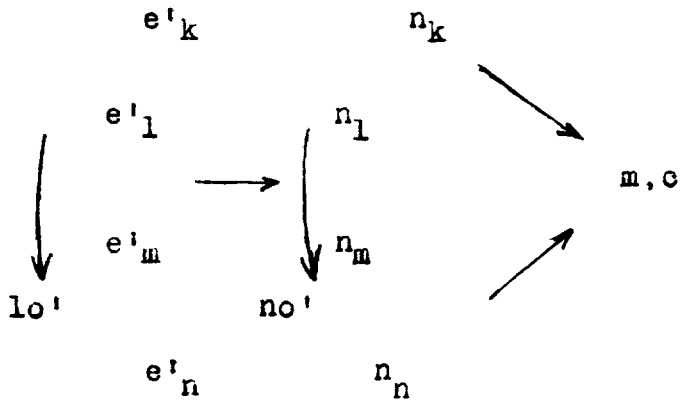
[9]This conflict outstandingly appears, for instance, when the problem is not only one of allocation of resources between different ends of the same individual, but also between those of different individuals. See Talcott Parsons, op. cit., p. 235.

zation, like the legitimacy of an order (III,A,4) or the intentionality of individual consciousness (III,A,2) goes also all the way from biological determinism to normative voluntarism. At the minimum level of deliberateness it is an automatic organization of sensorial perceptions. Then it becomes habitual until it attains a positive level where the organization is rationalized under criteria of efficiency, empirical adaptation, moral conformity, ritual observance, etc. Then, finally, the organization also attains an ideal level corresponding to the utopian level of the order. The organization for an act may be graphically represented as follows:

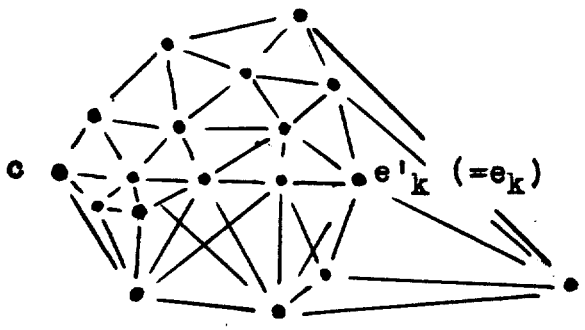


(26)

where no' denctes a competent organization of the actor's norms for acting.

6. Again, as the legitimate order is the stable norm for ultimate ends, and the competent organization is the stable norm for specific norms, the specific norm of an act is a plan of operations, a prescription as how to select means at each

occasion for such choice at each non-normative act compounding the intermediary means-end chain of relationships between the initial situation and the ultimate end. This norm is essentially "technological," and the most conspicuous example of it is a "production function" in economic theory. The specific norm may be <u>adequate</u> or <u>inadequate</u>. A specific norm is adequate when the actor can implement it, and it is inadequate in the contrary case. An adequate specific norm is also <u>effective</u> when its plan does not contain inner inconsistencies or contradictions, and it is <u>ineffective</u> when it contains such inconsistencies and contradictions that make it unstable. The adequate specific norm may be graphically represented as follows:



(27)

where straight line <u>ce'</u>$_k$ denotes the adequate norm when also effective; the dots, the available means; and the other "ways" connecting the conditions to the ultimate end, the ineffective, though adequate, specific norms.

7. With these preliminary observations in mind we shall now turn to the consideration of the question as of how meaningful acts such as these, being individualistic, and

atomistic, and having their ultimate ends decided on the basis of the free choice of isolated actors, can ever be made a part of an action or a system of actions, without continualy breaking down into general conflict and war.

8. The action. The dynamic structure of a unit act was outlined above (III,A,1-7) in analytical isolation from a system of acts, or an action. We have called action any human attitude or activity, inward or overt, active or passive, when and in so far as the agent or agents associate a subjective meaning[10] to it. We have called actor, throughout this study, the subject of an act, and agent, the subject of an action. These two terms must always be distinguished, at the same level of generality. An agent does always include more than one actor, but an agent may be considered as an actor when he acts in a collectivity of agents, in the same way as an actor may be considered as a collection of non-normative actors, or wants, interests, tendencies, etc. forming a personality. Thus, a person, when in action, that is, during a certain period of his life, faces many occasions for normative acting, in the social, economic, political, religious, etc., realms, and may be considered, therefore, as a group of actors each one of which performs one specific normative act in which many non-normative acts

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[10] That is, intentionality, understanding, subjective understanding, interpretation in subjective terms, etc., "Verstehen" as in Max Weber, op. cit., pp. 79, footnote, 80.

are telescoped in its intermediary means-end chain of relationships. For the action of this person to be meaningful, or coherent, it is necessary that the group of non-normative actors be integrated within each normative act of a unit actor, and the grouping of these unit actors to be integrated, by their ultimate end-values to the order or personality system of the agent.[11] In the same way, a group of physical persons, when integrated in an association, church, government, nation, etc., that is, when acting in consonance with a certain collective consciousness[12] of having characteristics in common, may also be conceived as a body of individual actors, each one of which, although having their own systems of non-normative acts, delegate their normative sovereignty to the group as a body which then acts, for instance, economically, as a corporation, or socially, as a club, or politically, as a party or a nation, etc., upon the basis of maximizing the attainment of some common interests such as profits, social pleasure, political power, or national income. In accordance, therefore, with the level of generality where the act or action takes place, the terms actor

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[11] That integration, of course, being never complete or total in a concrete person who only assymptotically approaches the ideal limit of perfect coherence of action, or sanity.

[12] As in Durkheim's "conscience collective," but trying to avoid the moral undertone of translating "conscience" into conscience.

or agent may denote either a tendency, a want or an interest acting within and dependent exclusively on the actor's or agent's end value order scheme; or a physical person performing an isolated action, that is, in the exclusive control of his means; or that same physical person when acting within, and under the dependence of other agent or agents, that is, having his means partly controlled by other people, of which he accepts the dominance, and even delegates some of his normative sovereignty; or, finally, a group, as a juridical person, acting similarly within a broader group. This device simplifies the scheme of action without mutilating its inherent complexity.

9. In formulation (9) we have described the structure of action, statically, as an organic totality of unit acts. Now we shall define action dynamically, as a set of "dated" decisions or normative acts. The dynamic structure of an action consists in the individual or collective agent who, (a) having a psychological criteria of indifference or preference to certain interests and wants at all, and (b) being aware of his situation, i.e., possessing some kind of information[13] about his conditions and means, faces three distinct

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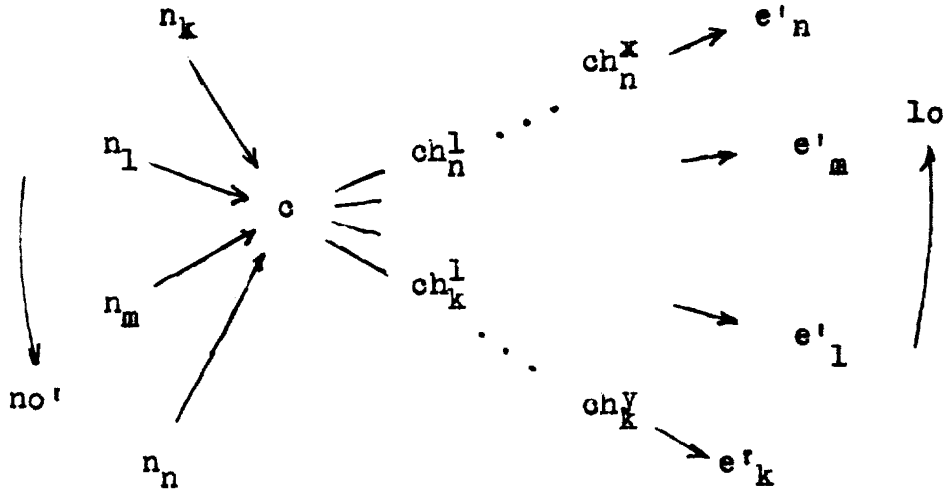
[13]We may now say a word about the agent's knowledge of his situation. The choice of adequate organization and an effective norm depends on that knowledge. Part of this process is automatic and instinctive, but a greater part is deliberate. This information regarding the past actions of others is twice restricted: (a) by the order itself which

(continued)

but transitively dependent types of problems the solution of which successively define his action: (1) the "political" problem of deciding the legitimate order for action, (2) the "economic" problem of establishing a competent organization for action, and, finally, (3) the "technological" problem of planning the adequate, and effective, norm for each one of his normative acts. The dynamic structure of an action may be formulated as follows:



(28)

where $\underline{ch}_n^1$, $\underline{ch}_n^2$, ... $\underline{ch}_n^x$, denotes the choices made at each non-normative act of which the concatenation means-end in each normative act consists. And a system of actions may be

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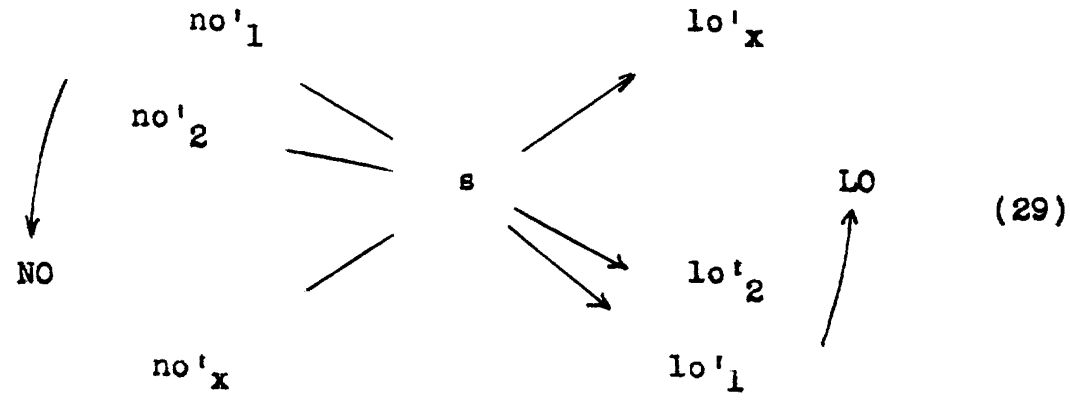
may conceal the actions of some of its most important agents; and (b) by the agents themselves who may conceal their actions or manifest them fraudulently, by explaining them erroneously on purpose, or spreading knowledge in order that other agents will relay them, guiding or misguiding those who are interested in them. This matter shall be more extensively appreciated later on in the course of this dissertation.

graphically represented as follows:



(29)

where LO is the legitimate order of the system of action, and NO is the competent organization of the same system.

10. Such dynamic structures of action or action systems may be classified into two broad types: (a) the non-social structure of action, which obtains whenever the individual or collective agent thinks he is not effected in his present action by past, present, or future actions of another agent or agents, and, therefore, that the achievement of his ends depends exclusively upon the legitimacy of his order, the competence of his organization, and the adequacy, and efficience of his specific norms; and (b) the social structure of action, which is characterized by the agent's recognition of his dependence, in the achievement of his ends, upon past, present, and future actions of others. We shall study, in detail, the nature of this dependence.

11. In conclusion of this systematic presentation of the theory of action, we shall now refer to the precise

meaning of legitimacy of an order, competence of an organization, and adequacy, and efficiency, of a specific norm, as well as the meaning of political, economic and technological conflict. We have already seen (II,C,10) that the concept of norm had to be extensively qualified to fit into a dynamic conception of action. In the light of the definitions of non-social as well as social actions (III,A,10) we may briefly point out that: (a) in non-social action, (1) the order is legitimate whenever it enrolls ends in such an order of preference that the ordering possesses transitivity, that is end e_k is preferred to end e_l, and end e_l is preferred to end e_m, and also end e_k is preferred to end e_m; and, moreover, every other ultimate end, such as e_j, not contained in lo' must be so placed that those named shall always be preferred ahead of it; in other words, the agent shall tackle his ends by order of preference, and shall never leave a work unfinished;[14] (2) the organization is competent whenever its norms are similarly arranged in order of transitive preference, and also that every n_j not contained in no' is dominated[15] by a norm n_k contained in it: that is, the agent must know himself thoroughly so that norms shall be adopted in an order

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[14] In psychoanalytic terminology: the action must be completed without frustration.

[15] A term used by John von Neumann and Oskar Morgenstern, op. cit., pp. 37 ff. These requirements for legitimacy, competence, etc., are these authors' requirements for a valid solution of a game.

that never violates his own intimate set of values; (3) the specific norms are adequate and effective whenever the choices concerning the selection of means in each of the non-normative act linking the initial situation to the ultimate end must conform to a technological transitive gradation of appropriateness, and that this arrangement is the best of all possible arrangements leading to the end in view. In (b) social action, (1) the order is legitimate whenever the order is transitive and free from inner contradictions, and whenever it can be used to discredit, to upset, or to dominate any non-conforming order; these same two rules must be verified in (2) a competent organization, and in (3) adequate and effective norms.

12. This may be summarized as follows. In general we may say, in broad terms, that order means the rules of an action: biological, institutional, rational, ethical, etc. Every specific instance of action, when there is a free choice of an end, is called normative act. Organization is the translation of the order to specific actions as a bundle of normative decisions. Within each of these normative acts there may exist many occasions for choice of means conducive to intermediary ends as means to further ends. A non-normative act is such an occasion for choice. The plan for such choices is called the specific norm of an act. Any action involves, therefore, the following hierarchy of norms:

order, organization, specific norm. An order is legitimate, an organization is competent, and a specific norm is effective when they fulfil the two following necessary and sufficient requirements for legitimacy, competence, and efficacy: (a) no end $\underline{e}_n$, or norm $\underline{n}_n$, or choice $\underline{ch}_n^1$, contained in an $\underline{lo}'$, $\underline{no}'$, or $\underline{n}$ is dominated by, or inferior to any end $\underline{e}_m$, or choice $\underline{ch}_n^2$ contained in $\underline{lo}'$, $\underline{no}'$, and $\underline{n}$: that is, a norm to be legitimate, an organization to be competent, and a specific norm to be efficient must be free from inner contradictions; and (b) every end $\underline{e}_n$, or norm $\underline{n}_n$, or choice $\underline{ch}_n^1$ not contained in $\underline{lo}'$, $\underline{no}'$, or $\underline{n}$, must be dominated by or inferior to some end $\underline{e}_m$, or norm $\underline{n}_m$, or choice $\underline{ch}_n^2$ contained in $\underline{lo}'$, $\underline{no}'$, and $\underline{n}$: that is, when a norm is legitimate, an organization competent, and a norm efficient they can be used to discredit, upset, or dominate any other non-conforming arrangement of ultimate ends, specific norms, and non-normative choices. These two very important postulates do not, however, imply: (a) that a legitimate order, a competent organization, or an efficient norm can never be discredited, upset, or dominated by another order, organization or specific norm, but that, if that is the case, the challenge must have come from outside the legitimate order, the competent organization or the efficient norm, which, when so discredited, upset, or dominated lose their legitimacy, competence, and efficiency in favor of the dominating order,

organization, or norm. Legitimacy, competence, and adequacy and efficiency are manifestations of inner stability in an order, organization, or specific norm; and (b) that a legitimate order, a competent organization, or an efficient specific norm are unique solutions to the problem of the agent's conduct in action: that is, given the same situation, different legitimate order, competent organizations, and efficient norms, possessing inner stability, but mutually contradictory, may be devised, chosen and accepted by those agents acting under their constraint.

B. Order, conflict, and organization

1. Social action. As the intentionality of individual consciousness, the legitimacy of an order, the competence of an organization, and the efficacy of specific norms, so the socialness of an action is also a matter of gradation of the agent's dependence upon the actions of other agents. The range of this gradation straddles from the automatism of instinctive reactions to the free will of normative decisions. If we define social act as that act in the performance of which the actor acts under the dependence of other actor's acts, then we may include under the classification of social act such extremely opposite forms of act as the physiologically motivated vegetative act of a person's stomach peristaltically digesting food produced by other people, as well as the distinctly normative act of someone

who has annihilated in mystical contemplation or realized in artistic expression a self born from man and woman. There is, in fact, a common social condition in every conceivable act, resulting from the unescapable ontological dependence of the actor's own existence upon the elements of the situation among which there always are at least some impression of other people's lives, if not their present influence, or their expected future effects.

2. This, however, is not the definition of social action that we have in mind. We mean by social act that which concomitantly fulfills the following two necessary and sufficient requirements for socialness of action: it is a normative, meaningful, intentional act (III,A,2e) and it is an act in the successful performance of which the actor takes account of his real or imaginary dependence upon someone else's decisions and choices.[16] The influence of others may be recognized either as affecting directly the attainment of the ultimate desired end of the normative act, or as affecting directly the proper execution of any one of its component non-normative acts, or as affecting both the end and the means. We define <u>social act</u> as that normative act not performed in subjective isolation by its individual

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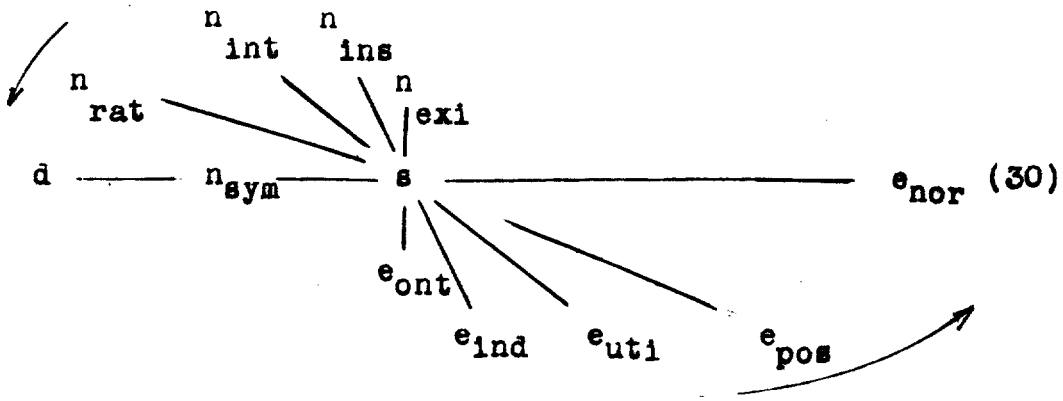
[16] By "someone else" we mean actor, actors, or agents specifically known to the actor, or indefinitely known to him as a plurality, or entirely unknown to him as individuals; see Max Weber, <u>op. cit</u>., p. 102.

actor, and as non-social act that normative act performed in such subjective isolation. Thus, for instance, a burglar who carefully plans and accomplishes his burglary by taking account of all possible human encroachments is acting socially in accordance with our definition; on the other hand, mystical contemplation or pure artistic expression are normative acts which are non-social acts; also, non-normative acts, such as the gastric act of digestion, and the instinctive act of avoiding an oncoming car, even when performed in a collectivity, as during a banquet or amid urban traffic, shall not be considered as social acts. We define social action as that system of normative acts where there are at least two subjectively interdependent actors. A non-social action, contrariwise, denotes a system of normative acts where each one of which is performed in subjective isolation. Finally, a system of social actions is that system of action consisting of at least two subjective interdependent agents, and a system of non-social actions is that in which every agent acts in subjective isolation from every other participating agent. We shall now characterize and exemplify each one of these various types of act, action, and system of action.

3. The non-social act is an isolated, normative act. The prototype of normative, isolated, non-social acter is

Robinson Crusoe.[17] Crusoe's non-social acting may be represented as follows:



(30)

where the ends, e, are classified into ontological, individualistic, utilitarian, positive, and normative; and the norms, n, are classified into existential, instinctive, intuitive, rational, and symbolical, in accordance with the level of consciousness in which each one non-normative act and the final normative act operate. Crusoe's acting is then seen as a struggle towards normativeness, deliberateness or individual sovereignty, by a gradual adaptation of himself to his situation. After the traumatic passage into isolation, and the occasional landing at some island, Crusoe recaptures

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[17] Defoe's Crusoe, not that pure essence of subjective utility which is called Crusoe in economic analysis. The distinction is pertinent. By Crusoe we mean here Defoe's description of a specific, historical individual in isolation, a detailed account of Alexander Selkirk's activities, thoughts, "fits of conscience," remorse, etc., of a 17th century middle class Protestant Scottish sailor, marooned by request at Juan Fernandez Island, and who never lost consciousness of belonging to a specific religious and national group of human beings, a quite different animal from the celebrated "economic man" fully entertained in the slightly depraved pleasure of allocating the picking of strawberries against leisure in a spaceless, timeless, close economic paradise.

himself as existing in an entirely new and peculiar situation. His first non-normative act is, therefore, existential; it takes place at the vegetative level of consciousness, and results in Crusoe's ontologically feeling himself alive. By recontacting his own existence Crusoe regains possession of his previous, inherited and acquired, identity as the historical individual named Robinson Crusoe. From that standpoint, then, his sensorial perceptions carve out of pure reality a number of "facts" of a surrounding "nature" which he intuitively interprets as the elements of a problematic situation. Crusoe reacquires some of his former rational uprightness by confronting this problematic situation as an object of inquiry. At this positive stage he explores his conditions, and probes potential means. So far he has been guided, not by his free volition, but by the invisible hand of self-preservation, from non-normative end to a further non-normative end. An exceptionally intelligent anthropoid ape, like Gossen's Crusoe,[18] would have been able to keep pace with him. But once "profane"[19] needs were met, and the

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[18] For the mental capacity of the anthropoid ape see W. Koehler, The Mentality of Apes, Kegan Paul, Trench, Trubner and Co., London, 1925, passim.; and as for the assignment to Gossen of paternity for the "economic Crusoe" see W. Stark, The Ideal Foundations of Economic Thought, Routledge, London, 1948, p. 159.

[19] As in Durkheim's "le travail est profane par excellence."

positive end of gaining a living had become a means to some further end, then Crusoe faced the extremely intricate problem of formulating his first free decision regarding what he ought to do with himself. The problem Crusoe faced, in his isolation, until he finds his man Friday, is simply that of recreating social constraints for his leisure. Realizing the gratuitousness of his life, its lack of engagement, he fetched obligations in order to be able to accept them, or to fight against them. He faced the following ethical problem: he had to decide what he would not do, in order to be free to do what he should do. In a truly Hamletian mood he even considered whether he should commit suicide or not, and discovered that this too was at the reach of his decision. Defoe's literary solution for his character's problem was to send him back to his Bible as a code of legitimate order. By so doing Defoe has characterized Crusoe as the ideal type of normative non-social actor. In order for the non-social act to be accomplished at all, i.e., to become meaningful, the actor must decide between a variety of legitimate orders which are capable of realization. Self-preservation is an intermediary end to some further ultimate end, since it leaves unanswered the question: what for? To the extent that a number of non-social actors, although acting in a collectivity, do not recognize the possibility of influence upon each one's freely chosen

legitimate order of other actors' will and intention to enforce their own individual legitimate orders, the action of which consists this collection of non-social acts remains non-social. To the extent that Crusoe did not recognize in his man Friday more than a passive means to his own ends, and to the extent that Friday freely accepted the white man's authority as the manifestation of an impersonal order of legitimate ends to which Crusoe himself was submitted, i.e., to the extent that each one treats the other as a passive means to his own freely chosen ends the mutual action remains non-social. Crusoe's coercion of Friday's will, or Friday's sensing illegitimacy for himself in Crusoe's legitimate order of ultimate ends would have transformed their mutually exclusive, isolated, non-social acts into a social action resulting in a political conflict.

4. The non-social action is, therefore, a system of isolated, normative, non-social actors each one of which treats everyone else as a passive means to his own ultimate, normative end, while believing that everyone is subject to the same legitimate order. The slightest suspicion of inequality or favoritism upsets this social general equilibrium system. If someone starts loving, or hating, or trying to overpower someone else then the non-social action becomes social, by the introduction of political conflict. As Defoe's account of Crusoe's activities up to Friday's

appearance into the incipient social scene was an example of isolated, individual, normative, non-social act, Johann Wyss' Swiss Family Robinson[20] is the ideal type of isolated, collective, non-social action. As long as each one in that family treats everyone else as a passive means to his own ultimate end of devoting his efforts, with perfect unselfishness, to the welfare of the group the action is stable as a non-social action. The moment, however, someone's authority is felt tne system of action becomes social, and, in order for it to be stable as a social system, then, the dominating authority must be recognized as a legitimate order not only by itself, in order to have moral authority, but also by everybody else who could upset it by not conforming to it. In this case not only a political conflict would develop between two equally legitimate authorities, but an economic conflict would also appear, in the wake of the political conflict, around the problem of the distribution of means between these two alternative and equally valid ultimate ends. As for a system of non-social actions it may be conspicuously exemplified in some "anarchistic" religious orders, such as that of the Franciscans or of the Vedanta Swamis, in which every participant, while striving to realize the system of ends which is most legitimate for himself,

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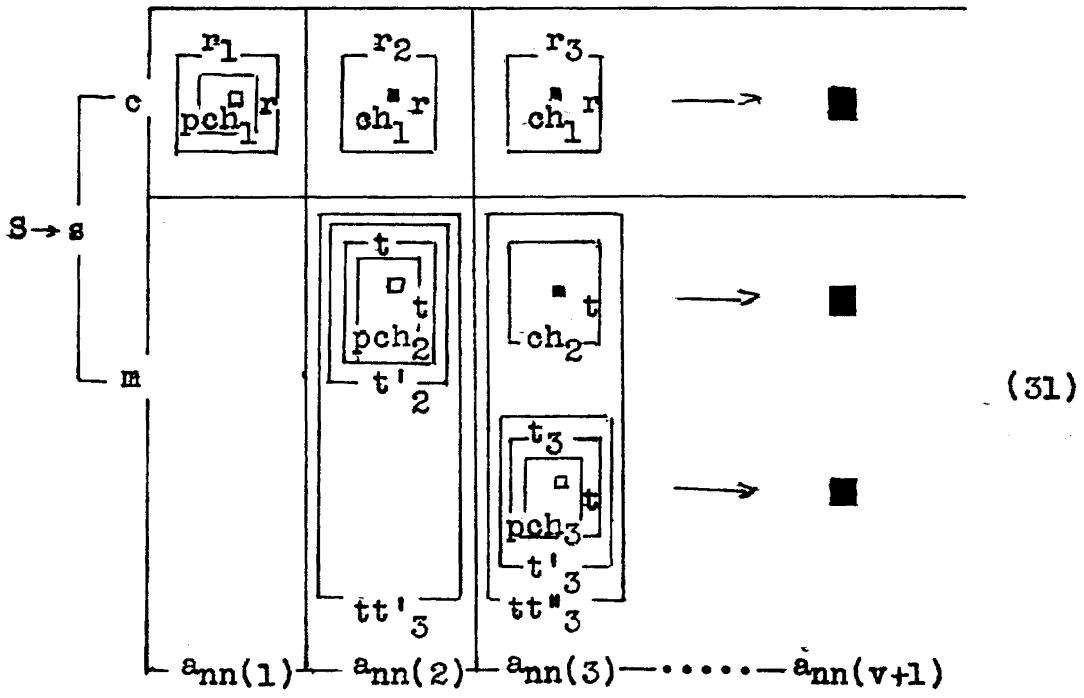
[20]Johann Wyss, Der Schweizerische Robinson, first translated into English in 1820.

such as the contemplative, the active, or the "jnana," the "karma," the "bhakti," or the "raja" yogas, subordinates, or dedicates, his individual action to the accomplishment of a supreme legitimate order. As seen from the outside, or from an observer's point of view, both the non-social action as well as the system of non-social actions have already been formulated above in (28) and (29).

5. Before proceeding to the examination of the concept of social action, we shall endeavor precisely and concisely to summarize the schema of an isolated, normative, non-social act as it has been above formulated (21,22,30), and exemplified (III,B,3). A graph of such an act may be as follows:



(31)

where the following characteristics are symbolically represented: (1) where a real or imaginary situation S involving possible or impossible choices of some undefined actor is narrowed down to a specific situation in time and space where an existent, isolated, normative actor faces some conditions and has at his disposal some means, c and m; (2) the non-social act appears as a non-social action of which the actors are "nature" and "Crusoe": "nature" includes the normative actor's hereditary and environmental conditions, and its choices, from a subjective point of view, manifest themselves to an observer as chance or random choices, ch^r, within an area, r, where the probability of the "nature"'s choice increases towards the center; "Crusoe" includes all voluntary choices of the actor, i.e., his rational choices be they logico-experimental or logico-transcendental, t or t' (III,A,2,d); (3) the non-social act takes place in time which is divided into periods by the set of possible choices as they may conceivably appear to someone who is better informed about these possibilities than the actor himself: i.e., an almost unlimited set of both possible and impossible choices, S, is firstly narrowed down to an area of possibilities, s, which is subdivided into time-subpartitions, ann(k), k l ... v, v+1, circumscribing choices that are, then, possible; (4) the random choices within the area of

conditions are picked up on the basis of different probabilities, and $\underline{ch}^{r}1$ is, therefore, picked up within the subset $\underline{c}$ of $\underline{a}_{nn}(1)$; but, within the subset $\underline{m}$, in $\underline{a}_{nn}(2)$, the actor does not know everything: he knows only $\underline{tt}'_2$, of which he thinks that only the area $\underline{t}'2$ is applicable, but of which, in fact, only area $\underline{t}_2$ is valid since the knowledge it contains coincides with the knowledge of the neutral observer, i.e., is scientifically, publicly valid knowledge; (5) the actor chooses right within $\underline{m}$ of $\underline{a}_{nn}(2)$, since he picked up the alternative $\underline{ch}^{t}_2$ which is inside subset $\underline{pch}^{t}2$; (6) the various choices along the means-end chain of non-normative acts are made out either at random, with known probabilities, or by voluntary, valid, both effective and adequate choices of the actor when selecting his means to an end as means to a further end; (7) this picture of an isolated, normative, non-social act may be further simplified by making the actor start his act with a norm or a plan, for then, instead of making his decision concerning the means as the necessity for it arises, he makes up his mind for all possible contingencies: he is no longer satisfied by deciding about a normative end for his effort, but also he tries to organize, competently, in order to proceed with technical adequacy and efficiency towards his goal: he chooses a norm and submits it to the test of verification; (8) the value

of the normative act is a function of this ultimate choice.

6. Such a non-social act becomes, for its actor, a social act the moment he recognizes, with or without grounds for doing so, that it may be influenced, either favorably or unfavorably, by someone else's choices or decisions about which he does not possess full knowledge and information. The change that socialness introduces into formalation (31) is easily visualized: when confronting a situation the actor's knowledge of it may be already outmoded, in such a way that although his choice be entirely rational it may no longer be applicable or valid in the new pattern of information of "someone who knows better" than the actor "what is good for him" at that special moment. The moment, therefore, an otherwise isolated, non-social actor suspects that his act may be either upheld or upset by somebody else's non-normative choices regarding means and normative decisions concerning ultimate ends, there, then, the isolated, non-social actor ceases to be non-social and becomes a social actor. This unilateral recognition of dependence is, however, not sufficient to transform a general equilibrium system of isolated, non-social acts into a social action. It takes at least two subjectively interdependent, though perhaps no less independent, actors to transform a non-social

action into a social action. Recognition of dependence, as long as there is no coercion by force, would not make each actor's individual sovereignty less sovereign or free to make its own decisions regarding ultimate ends. But then, the potentiality of mutual interaction being recognized or suspected, the question arises as to how the terms of social relationships are settled. In other words, once at least two non-social acts have been integrated, through subjective interdependence of their actors, in an action system, the problem comes up as to know whether the resulting common social order is stable or unstable, that is, whether the resulting social action is a system of conflict or a system of organization and contract. When non-social acts are brought together by their actors' mutual recognition of interdependence, but their ultimate ends, whatever they may be, remain uncorrelated, and individualistically compartimentalized, a social act of conflict will result from the former non-social order of subjective isolation. Or, then, at the other extreme, the actors, by recognizing interdependence, cease to exert sovereign power any longer, and then, with this last free decision, which then must be unanimous, the core of normativeness will be forever abolished, and the resulting social action will cease to be social in order to become an endless process of adaptation, a long waiting for

further initiative, a pointless preservation of movement for the movement's sake. Either the non-social action becomes Hobbesian in the transformation into a social action, or it becomes Kantian:[21] it is "a war of all against all" or it is "an eternal peace." Reality, of course, is neither.

7. Let us go back to the extraordinary fertility of Crusoe's example. We have already pointed out (III,A,9) that Crusoe, when acting in social isolation, faced three major problems, which we have represented graphically, in a summary (30), and in a more detailed way (31). These problems were: (a) a "psychological" problem: Crusoe had to make up his mind as for the ultimate end to choose and pursue: we saw (III,B,3) how Crusoe kept shifting his end to a further and further end, at first quite irrationally, and then voluntarily, until he found in "salvation"[22] a sufficiently remote end to be called ultimate without danger of ever finding out that it might be a means to a more remote goal; (b) an "economic"

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[21] To qualify it as Lockean would have been more accurate, philosophically speaking, since Kant entitled his little essay on peace as "To eternal peace" having in mind the peace of death. See C. J. Friedrich, Inevitable Peace, Harvard University Press, Cambridge, Mass., 1948, p. 244ff.

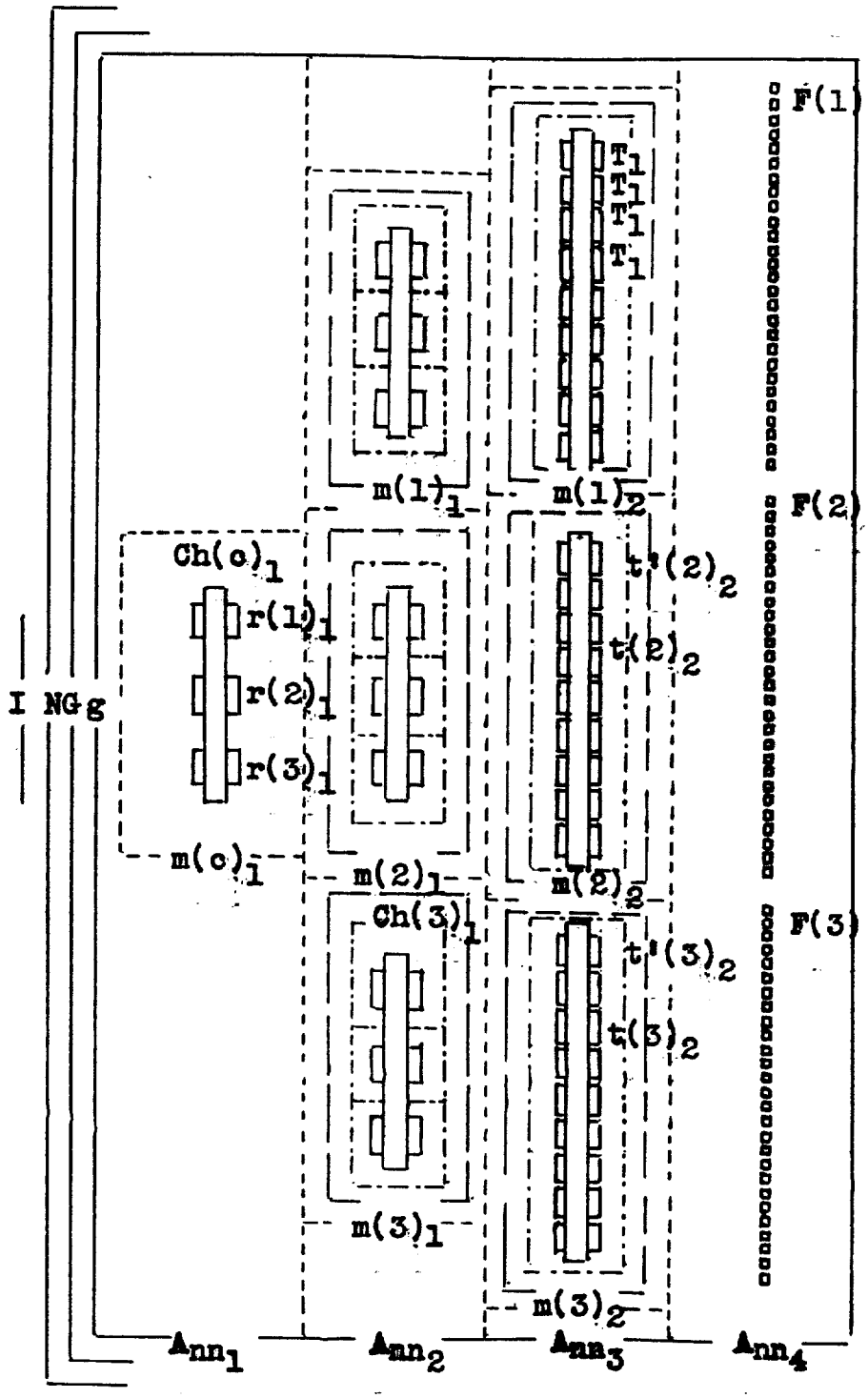
[22] "But now I began to exercise myself with new thoughts; I daily read the Word of God and applied all the comforts of it to my present state." See Daniel Defoe, Robinson Crusoe and A Journal of the Plague Year, Random House, The Modern Library, New York, 1948, p. 125.

problem: Crusoe had to decide about the allocation of his means between these graded ends, the distribution, for instance, of his leisure time between Bible reading and more earthly occupations, i.e., in other words, how to replace a "natural order" of successive choices, or partial norms, such as the instinctive, intuitive, rational, etc., (30) by a deliberate, organizational norm (III,B,5) involving the statistically predictable trends of his hereditary-environmental "nature" or conditions, as well as a plan of choices in the intermediary means-end chain of non-normative acts; and, finally, (c) a "technological" problem: Crusoe had to apply this norm in such a way that the normative end should be maximized, or approached as close as possible, as a target, within the conditions imposed by nature, since the "value," for Crusoe, of his normative act was a function of the adequacy and efficiency of this norm. These three major problems remained invariable for Crusoe, after Friday's arrival, and as long as there was a non-social action consisting of two isolated, normative, non-social actors: Crusoe, who had not yet recognized Friday's influence in his own Bible oriented "way of life," but used Friday's services as a matter of course, and as a no less predictable event of his natural surroundings than the reappearance of the sun every morning; and Friday who "used" Crusoe as a "manifestation"

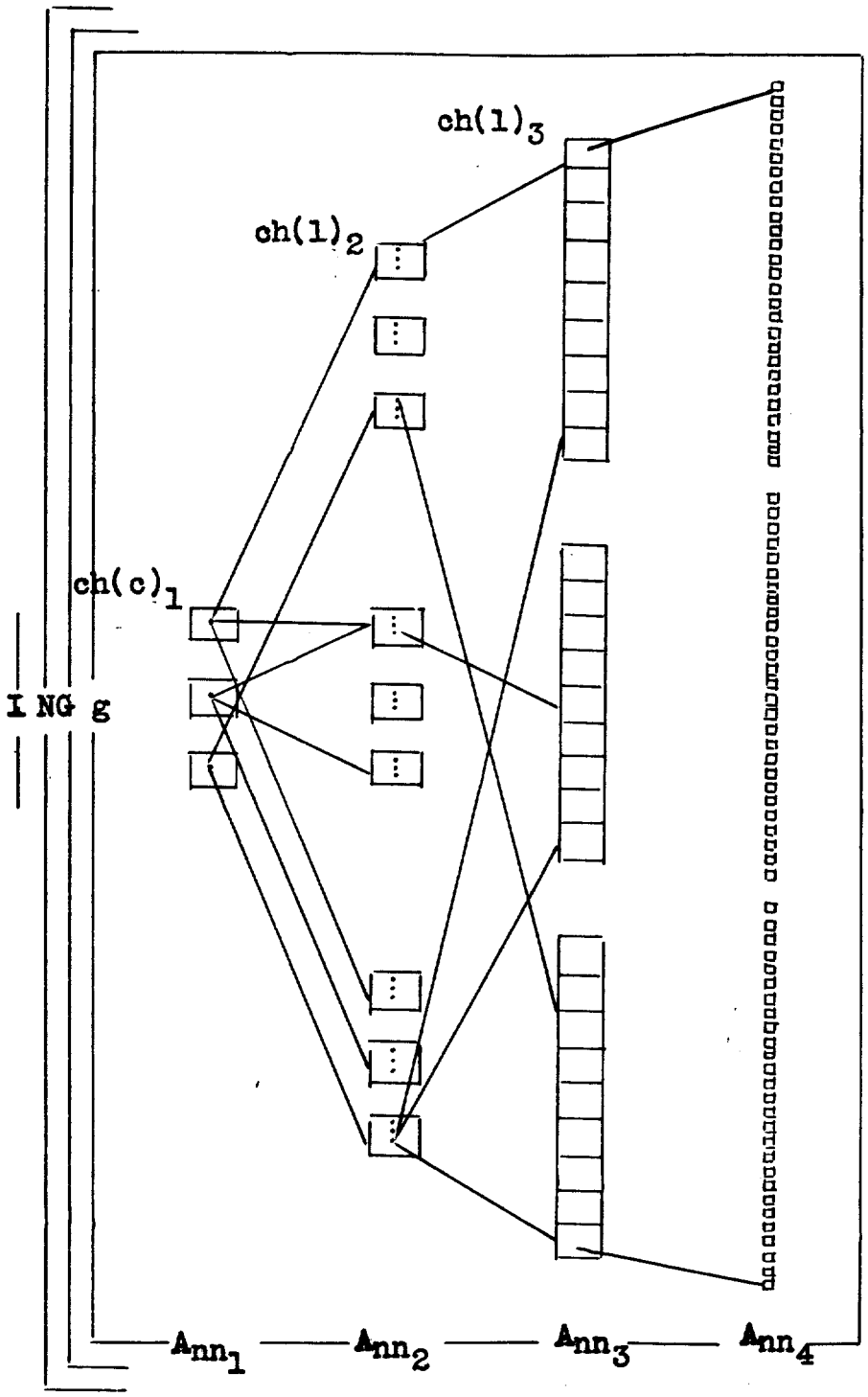
of a higher power, a no less controllable means in his own totem oriented, logico-transcendental chain of symbolical meanings in his isolated, normative, non-social way of life. This non-social action conceivably persisted until one of its actors, Crusoe, for instance, begun to suspect that Friday was something more than merely a passive object, and might be capable of active partnership in the pursuance of Crusoe's own ultimate end, or of active resistance to Crusoe's attainment of that ultimate end. At this moment, when Crusoe senses that Friday is also in a position to enforce his own totemic, normative decisions, Crusoe's non-social act became, for Crusoe, a social act. But this, however, was not sufficient to transform their collective, non-social action into a social action. Crusoe's change of attitude had to arise Friday's suspicion that Crusoe might very well be something more than a passive instrument to a higher, invisible "hand," or powerful "law," and that, therefore, his conduct could be directed entirely by magical incantation. The moment Friday recognized Crusoe as an extremely unreliable means to be counted upon as adequate to his own ends, then Friday's "theory" of Crusoe's behavior, or the norm he had adopted towards Crusoe, was not verified: uncertainty arose together with risk, in Friday's mind. The mutual action was no longer to be pursued under the assumption

of belief that complete or perfect information was available to both Crusoe as well as Friday. When each one saw in the other a possibility of unallegiance, or disrespect, for one's own convictions concerning ultimate values, or a threat to the stability of those convictions, then, the "psychological" ordering of ends of each isolated act gave place to a "political" ordering of ends by contract, persuasion or coercion, or to a conflict of power. Thus, a social act is characterized by (a) the presence within the schema of action of at least two normative actors; (b) a scarcity of those means which are needed by different actors for alternative ends or uses; (c) a consciousness by the actors of not having complete information about the means effectively at their disposal; and (d) a political restriction placed upon the psychological freedom of decision concerning ultimate ends. A social action may be diagrammatically represented as follows:

Note on the grafical presentation. Configurations (32a) and (32b) are simple translations into diagrammatical terms of the Von Neumann-Morgenstern geheral formal description of games of strategy. The sets have been arbitrarily chosen as rectangular sets, and in so doing we followed the suggestion of Oskar Morgenstern, On the Accuracy of Economic Observations, Princeton University Press, Princeton, N.J., 1950, fig. 1, p. 31. This graphical presentation may be further elaborated to take care of very complex situations, and a good draftsman may devise ways by which the information to be conveyed becomes immediately self-evident by simple inspection of the diagrammatical sketch.


F(1)
F(2)
F(3)
Ch(o)1
r(1)1
r(2)1
r(3)1
m(o)1
m(1)1
m(2)1
Ch(3)1
m(3)1
m(1)2
t'(2)2
t(2)2
m(2)2
t'(3)2
t(3)2
m(3)2
I NG g
Ann1
Ann2
Ann3
Ann4

(32a)



(32b)

8. The graphical representation of a social action, even when involving few participants, seems to lead to complicated diagrams.[23] The configuration (32a) combines three actors, $\underline{K} = 1, \ldots 3$, in a social action within a group, g, and, as formulation (31) was a development of formulations (21, 22, and 30), so formulation (31a) is a development of formulations (28 and 29). Suppose that $\underline{I}$ is a set of all possible choices and decisions occurring within the limits of a certain space during a certain period of time. In order to make some headway towards the central subject of this thesis, let us assume that $\underline{I}$ is the set of all political, economic, social, etc., choices and decisions to take place internationally, during a year. This perfectly general and undefined international action consists of a system of national actions where the agents are nations, the limits of the set are political boundaries, and the time of the action is a fraction of a year, say, a month. Denote by $\underline{N}$ this partition in $\underline{I}$, i.e., every nation in $\underline{N}$ is a subset of $\underline{I}$, and $\underline{N}$ is a system of pairwise disjunct sets as national units of action.[24] Every

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[23] In the description that follows we have attempted to reinterpret, in terms of action, the description of games of strategy as it appears in John von Neumann and Oskar Morgenstern, op. cit., pp. 68-84.

[24] See Garrett Birkhoff, Lattice Theory, John Wiley and Sons, New York, 1940, chap. VIII.

nation, in its turn, may be conceived as a system of economic, political, social, cultural, etc., actions in which the agents are groups of individuals. Denote by G that system of group actions one of which, g, involves a particular group of three actors with the social action of which we are now concerned. Suppose that this action is initiated and concluded within a day, and that it may be divided into four periods, $k = 1, \ldots 4$, including an initial period, two successive intermediary periods, and a final period. The set I, and the system of sets N, G, and g, each one of which is a partition in the preceding one conceivably represents a body of unspecified information I which gradually becomes narrower and narrower, more and more specific or concentrated around an otherwise undetermined element of I. As an illustration visualize that at I we are at the vertex of a cone of light, and that we are blinded by its brightness, and quite unable to see more than great masses of objects surrounding us. As we go further and further away from that source of light we become more and more capable to see even specks of dust in suspension as well as every minute detail of the illumined surface. In formal, logistic terms we may say that each set is the actual information that came out as a result of the preceding set,[25] so that the tree denoted

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[25]On the subject of sets and partitions, see John von Neumann and Oskar Morgenstern, op. cit., pp. 60-66, and also Alfred Tarski, Introduction to Logic, Oxford University Press, New York, 1946, p. 155ff.

by configuration (32b) pictures a sequence of continually increasing specification of patterns of information. Note, for instance, how a social action thus represented resembles the methodological development of a scientific theory: each stage in it, I, N, G, g, and the periods in g, is like an announcement which states how much information will be provided later concerning an otherwise unknown element of I. Thus, if I is understood as a situation where nations internationally act, and N, as a situation where groups nationally act, and G, as a situation where individuals act socially within groups, then, the particular group whose action is represented above (32a, 32b) may be conceived as a situation within which the three actors act socially, i.e., it may be further subdivided into conditions and means. In order to simplify the exposition, we have considered the conditions as a sort of natural, hereditary-environmental actor controlling those means which are uncontrolled by the normative actors involved in the social action. This schema of social action (32a, 32b) may, of course, equally well be applied to any one of the upper types of social action, between groups within a nation, and between nations in the international society.

9. The notation employed in (32a, 32b) is as follows:

a) I, N, G, and g are, as already explained above, sets of telescoping partitions denoting actions

at the international level, where the actors are nations; at the national level, where they are groups of individuals; at the group level, where they are individual, as in the action examined,[26] and so forth. In g there are three actors, $\underline{K} = 1, \ldots 3$, and "nature," and the action takes four periods from initiation to conclusion, $\underline{k} = 1, \ldots 4$.

b) This particular group action we are considering consists of these three normative actors controlling together a set of means: $\underline{m(K)}_k$, and acting in this pattern of act assignment from the top to the bottom of both diagrams: $\underline{m(1)}_k$, $\underline{m(2)}_k$, $\underline{m(3)}_k$ which are also the actual assignment from non-normative act to non-normative act of the same actor within his own chain of action, as follows: $\underline{m(1)}_1$, $\underline{m(1)}_2$, $\underline{m(1)}_3$.

c) Ann1, Ann2, Ann3, Ann4, denote the non-normative actions the chronological sequence of which brings the action from its unspecified initiation, where there is only intentionality

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[27]The series, of course, could be pursued further on by considering the individual as a system of emotions, drives, tendencies, preferences, interests, etc.

of consciousness from the part of the actors to its conclusion where there are only the results of the concluded action.

d) The "fourth" actor, i.e., the natural conditions of the social action, involving internal, hereditary, as well as external, environmental circumstances, is denoted by $\underline{m(c)_k}$, and may occur at any non-normative stage of the action except at its very inception where the actors decide so to act (this is not shown in the diagram, but is a necessary and sufficient condition for the existence of $\underline{I}$, $\underline{N}$, $\underline{G}$, and $\underline{g}$ as denoting actions at all); $\underline{m(c)_k}$, therefore, denotes those manifestations which are irrational in every action, and may be represented by the statistical probabilities of certain "choices" that will be selected by the physical and physiobiological "nature," or environmental circumstances conditioning the action.

e) In the first, non-normative action, $\underline{Ann_1}$, are included only such irrational or chance "choices." We are, then, within the non-normative act $\underline{m(c)_1}$ where the significant data are: the three groups of alternatives $\underline{r(1)_1}$, $\underline{r(2)_1}$, $r(3)_1$, for

each one of the three actors,[27] i.e., they are constant within each square grouping, but they may vary from one to another, as in reality personal conditions vary from individual to individual, but may be considered as constant within each individual during a sufficiently short period of time.

f) Within each one of these groups of alternatives, $\underline{r(1)_1}$, $\underline{r(2)_1}$, and $\underline{r(3)_1}$ there is a number of possible choices, one of which, $\underline{ch(1)_1}$ (in 32b) is chosen by actor $\underline{K}$ = 1's hereditary-environmental "nature" to initiate his action, they are those circumstances which involved him in that particular action. This system of "nature"'s choices is denoted by $\underline{Ch(c)_1}$ in (32a). Note, once more, that the statistical probabilities of the choice is only confirmed by the choice itself: until then it is only a matter of conjecture, of "mathematical expectation": ex-ante-decisions we only know that the probability of a certain choice is that it will be chosen when that probability is greater than

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[27] These alternatives may conceivably be represented by their probabilities of occurrence, which may depend upon the information embodied in $\underline{Ann_1}$.

zero, or that it will not be chosen, when the probability is equal to zero. The sum extended over all ch(c) of Ch(c) is equal to unity, i.e., it is by definition the unit choice that characterizes the act.

g) The intermediary non-normative actions, Ann2, and Ann3, involve rational choices by the actors. We are now within any one $m(K)_k$ and the act being rational, we must specify the state of information of the actor K there, and the specific choice he is going to pick up. The pattern of K's information we have denoted, following formulation (31) as $t'(K)_k$ or the area of choice circumscribed within ___ ___ and the actual information of K at $m(K)_k$ as $t(K)_k$ —·—·— As K's information must be a part of the total information available at that stage, the particular alternative about which K may have some knowledge may lie outside of the area of actual information. In other words, he may not know everything that happened previously: preliminarity does not then imply anteriority. The information may be either erroneous or insufficient. Denoting the zone of truthful information about

previous choices by other actors as $\underline{T}_k$ we see that $\underline{t(K)}_k$ may either be greater, smaller or coicident with $\underline{T}_k$. In reality, at $\underline{m(K)}_k$, the range of valid choices are narrowed to the square set $\underline{T}_k$, but the actor $\underline{K}$ may not know as much, since as far as he is concerned the action is merely within a set $\underline{t(K)}_k$ of $t'(K)_k$. He makes choices within the range of $\underline{Ch(K)}_k$ but if the actual choice $\underline{ch(K)}_k$ does not fall within $\underline{T}_k$ it will not be transferred or commuted to the next action $\underline{Ann}_{k+1}$.

h) Thus, the information embodied in $\underline{Ann}_{k+1}$ obtains from that embodied in $\underline{Ann}_k$ by adding to it the *value* of its $\underline{m(K)}_k$, i.e., by superimposing every $\underline{T}_k$ in $\underline{Ann}_k$ with every $\underline{ch(K)}_k$ of $\underline{Ch(K)}_k$ and throwing away the empty sets. In $\underline{m(c)}_k$, $\underline{Ann}_{k+1}$ coincides with $\underline{Ch(c)}_k$. This transposition is shown in formulation (32b) where we have restrained ourselves to connect by straight lines, which are the *paths of action*, some of the innumerous possibilities within which the action may have occurred.

i) Finally, $\underline{F(K)}$ is one of the various possible results of $\underline{K}$'s action. This is, of course, a function of the various choices $\underline{ch(K)}_{1,2,3,4}$

> lying on the particular path of action which happened to have been followed by the actor during the social action. We may denote this sequence of choices as the action itself, a partition in G, or simply as $\underline{A(K)}_{nor.}$ the outcome of which is $\underline{F(K)} = \underline{F(K)}\ \ \underline{A(K)}_{nor.}$.

10. This term "normative" and everything that it should by now imply to the reader of this thesis points towards a simplification of this rather complex schema of social action. In fact, many of these paths of action cannot be trod by the actor without incurring in social penalties or sanctions, imposed upon him by a certain social or legal order. A social action is like a river which springs from irrational impulses at its fountainhead, and afterwards follows rational gradients but always constrained by its own rising banks, down to the sea. The possibility gradients are reduced by the sanctions of the rising ground in such a way that the stream always fetches a Tallweg path consisting of a succession of points, at different geological sections of the ground, where altitude is minimum and basin cavity is maximum as altitude of its deepest point.[28] And, as an hydrographical map does not

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[28] In other words, there is a "saddle point," a point where the altitude is minimum of all latitude maxima, and it is maximum of all longitude minima. See John von Neumann and Oskar Morgenstern, op. cit., pp. 93-95.

represent all possibilities but only actualities of stream courses, so our representation of social action may be simplified to a representation of those lines of conduct which are permissible within an established social order. Thus, in making non-normative choices along his own means-end chain of non-normative acts in a normative act of a normative action, the actor may proceed, consciously or unconsciously, in accordance with some plan or rule of procedure which may consist of some line of conduct pursued by habit, by tradition, by education, by logico-experimental or logico-transcendental reasoning, etc., however he might have acquired it. In formal terms:

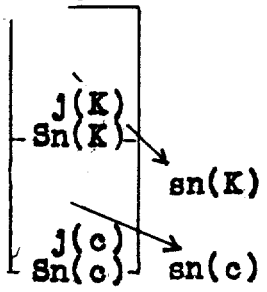
a) we call that plan of the actor his <u>specific norm</u> for action, i.e., the norm specifying what choices he <u>should</u> make, in every possible contingency, for every possible actual information he may possess at that moment, in conformity with the rules of the established, legitimate order under which he lives; and

b) the specific norm of an actor in a social action is determined: (1) by the pattern of "nature"'s choices, that is, $\underline{ch(c)_k}$ belonging to $\underline{Ch(c)_k}$ which is, in $\underline{m(c)_k}$, a subset of $\underline{Ann_k}$; and (2) by $\underline{K}$'s actual information, $\underline{t(K)_k}$, within his own pattern of information, i.e., $\underline{t'(K)_k}$, in

$\underline{m(K)_k}$ of $\underline{Ann_k}$. If a norm is adopted, and the trend of the conditions is verified, then, these data determine the result of the action for each actor.

11. This means that, from our formulations (32a, 32b) we are brought back to its primitive, simplest description (28,29). Translating all this in terms of scientific methodology (II,B,1-3) we may say that each actor in a social action acts as if he had a "theory" about what he is doing. That this is always the case in a subjective action as an intentionality of consciousness follows from the concept of action as developed in this study. The outcome of the act for each actor is the "verification" of his "theory." In other words, for an actor engaged in a social action his ultimate end is a function of the validity of the norm he adopts for acting within a social order. The complex formulations (32a and 32b) may now be represented as follows:

$a(K)_{nor.}$



(33)

$$g \rightarrow ch(K)_1 \rightarrow ch(K)_2 \rightarrow F(K)\left(a(K)_{nor.}\right)$$

where each actor, $\underline{K} = 1 \ldots \underline{n}$, including "nature," $\underline{c}$, instead of making chance, $\underline{ch(c)_k}$, or voluntary, $ch(K)_k$, choices along the means-end sequence of non-normative acts, $\underline{m(c)_k}$ and $\underline{m(K)_k}$, linking the situation, $\underline{g}$, to the obtained end, $\underline{F(K)}$, makes up his mind for all possible contingencies, i.e., acts with a norm or a "theory" about what he is doing. Of course, the norm for nature is simply an epistemologically verified scientific theory. What is meant here by the norm for nature's behavior is nothing else than the most probable trend of events within the conditions of a situation. It is, then, perfectly legitimate to replace the intermediary non-normative "nature"'s chance choices by the biological, physiological, meteorological, etc., theories about the probable trend of the situation of the social action in question. As for the normative actors involved in the social action, their adopted norms, in order to be both effective and adequate, must determine, at all possible non-normative acts $\underline{m(K)_k}$, what choice to select, i.e., what $\underline{ch(K)_k}$ to pick up among all possible choices, $\underline{Ch(K)_k}$, within $\underline{K}$'s actual information, $\underline{t(K)_k}$, as included in his pattern of information $\underline{t'(K)_k}$. Two precise definitions are possible at this point:

a) the <u>specific norm</u>, <u>sn</u>, for the actor $\underline{K} = 1 \ldots \underline{n}$, is defined for every period of the action, $\underline{k} = 1 \ldots \underline{v}$, and for every actual

information of K at that moment, $t(K)_k$ of $t'(K)_k$; and the value of this specific norm at the non-normative action Ann_k is $ch(K)_k$;

b) the trend of the conditions, or the specific norm of "nature" is similarly defined for every period of the action, $k = 1 \ldots v$, and for every $r(K)_k$ of Ann_k which is a subset of $m(c)_k$; and the value of this specific norm of "nature," i.e., of the trend of the conditions, or the statistical probability of this trend (III,B,8, f) is $ch(c)_k$ of $Ch(c)_k$.

12. Once specific norms are adopted and the trends of the conditions are known the action is determined at the same time that its results are verified for each actor: in (32b) a certain path of action will be followed by each actor in such a way that, at the end of the action, the diagram, instead of showing all possible paths that might have been taken, shows only the paths of the individual acts that actually took place. This is shown in the left side of diagram (33). Consider there actor K. After having decided to act in order to attain a certain goal, K is given by the circumstances within which he lives a set of possible norms $j(K)$, $j = 1 \ldots u$, which are assigned to him as $Sn(K)_{j(K)}$. Now consider also all possible trends that may be contained in the conditions of that

particular situation g. The conditions may develop along many possibilities j(c), denoted by their probabilities j = p ... p(j). A definite choice, sn(K), amid all possible norms Sn(K), for every actor, and the probable trend of the conditions determine the outcome of his normative act when the action is a non-social action, so that

$$a(K)_{nor.} = F(K)\left(sn(K), sn(c) \right), \qquad (34)$$

and the problem is one of simple maximization. In a social action, however, the problem becomes much more complicated, since the result of the action for each actor does not only depend upon the adequacy of his chosen norm but also upon the adequacy of the norms chosen by others, and the degree his expectation of those choices is verified. Of course, in a social action each actor chooses his norm for action without precise information concerning the choice of others, although he may have valid conjectures about what those choices are going to be. Anyhow, his information must be within his $t(K)_k$. As for the trends of the conditions, his judgment may be valuably guided by mathematical expectations regarding natural events. In summary, in a social action

$$F(K)\left(a(K)_{nor.}\right) = A(K)_{nor.}\left(sn(1) \ldots sn(n) \right) \qquad (35)$$

which is the symbolical representation of a legitimate action order for K: K's result from the social action $A_{nor.}$ depends not only on the adequacy and effectiveness

of his own adopted specific norm but also on the specific norms for action adopted by others; and if K accepts that state of affairs the order of norms under which he acts is legitimate order, i.e., if they can discredit that order as legitimate, then their own order may conflict with the established order, and if they can, by acting together, enforce their own order, then, the legitimate order for the coalition is said to dominate the legitimate order of the action.

13. In formulation (30) we have tried to represent an isolated, normative, non-social act. We have seen that this type of act involves a maximization problem with no inherent difficulty of solution: everything must be subordinated to the normative end, the full attainment of which determines the "value" of the act either for the individual as well as for the collective actor. This formulation has been developed in detail in diagram (31) and combined in a schema of social action (32a and 32b) in order to show the role of subjective interdependence within such action. It is evident that this social action cannot admit a simple maximization solution, but a solution which depends, for each one participant, in overlapping variables within the action schema. In order to simplify this complex picture we have shifted our focus of interest from the intricate sequences of choices as partially represented in

conformation (32b) to the specific norms guiding those choices. We have, thus, described social action no longer in an extensive form as an interconnection of isolated choices, but, by going closer to reality, in terms of social constraints placed upon the selection of socially sanctioned norms by social habits, modes, traditions, experimental and symbolical rules of reasoning, etc. So we were able to reduce our problem from its immense combinatorial complexity to a simple representation (33) of an organization of norms within a social order. But at least one major problem remains to be clarified in the realm of social action: how is it possible that an actor will ever accept constraints to his own act? how is it possible for a social order to be legitimate at all? Our next objective is to determine under which conditions there will be stability of order, organization and norm. In order to do this, we must re-examine our concepts of legitimate order, competent organization, and adequate norm in the light of the schema of social action.

14. We call <u>social order</u> the particular, <u>established</u>, arrangement of ultimate ends in a social action. We call <u>social organization</u> the particular arrangement of specific norms approved by the order. We call <u>specific social norms</u> those rules of procedure adopted by the actor when performing a social action. We have already seen (III,A,12)

that an order, an organization, and a norm may be stable or unstable. If an order is a set of ultimate ends, an organization is a set of norms, and a norm a set of non-normative choices, then the three systems are stable whenever the following two conditions are met (III,A,11): (a) no element of the set is to be preferred by a group of actos to any other element of the set; (b) at least one element within the set is to be preferred to any other alternative outside the set. From these postulates the following corollaries may be deduced: (a) an element outside the set may be preferred to an element of the set; (b) there can be more than one order, organization or specific norm for action; (c) an element is said to be preferred to another when some of the actors involved in the social action have in collusion greater gains from acting together, and can implement that preference. The last corollary endangers the whole construction. How is it possible to avoid perpetual social conflict? Within the concept of stable order, organization and norm, we must introduce the notion of legitimacy, competence and adequacy (III,A,11).

15. The legitimacy of an order, the competence of an organization, and the adequacy of a specific norm are a matter of gradation, which goes through five levels of

intentionality of social consciousness,[29] from geographical adherance to utopian solidarity. This problem as of how legitimacy is ever to be assigned to an order by someone living under it is a rather philosophical and complicated one. In fact, how is it possible, within the utilitarian premises, to explain how it comes that a person freely restrains his freedom of volition in order to act socially. This basic difficulty of explanation has customarily been referred to in sociology as the "utilitarian dilemma." We have already mentioned it (II,C,7), and now we return to it as the contradiction lying at the kernel of all utilitarian and positivistic explanations of the foundation of legitimacy. The "utilitarian dilemma"[30] may be stated as follows: either individuals establish the ultimate ends for their actions upon individual preferences and tastes, and, in this case, it remains to be explained how a perpetual social conflict of clashing interests can be avoided by something else than the crude coercion of the weaker by the stronger; or individuals do not set after all the ultimate ends for their actions, but have those ends imposed upon them from outside, by an external body

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[29]Emile Durkheim, De la Division du Travail Social, F. Alcan, Paris, 1893, Book II, Chap. II.

[30]Ibid., Book I, Chap. VII. Also Emile Durkheim, Regles de la Méthode Sociologique, F. Alcan, Paris, 1919, p. 6ff., Pref. 2nd Edition, p. XIVff. Ibid., p. 20ff.

of intractable conditions in relation to which the only rational attitude is that of scientific observation, deduction of their laws of behavior, followed by adaptation of the individual conduct to their external, sovereign reality. This means, in our own terms, that either the individual reduces by force, cleverness, fraud, and persuasion, everyone else's decision concerning ultimate ends to the role of passive means to his own ultimate ends; or, then, the individual is dominated by someone else, and the only rational way to live in subordination is to adapt one's own ultimate ends to the master's will, and to repress one's own preferences and tastes that do not conform to the master's pattern of legitimate order. Either normativeness of action is maintained and then social order becomes a perpetual latent or overt conflict of interests and struggle for power where the equilibrium of contract can never be achieved; or contract is recognized as an immediate data of empirical reality, but then the introspected certitude of freedom of volition as well as the immediate evidence of normativeness in acting must be relaxed as a support for social order. The dilemma has been solved in many ways: (a) it has been suggested that such a thing as a meeting of free minds does not in fact exist: there is never an absolute equality of power in both sides so that always one party "finds the other

out" and gets an advantage by so doing; (b) it has been suggested that although the meeting minds are free but not equal in power all parties concerned accept the rules of procedure of a greater order than theirs, but then the question emerges as of whether this is a stable solution, since non-conformists may achieve a greater gain by not observing the rules of the order. It is to the discussion of the foundation for such a belief that we must now turn our attention. We have already suggested (III,B,4) that the "utilitarian dilemma" may be solved by differentiating independence of action from interdependence of action, and how the two necessary and sufficient requirements for stability may subsist together without need either of maintaining normativeness at the cost of the order, or vice-versa. This may now be restated in terms of social action as follows: (a) the individuals engaged in social action instead of making choices about means as the occasions for such choices occur during the course of the action, establish from the beginning a rule of procedure with which to meet all possible situations that may arise along the non-normative sequence of means and ends linking the initial situation to the desired ultimate end (III,B, 11); (b) once the ultimate end is decided upon by the individual the best norm that he could adopt is that in which all choices regarding norms by other actors are

predicted with a maximum of certitude, that is, the best norm is that which will successfully consider every other norm as a most reliable constant: once the law of behavior of others is discovered, then it will be both easy and advantageous to treat others as conditions within which the individual's own ultimate end could then be maximized in non-social fashion; (c) this, however, may result in losses for the other actors who, then, will strive to know the secret of the success of the actor concerned, who, in his turn, will try to maintain it secret by confusing his pattern of behavior: if, however, in spite of his efforts, his formula for success is found out by others imitation will follow resulting in routinization, loss of distinction, etc., a phase which is subverted by someone else's initiating another action upon another norm;[31] in order to prevent these disastrous effects the successful actor may ask the assistance of the order itself in granting him for the duration of the action a monopoly right over his specific norm; (d) stability, then, is achieved (1) by everybody minding "his own business," i.e., acting upon the basis of their exclusive individual preferences, and, by acting irrationally, to find equilibrium at a

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[31]Example: the "Scharenweise" or "clustering" effects of entrepreneurial skill as in Joseph Schumpeter, Theory of Economic Development, Harvard University Press, Cambridge, Mass., p. 214ff.

statistically determined "saddle point": the strict requirement then is for everybody not to know himself what his own decision is going to be: this solution for social equilibrium is most emphatically rejected by the concept of normativeness of action adopted in this dissertation; (2) or stability of social order is achieved because actors are not equally endowed with the same power to develop adequate specific norms for their actions, either because they are different in intelligence or discernment, or because they are protected from imitation by the established, legitimate order: we adopt this point of view in trying to solve the "utilitarian dilemma."

16. The acceptance that makes a social order a legitimate order for those living under its ruling springs from many sources. In the first place, there is at the very foundation of legitimacy, or acceptance of an order, a spatial, geographical motive. This simply states the often forgotten tautology that someone must exist somewhere in order to consider a social order legitimate at all. In other words, there is no a priori given legitimate social order. Before it is at all possible to affirm whether a certain social order is or has been legitimate or not someone must exist or have existed who feel or has felt towards that norm a sense of moral obligation.[32] A social order is

[32]Emile Durkheim, La Division du Travail Social, loc. cit.

a value system that cannot prescind from an evaluative subject in order to acquire legitimacy. As such, it is always relational, and can only be formulated meaningfully with reference to the position of the actor who finds it legitimate. There is no social legitimacy in an order which is independent of a historically and socially set of meanings, and, as such, it must operate not in an a priori categorial social setup, but in a definite social milieu. Moreover, legitimacy also needs temporal coordinates. This temporal source of legitimacy simply translates in terms of historical time what has been said above with regard to legitimacy in a social space. That legitimacy must be historically determined is another often forgotten common place. What has been often forgotten or abstracted, or perhaps more frequently ignored in this score is that the assignment of legitimacy to an order at a so diffuse range of individual deliberatedness may very well simply be the result of social environmental stimuli acting in a statistically randomized way or being behavioristically controlled by the masters of the social order itself. When reduced to this spacio-temporal category of acceptance or receptivity by repetition, daily routine, etc., the mind of the legitimating actor may become so dormant, so uncritical, so responsive to conditioning, that his assignment of legitimacy to a social

order may represent nothing more than a reflex of the order's propaganda, advertisement, ritual, etc. Both the spatial as well as the temporal sources of legitimacy shade into an institutional motivation according to which legitimacy is assigned to the social order by the actor through the mechanism of habit. This range of social order is characterized by conditions of psychic environment backed by sanctions, an acceptance in the part of the actor of certain social standards of behavior as immune from rational criticism.[33] At this state, the actors accepts the order as legitimate because he intuitively thinks that it is so without attempting to place that belief upon firmer grounds. The element of this acceptance is usage, and it works in spite of the actor's conscious intentions. The most peculiar example of such an institutional assignment of legitimacy to an order is the acceptance of marriage as a legitimate institution.[34] Thus the norms for social action have been chosen as a matter of usage whenever it has involved uniformities of

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[33]Max Weber, Theory of Social and Economic Organization, William Hodge and Co., London, 1947, p. 105.

[34]Ferdinand Tönnies, Gemeinshaft und Gesellschaft, R. Reisland, Leipzig, 1887, passim, for his definition of "Gemeinshaft" and "Gesellschaft" and their relation to marital relationships.

actual practice[35] in the orientation of the social action towards certain approved ends. As such, it may be subordinated to group norms of "good" or "bad" taste, which norms are enforced through diffuse sanctions of disapproval, but which are not legally binding. It is, for instance, considered bad taste for a certain type of New Yorker to adopt a norm of living in the West side of their city, but no legal sanction is attached to its contravention.[36] Usage in the choice of a norm applies not only to matters of food, dress, daily personal habits, but also to sexual behavior, to art, recreation, etc.[37] Seen from a very broad point of view, the choice of norms by usage implies a solidarity of interests, a sharing of the same conditions[38] and so it may be fully interpreted as a traditional motivation for acceptance of an order as legitimate. The characteristic of this traditional constraint is its lack of specific purposes in the adherents to its observance as

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[35]As in Weber's "Brauch" op. cit., p. 110.

[36]Another curious example of usage, as norm dictated by custom, is seen in the habit of carving bird snares among the ancient Maori of New Zealand, which carving has no relevance to the efficiency of the snare in catching birds (Talcott Parsons, op. cit., p. 679).

[37]For instance, in the establishment of a literary school upon a certain technique of writing.

[38]As in Tönnies' "Schicksal" or community of fate, op. cit.

a norm. Marriage, again, is a traditional norm in that sense. Generally it is very difficult to answer the question as to why one marries in the usual teleological or technological sense with which one describes one's entering into a store to buy a package of cigarettes. Traditional obligations are unspecified and unlimited, although not lacking in control but only relative to attitudes and not to specific acts. Gossip, for instance, is such a control of traditional usage. Religion is another example of traditional usage in the choice of norms, so long as it is ritual or a mode of expression of attitudes.

17. When, thus, broadly interpreted usage covers traditional norms for action or modes of expression from the almost automatic domain of habit, through tastes, and art techniques, to the verge where tradition becomes convention involving coercion by a specially authorized agency of enforcement. At this point, the choice of the appropriate norm for action leaves the purely social realm and enters the region of political action. The attitude of the agent towards convention and law is no longer similar to his attitude towards usage and tradition. Now his uniformity of action, or his choice of a norm for action, is determined most conspicuously by his rational inspection of the situation in his own self-interest. We call that the <u>ideological motivation</u> for acceptance of an

order as legitimate. This is characterized by the actor recognizing a plurality of valid, or legal, ends for action, as well as a scale of positive importance between them. He recognizes, moreover, his dependence in the attainment of those ends upon the actions of the other actors involved in the same social action. The actor, when so choosing his norm for action, will be intensely interested in the outcome of his action, in the sense that he will assign legitimacy to that order which will not contradict or upset his appropriate, specific norm for action.[39] Positive or "pure" economics, as well as positive social theory confine their attention exclusively to that segment of legitimacy of a social order. Naturally, the transition from the traditional motivation where the norms of usage are not binding to the ideological motivation where norms have legal validity is gradual. There is, for instance, in marriage the traditional as well as the ideological motivation: a blanket obligation to help in whatever contingency that may arise, and a legal sanction in case of desertion or non-support. The norms for action chosen under an ideological motivation are characterized by their rationality, by the actor's obedience to self-interest and his expectations as for the behavior of others.

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[39]Max Weber, op. cit., p. 105, where he calls the ideological motivation for legitimacy assignment by the actor as "Zweckrational" implied by a "Verantwortungsethik."

It presupposes a certain social, institutional, and legal background as physical conditions for action, as well as a plurality of ways to combine the available means towards lawful ends. Ideological norms are eminently "practical" in the sense that, from the subjective standpoint of the agent they are the most efficient and adequate standards of conduct to his ultimate ends. We have already seen (III,B,15) how this may involve participants endowed with equal power,[40] or an interaction of authority of one participant over the other. In any case, it involves a relationship of compromise in a precisely defined area of interests within a framework of rules dictated by the legitimate order. A typical example of such a meeting of minds is the closure of a valid, legally enforceable contract. The ideological motivation takes for granted the existence of an order to which legitimacy is assigned because the existence of the order is convenient for the interests of the acting individual. But the actor may assign legitimacy to a social order, not because it is a traditional, institutional, or convenient order, but because he thinks that it is ethically valid in absolute terms. The norm for action is then chosen because it leads to salvation, or social reform, etc. We call that the

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[40]As in classic economic theory where the yardstick for legitimacy is the maximization of utility for the consumer, and of profits, for the producer.

utopian motivation for the assignment of legitimacy to an order. Success, then, is not even essential: the ultimate ends in the utopian action are such that the actor should only try to fulfill them, and end in martyrdom if necessary, the norm to select means being only a secondary ingredient of the action which justifies itself. Even the fruits of such action are to be looked upon with "holy indifference."[41] They are inexpressive, though, perhaps crucially important towards the highest good embodied in the ultimate end.[42]

18. In summary, there are five different types of motivations for an actor to accept a social order as legitimate:

a) the ontological motivation: in order to assign legitimacy to an order the actor must be in existence. The actor must exist in the first place, in order, then, to assign legitimacy to a social order in which he thinks that he will be able to realize his possibilities as a human being. As there is no such a thing as a fixed, absolute, categorial pattern for human realization, then, legitimate orders are as

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[41] As in Saint François de Sales' "sacré indifference pour les fruits de l'action," Traité de l'amour de Dieu, Guillaume Budé, Paris, 1932, Vol. IV, Book X, Sec. 1.

[42] Max Weber, op. cit., loc. cit., "Wertrational" as implied by "Gesinnungsethik."

numerous as there are human beings in existence. This is another way of affirming the inherent normativeness of human action based upon intentionality of consciousness. It must be stressed that the legitimacy of a social order is a quality imputed to the order by those acting in relation to it. Next there is

b) the historical motivation: within the infinite number of possibilities of human realization the existent actor is restricted by the historical circumstances in which he lives to a much narrower set of possibilities in which his human beingness would not be degraded or wasted. There are historical epochs in which the individual faces only ready made destinies. When traditional, ecclesiastical or aristocratic, dogmatism prevails, man is completely determined in some blueprint. In times of social mobility when many divergent conceptions of man coexist within the same empirical reality, such as during the Athenian democracy or the Renaissance, the actor faces the ordeal of choosing how he wishes himself to be. These historical possibilities the existence of which would be known to someone endowed with perfect

information about the actual situation is further narrowed to the set of possibilities for a choice of a norm of conduct which reach the actual knowledge of the actor. Thus,

c) the traditional motivation further restricts the choice of a norm to those which are approved by the group within which the action is going to take place. To someone born in the slums of Manchester a hundred years ago, or in the slums of Rome nineteen centuries ago, the possibilities of a choice of a norm of conduct was very narrow, indeed. Moreover, the quantity of information that may reach the actor about the possibilities of realization, or norms of conduct that are opened to him may be manipulated, or falsified, or restricted by the order itself in such a way that it acquires legitimacy from those living under it in a manner that does not expose the true situation of the actor. Thus, for instance, for the Roman galley slave or for the Manchester worker there was no information available about a better destiny than that to which they were subjected. There is no perceptible dividing line between the traditional and the institutional

motivation. On the other hand, legal sanction demarcates the field of the traditional or institutional from that of

d) the ideological motivation where the actor, when choosing a norm for action is in the privileged position of having the chance to choose between a number of alternatives that which is better for his self-interest. The criteria for the choice of the norm are rationalistic and positivistic. In this stage of legitimacy the actor is exhaustively explainable by the simple scheme of mechanics. Final success in reaching the end justifies the means taken towards that realization. Legitimacy is then assigned by the actor to that order which favors the unrestrained satisfaction of his desires, including that urge for power and domination, economic or political. This is the region of Darwinian sociology, of "cut-throat" free enterprise, etc. The ideological motivation, however, is not final. Being extremely intentional that motivation for the acceptance of an order always asks for some form of payment, in wealth, in political power, in security of office, etc. The ultimate motivation for legitimacy is

e) the utopian motivation. As the verification was seen as the dynamic element in the theoretical evolution of cognitive action (II,B,3), and the norm was seen as the dynamic element of the unit act (II,C,10) so, now, the concept of legitimate order is seen as the dynamic element of social change. The utopian message, when it overthrows the established ideology, undergoes itself a fundamental change. When an utopia is risen into office, it has to become institutionalized. This process of change of the legitimate order, from a revolutionary order to a legally valid order, may develop into one of two directions: it becomes institutionalized when a system of rules carries legitimacy from one phase to the other in the evolution of the order, such as in hereditary succession or constitutional substitution of the leader; and it becomes rationalized when it ossifies and routinizes into a system of rules of office. The essential point to emphasize here is that the legitimacy of an order springs from respect towards an established order, and that this legitimate order, once established gains legality by apostolic succession, revealed law, divine right or general will and consent.

19. Having shown the schema of social action, its order, and organization, its inherent stability based upon moral codes, and having shown, in detail, the foundations of legitimacy which lies at the core of social stability, we now turn to the consideration of two characteristic problems arising within the framework of social action: the examination of political action, and economic action. Political action gravitates around the question of how and to whom the means should be distributed in a social action. The economic action deals with the production, the consumption and the exchange of the results of social action. These two problems are preliminary to the detailed study of international economic action.

C. The social action function

1. Axiomatic summary of argument. It is perhaps convenient to head this section with a summary of our argument as it has been developed to this stage. In order for this summary to be as brief as possible we shall present it in axiomatic form.

a) A normative act is a set of non-normative acts. An action is a set of normative acts. A system of action is a set of non-normative actions subpartitioned into non-normative acts as subsets of the component actions leading to normative ultimate ends.

(1) The order of an act is the normative deliberateness by which the ultimate end is decided by the actor. The organization of an act is the particular ordering of non-normative acts linking the initial situation to the desired end. The norm of an act is the implementation of its organization in technological form.

(2) The order of an action is the ordering of its ultimate ends. The organization of an action is the ordering of the specific norms of its normative acts. The specific norm of a normative act is the predetermined plan for all non-normative choices occuring during the normative act.

(3) The order of a system of action is the ordering of the subsets of the ultimate ends belonging to each of its component actions. The organization of a system of action is the ordering of the subsets of the specific norm pertaining to each of its component actions. The general norm of a system of action is the

ordering of the subsets of the specific norms belonging to each of its component actions.

b) An order, an organization, and a norm will be stable when they fulfill the following two necessary and sufficient requirements: no element of the set dominates any other element of the set; any point outside the set must be dominated by at least one element within the set.

c) The norm of an act, the specific norms of an action, and the general norm of a system of action may be either

(1) non-social, when the actor, or the agent does not recognize the subjective interdependence of his act or action and the act or action of others; or

(2) social, when the actor or agent does so recognize subjective interdependence of action.

2. We shall now characterize the principal types of social norms. We have seen (III,A,10-12) that

d) the social order of an action is the ordering of its accepted ends for action; that the social organization of an action is the ordering

of the specific social norms of its normative acts; and that the specific social norm of a normative social act is the plan for the non-normative choices of means occurring during the act.

3. Specific social norms, as a subset of specific norms, may be sub-partitioned into two classes of specific social norms: political, and economic. The political order of a social action is called legislative order, and as such it is essentially normative. The political organization of a social action is called executive organization, and as such it is essentially administrative. The specific political norms of a social action is called judicial norm, and as such it is essentially technical, and juridical. The economic order of a social action is distributive of purchasing power, and as such it is subordinated to the political order which is distributive of coercive power. The economic organization of a social action deals with the production and consumption of purchasable or exchangeable means for action. The specific economic norm of a social action is the exchange of those means for action. Political norms are based on values as ultimate ends. Economic norms are based on tastes as intermediary ends to a further, ultimate end.

4. <u>The political and the economic norms of social action</u>. We have also seen that the result of every normative action depends upon the solution of three successively interdependent problems (III,A,9). The non-social, isolated, normative, individual or collective actor faces, firstly, the problem of arranging his ultimate ends in an order of priority of attention in accordance to preference. This is the "psychological" problem of determining one's own map of interests, wants, values, etc., the problem of "making up one's mind." Once this "psychological" problem is unambiguously solved, and hesitation is overcome by decision, the "economic " problem of allocating scarce means between various potential uses as alternative ends claiming satisfaction is also partly solved, since these means should then be allocated according to the adopted ordering of ends: then costs, as "sacrifice," are particularly considered by the isolated, non-social actor or agent. Moreover, the third problem, the "technological" problem, is also partly solved, since it becomes an inherently simple efficiency problem of maximization of ultimate end attainment with a minimum of cost or "sacrifice." We have also seen (III,B,3) how these three problems increase in complexity, and importance, in a social action schema. The social, normative, individual actor or agent faces, firstly, the "political" problem of placing his claims over

disposable, scarce means towards his own non-socially decided ends. Once the social actor has set his "psychological" problem, or has "made up his mind" on the proper ends to pursue, he may think either that if he tries to realize his own ends under the conditions given the satisfactory result will follow automatically, i.e., he may abstract the possibility of the encroaching influence of others; or he may take account of those actions. In the first alternative others may or may not do the same in relation to his actions. If they do the action will be a non-social action. If they do not, as it will be the case specially when, in the pursuance of his own ends the actor will encroach upon the action of others, then, his behavior will provoke resistances, and he will be obliged to recognize the interdependence of his action upon the actions of others, and then his action becomes social. In this case he will naturally consider employing the coercive means at his disposal to push his own claims to command over resources and services at the expense of identical claims of others. Once the possibility of employing coercion is introduced into the social action schema, a number of power relationships appear therein, such as force, fraud, exercise of authority, advantage of a better situation, greater shrewdness and foresight in securing voluntary agreements to exchange goods and services, etc. Then his action not

only becomes social, through subjective recognition of dependence, but it also becomes "political." We may define political action as a social action in which coercive means is used by at least one participant in the social action. We shall call political order that social order in which coercive power is distributed by legislative action, organized by executive action, and normalized by judiciary action. We shall denominate political norm the social norm of legal coercion.

5. We have already examined (III,B,16-19) the nature of the constraining social forces which control the exercise of coercive power by any one actor acting socially under a social order. Those constraining forces of usage, tradition, ideology, "charismatic" authority, etc., which translate a social order of ends or values, into a social organization as a set of possible, or approved, norms of conduct for the individual actor, will restrict his choice of specific norms in a way that the actor either takes these constraints as a morally neutral background for his action, i.e., as conditions to which he must adapt his action technically, or his attitude may be a moral one of acceptance of the order, and hence an obligation to live up to its standards, or of rejection, and hence a corresponding obligation to combat it. Anyhow, once it is decided by coercive means a certain allocation

of resources as well as the conditions under which that allocation is to take place, the next problem that the actor or agent must solve is that of the distribution of the scarce means that were in one way or another allocated to him between his own alternative ends. In a social action this allocation of means by the actor between his alternative ends is pursued with close consideration of cost sacrifice or "price." This "economic" problem to be faced by the social actor is simply that of choosing, among all possible ways of acting, the most efficient and adequate specific norm for selecting those disposable means towards ends as means to further ends in the non-normative chain of acts linking the situation to the desired end. Thus, after the economic order of the distribution of means is politically settled and economically recognized, production and consumption of utilities will be taken care of by economic action without inclusion of force, or other forms of coercion, since the economic action takes place under a social order and organization which are taken as given at the economic range of the social action. In summary: a framework of social constraints being accepted as the established or legitimate rules of behavior, the political system of power relationships is translated into a legal mechanism whereby a relatively stable settlement of those relationships is attained, making possible the functioning

of an economic system. Then, and only then, the social actor faces the "technological" problem of the implementation or execution of the adopted norm which has been sanctioned as viable by the social organization of specific norms under which it will become effective. Once an economic system is thus made possible then there will be opportunity for the development of the division of labor, i.e., after the coercive means have been limited, and a legal machinery has been set up to enforce these limitations, then, and only then, stable and regular processes of exchange are possible. It must never be forgotten that the solutions of the "political," the "economic," and the "technological" problem establish a hierarchy of norms of conduct whereby the social norm motivates the political norm without which it is not possible to develop an economic norm. The "technological" problem is a problem and not a specific norm: it may appear as jurisprudence at the political range of action, and as exchange at the economic range of action. Without subjective recognition of interdependence no political action is conceptually possible, and the alteration of the political process of distribution have immensely important consequences for concrete processes and techniques of exchange such as money, banking, credit, etc., through the alteration of the legal norms presiding

the social action in its economic form.[43]

6. These three problems which are faced with an increasing degree of complexity, by the actor in isolation, and then by the social actor within a group, are faced also by the agent as a group of actors, as a unit of action within a society. By society we mean a community of individual or collective agents which, in living and working together, recognize their mutual interdependence of action towards the attainment of their ends. This social action will be political when coercive means are used in action. The "political" problem becomes particularly acute when the social action of groups is considered. Again, the group of actors may try to realize its own ends under conditions given, or may use the coercive means available to it. The first type of action would have presupposed that the ultimate ends of the individuals composing the group, as well as the ultimate ends of the group itself in relation to other groups are set upon the exclusive basis of random, irrational, individualistic preferences and tastes: in this case there is, as an absolute condition for the order of action, the necessity to introduce into the analysis an external controlling agency, Reason,

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[43]It is impossible specifically to acknowledge our debt to the work of Hans Kelsen in this score. See Hans Kelsen, General Theory of Law and State, Harvard University Press, Cambridge, Mass., 1949, passim.

God, or the State, as "deus ex machina," standing in sovereign isolation outside the social action in question, and to which the social actor must adapt his action. The second type of behavior, that in which the actor or agent uses the coercive means at his disposal to attain his ultimate ends, would have presupposed that this norm for action is sanctioned by the order under which the action takes place, and, therefore, that the actor or agent is integrated within a common system which controls his use of coercive means and is recognized by the actor as authorized, competent, or legitimate, to exert that restrictive function. This postulate of the social actor's or agent's obedience to a certain social order that he deems as legitimate is based upon the philosophical premise of intentionality of consciousness which lies at the theoretical core of this thesis. One corollary of this premise is that, if action itself is normative, the ultimate ends for action are not decided by the actor or agent in an absolutely arbitrary or chance way. This means that the individual system of ultimate ends in a group action, as well as the collective system of ultimate ends in the action of a group within a society is necessarily a part of the organic totality of the action. Social action is, therefore, understood as "immanent,"[44] that is, founded

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[44]As frequently used by Prof. P. A. Sorokin.

upon the character of the society in which it takes place, or, in other words, every group action must conform, as protagonist or antagonist, to that set of norms of conduct that binds the group together, and which, in its turn, must regard the social order of the broader group of which it is a part either as morally neutral, or to be accepted as legitimate, or to be opposed as illegitimate. As in the case of the social actor, once this "political" problem is solved either as a social relationship of conflict,[45] or solidarity,[46] once more the "economic" problem will follow in the wake of the political action. If the political problem is solved as conflict, i.e., when the acting agent orients his action intentionally to carrying out his will against the resistance of other groups,[47] then the economic problem of production and consumption will be circumscribed to the group itself, and, in accordance with the degree of social cohesion of the group, it will either break up into intestinal conflict, or, again, it will develop into contract to carry out the norm of the group. In this case, the narrower group will become either isolated within the broader group and its action will resolve itself into non-socialness and collectivistic autarky, or

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[45]Max Weber's "Kampf."

[46]And "Vergemeinschaftung" or "Vergesellschaftung."

[47]Max Weber, op. cit., pp. 121-124.

it will be a focus of revolution and subversion within the broader group upon whose order it will try to impose its own legitimate order. In accordance with the economic system that will be established by the solution given by the group to its economic problem, the "technological" problem of the application of the adopted economic norm will be solved either as technological isolation, and self-sufficiency, technological aggression or imperialism, or, finally, as technological cooperation and division of labor within the larger group in which the action takes place. We shall now examine in detail these two types of social action, the political, and the economic.

7. Structural elements of political action. A social action becomes a politically oriented action when (a) though primarily pursuing ends which are not that of coercive power, takes account and uses coercive means as a chosen norm; (b) or when, although primarily directed to the attainment of coercive power makes use of physical force as a means to attain that objective. We wish to eliminate the use of force as a political means: the use of physical force shall be limited within the scope of this thesis to military action. As such, in a narrower acceptation, we shall define a political action, then, as a specific type of social action in which the individual or collective agent makes peaceful use of coercive power over

the actions of others as a means to attain or maintain the use of that coercive power as an ultimate end for the action.[48] Political action, then, may appear in the action schema of any group of actors or agents. We have already shown (III,A,4) how "political" action manifests itself as "psychological" action even within the individual actor, as for instance when a person controls the impulses of his collective "ego" by means of the coercive power of the sovereign authority of his "super-ego," which, in sanity, is considered as a legitimate order of action. When there is a group, of course, the psychological problem is taken as solved when it manifests itself as political action of certain participants over others. This political action may be extended to social or juridical persons such as families, corporations, and national states. Within all these groups political action plays a more or less important role. It would be an interesting matter, and a distinct contribution to economic and social thought to examine the "internal politics" of labor unions, of business management, of religious congregations, as well as of congresses and parliaments, etc. But we must focus our attention in this thesis to the political action as it appears in the schema of international economic action. And so we must

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[48]Max Weber, op. cit., sec. 32-36. Talcott Parsons, op. cit., footnote 1, p. 240. Karl Mannheim, op. cit., chap. III.

restrict ourselves to a brief approach to a treatment of political action within a national government.

8. We have defined society (III,C,6) as a group of persons who recognize the mutual interdependence of their actions when pursuing their individual ends. Theoretically, if this recognition of interdependence is extended to the totality of human beings, there is no reason why mankind should not be considered as one society in which, as John Donne has so beautifully expressed, "whenever bells toll they toll for thee." In practice, however, we find that human beings, when acting in ordinary life, consciously conceive their mutual interaction as much narrower. In fact, human beings can only easily recognize interdependence when there is a mutually valid structure of social action. It rarely occurs that these different structures may be interrelated between themselves, and, therefore, people living under each one of them are mutually interdependent. When, of course, interaction is recognized at the ontological level we may have a legitimate world order, such as that of an universal church, but usually, the social framework for action specifies a certain biological, traditional, institutional, and national setup thereby circumscribing narrower and narrower sets of rational, psychological, linguistic, political, usual, etc., uniformities of elements. Within these sets of social

relationships, when, not only interdependence is recognized, but also coercive power is regulated and used, we shall say that the society has been politically integrated. When the society in question is nationally integrated in a state, the supreme coercive power is then called national sovereignty, and the special collective agent which operates the national sovereignty in the name of the state is called government.[49] We shall now turn to the examination of the concept of sovereignty.

9. The essential point about sovereignty is that it is always possible to localize it as the established authority.[50] There is an accepted authority whenever there is action. But we must sometimes distinguish between the established authority under which an action takes place, and the agent or actor of an action. Within the social action schema we may interpret sovereignty as the social condition for action. Sovereignty connects conceptually the political action of the individual or collective agent to the exercise of legitimate authority. Sovereignty is the integrative factor by which the agent's system of norms for action becomes socially possible under a certain

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[49]On the problem of sovereignty see Harold J. Laski, The State in Theory and Practice, The Viking Press, New York, 1947, chap. I, and also Harold J. Laski, Studies in the Problem of Sovereignty, 1937, Oxford University Press, passim.

[50]Max Weber, op. cit., chap. III.

legitimate order. Sovereignty may be conceived, at the individual level, as the Freudian "super-ego," or as the Christian "conscience," or as the Confucian "yen"; or, at the family level, as the authority of the father, or that of the mother, or even that of the elders; or, at the corporation level, as the authority of ownership or management. In the state sovereignty may shift from one branch of the government to the other. In other words, sovereignty acquires different seats in different groups. It shifts in accordance with a certain trend of social change and historical evolution,[51] but it is always possible to identify it with the established authority. This identification, however, is not so easy as it sounds to be. In the case of national groups, for instance, sovereignty may be defined as the authority of the state in deciding about the means and ends for national action. At this level the matter becomes subject to confusion because the established authority is also the agent of the action. The state, which is the supreme authority endowed with sovereignty, is also the agent which decides the ultimate ends for national action, the distribution of political power and of economic power, under form of coercive and purchasing capacity. But since the state itself is nothing but a

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[51]James Burnham, The Managerial Revolution, John Day Co., New York, 1941, chap. V.

concept by postulation in political theory, sovereignty can only act by means of a human agent, that is, through existent actors or persons. We have already seen (III,C,8) that the body of persons which administer the affairs of the state is called the government. As such, the exercise of the supreme authority called sovereignty is circumscribed, in a state, to its government, and, within the government, to its branches. By thus defining government as the detentor of political power in the national level of action, i.e., as that body of persons whose function is to define, regulate, and distribute the use of coercive means in a national group, we are able theoretically to split the exercise of sovereignty between the legislative, the executive, and the judiciary. The legislative body would be entitled to deal with ultimate political ends of national action, i.e., to define the political order of a particular national society. The legislative deals with those events which are still in the process of becoming, in which, in individual cases, decisions have to be made about new and unique situations: it is the "irrational" matrix of sovereignty. The executive body, or the administration, deals with the organization of norms to which the politically defined social order gives rise, i.e., with those socio-political events which have acquired a set pattern and occur regularly, the "laufendes Staatsleben,"

the routine affairs of the state: the case in hand is to be disposed of in a manner similar to precedents that already exists:[52] it is the rationalized structure of sovereignty. The judiciary body deals with the implementation of those specific norms which, having been defined by the legislative, were promulgated by the executive: it is the "technological" matrix of sovereignty, if we have in mind that the legal technique is not exclusively logico-experimental or "scientific" but that it is also logico-transcendental or symbolical, i.e., "unscientific" if compared, for instance, to engineering technology: jurisprudence is a stereotype of traditionalism as well as of rationalism. The legislative, the executive, and the judiciary exert sovereign power in the name of the state. They are agents, or groups of actors, acting within the broader group called government.

10. It is a trend in political theory to place sovereignty upon the executive. This shift of the locus of sovereignty from the legislative to the executive is frequently explained by modern political thinkers[53] as a manifestation of the generalized tendency towards

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[52] Karl Mannheim, op. cit., p. 100. See also A. Schäffle, "Ueber den wissenschaftlichen Begriff der Politik," Zeitschrift für die gesamte Staatswissenschaften, Vol. 53, 1897.

[53] The "managerial" political thinkers.

rationalization of processes. At the limit, in dictatorships, the legislative is abolished altogether. For our own purposes here we must keep in mind that, wherever it may be placed within government, sovereignty never shifts over to the state itself, since this is only a concept which cannot act. So, the established authority in a state can never be distinguished in practice from the agent of state action. There is, of course, a theoretical distinction between the state and its government. In fact, in every state where legal rule has replaced arbitrary discretion as the basis for political action, the state must be distinguished from its government by the limitation placed upon the latter so to act that it pay proper respect to the ends for the accomplishment of which the state exists. Since, by definition, individuals live in society for the satisfaction of their values, tastes, interests, etc., and that society has been somehow integrated into a political order as a state, it has sometimes been said that the end of political action, that is, of state action is to accomplish "the greatest possible good for the greatest possible number." This, unhappily, cannot be achieved, since, as it seems, the proposition is based upon a misunderstanding. Political philosophers simply took <u>à la lettre</u> a political slogan which cannot be either justified or executed scientifically. They generalized for society

the special maximum problem of the non-social, isolated action of Robinson Crusoe. They did not see that even in the case of the isolated individual there is a "political" problem of the allocation of coercive power preceding the "economic" problem of the allocation of resources. Crusoe must make up his mind as to the legitimate authority of certain values over other values before falling back to the inherently simple question of the maximization of satisfaction with scarce and "resistant" resources. The political thinkers abstracted from their theory two very important variables in political action: subjective interdependence, and imperfection of information. It is precisely by these two variables that political action is most characteristically defined, as every politician clearly realizes since the time of Gorgias. From this point of view we may distinguish the function of the state as manifested in governmental action as distributive (a) of coercive power between citizens in order to attain maximum social utility for the collectivity,[54] and, then, (b) of purchasing power between citizens in order to increase the individual utility of each member of the collectivity.[55] Politically, the end of state action, i.e., of government

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[54]Vilfredo Pareto, Traité de Sociologie Générale, ed. by Pierre Boven, Payot et Cie., Paris, 1917-19, pp. 2128-46.

[55]Ibid., and Vilfedo Pareto, Manuel d'Économie Politique, Marcel Giard, Paris, 1927, pp. 617ff.

action is not the maximization of satisfaction of the "tastes" of all and each one of its citizens, but to select, for approval, those "values" which agree with the society's ideology. A written constitution, a bill of rights, the separation of power are "empty sets" as long as they are not filled up with those words which will change them into political instruments expressing the will of the state. But this expression is an act of a government, and it must be interpreted by a government, and by a government it will be regulated and implemented. The selection of "values" for acceptance is made by persons, and not by an exogenous authority external to society itself. And in that selection those persons cannot help but put themselves in it: they are included in the situation presented by the political problem of selection of values for adoption by legal sanction. The will of the state is in its laws, but it is government that gives substance and effect to their content. In a democracy government is responsible for the commission of acts beyond its allotted power: the coercive power of government is in its turn conditioned by the limits of the law, and it is the consent over whom government rules which, through voting, gives government the power to have its laws obeyed. This consent is the theoretical source of moral authority, i.e., of legitimacy of order, as it has been called in this thesis. This means

that the state never acts, but is acted for by those who have become competent to determine its policies.[56] We have already examined the various motives (III,B,16-18) that may impel an actor who is a citizen to assign legitimacy to an order. Except when there is a voluntary or involuntary, but perfect, and complete, coincidence of motivation, or will, interests, value judgments, and ultimate ends among all citizens of a national state, the only circumstance in which it is possible to maximize, at the same time, the social utility for a collectivity as well as the individual utility of each one of its members, there must be, and there will be latent or overt conflict of political values in a community. This conflict is peacefully settled by voting whereby a number of citizens will have their values sacrificed in order that the collectivity's ultimate ends or values be maximized. The government's competence then, i.e., the competence of its legal organization consists in the government's ability to operate successfully its coercive power. This means that some wants must go unsatisfied, and, then, that the successful operation of sovereignty is measured by the government's ability to coerce the opponents of the government, to dominate over their desired imputations, to break

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[56]Harold J. Laski, The Problem of Sovereignty, op. cit., pp. 27ff.

their will, to compel them to submission, either by the threat of force, or by the magesty of its moral authority, or simply by persuading those who were excluded from satisfaction that their "welfare" is better served by this exclusion.[57] This power of coercion, by force or persuasion, is a guarantee of the legitimacy of the established order against those individual orders that may attempt to discredit the established standards of behavior.

11. The problem of the justification of the established order in rational, logico-transcendental, or logico-experimental, terms is the critical problem that is being faced by modern governments throughout the world. The deistic, Platonic, rationalistic justifications for the legitimacy of the automatism of the market place, the neutrality of the laws, the sanctity of authority has been discredited by the doctrine of intentionality of consciousness in its philosophical, sociological, political, and economic form.[58] Every human action is "interested," and there is no mechanical automatism in the realm of human affairs. If the social order cannot be upheld by the deterministic law of causality, then it is because the

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[57]Harold J. Laski, The State in Theory and Practice, op. cit., p. 13.

[58]That is, "existential" or "phenomenological" philosophy; of "Soziologie des Wissens"; of Marxist "Klassenbewusstsein"; of the economic "partial equilibrium theory of value."

human will is free even to act in disharmony with its interests, values, etc. In terms of political theory this simply shifts sovereignty as the power to take decisions from the external authority of a State, or a Church, to the internal, specific authority of a body of men composing a government. If every human action is "interested" or intentional, then governmental actions are also intentional and "interested," and if that is the case, then why should government favor a group of citizens by disfavoring other groups. As long as discrimination was imposed from outside it was thought that it was the necessary result of some original sin or error that mankind itself had to bear the consequences. The moment that it was perceived not only that discrimination was man-made, but also that those who were discriminated could implement another order of things, then the problem of the justification of governmental action became particularly acute, and necessary. To intervene or not to intervene? To socialize monopolies, to control foreign trade, or to liberalize the market, to make merely the anti-trust gesture, and to drop those import licenses? The pros and contras are equally rational, therefore, epistemologically valid. There are always at least two different types of political action, two types of moral, one of which must be enforced, at the exclusion of the other, and hesitation cannot be prolonged beyond a

certain limit of human endurance. One action addresses itself to individuals: it aims at the hedonic satisfaction of their atomistically given, individual tastes; it is the solution of the liberal-democratic bourgeois thought, of classical economics, the libertarian, utilitarian, capitalistic solution. The other action is directed to the community; it aims at the maximization of social utility within a predetermined set of values; it is the egalitarian solution of the socialist-communist conception. In a democracy the issue should be set by voting, but then how should the citizen vote? If he votes in accordance to his own self-interest he must know that interest perfectly well, i.e., he must have complete information about his situation, because, if not, it may turn out that, by voting in accordance with his interests, the elector may very well be going against them. Democratic election is based upon the same type of fallacy as perfect competition. Indeed, how should the citizen vote? Religion points towards brotherly love, charity, self-sacrifice. But who should the citizen love? "What is he to Hecuba or Hecuba to him that he should weep for her?" To a government this is very clear. A government should favor those who will vote for the maintenance of that administration in power of office. Is that the monopolist, the farmer, the miner, the foreign exporter, the foreign producer, the foreign unemployed

worker? If foreigners are automatically excluded from the national ballot, then, to be consistent, the national economy should be closed to outside influences. What is the greatest utility for the collectivity as a whole? Which decision is most justifiable? The one that is vague, directed to a whole or to some symbol, or the one that is precise, and directed to a specific individual or group within the community? The Kantian moral will say never to treat a person as a means but always as an end. Thus, if government chooses not to crack on monopolies it is treating monopolies as an end and the rest of the community as a means. If, contrarywise, it protects the consumer, or labor, it is treating the consumer, or labor, as an end, and the producer, or management, as a means. Finally, the elector decides, or government itself decides, not even as a body of persons, and much less as the majority's opinion, but on the basis of the interests, sentiments, preferences, intuitions, of one or few individuals which then act as the agent of political action. But, in this case, who can ever forecast with precision the outcome of a political action? The particular person who will act as the leader, as the agent of that political action may be localized within a government or even outside of it, but even if he is so localized, who can figure out, <u>a priori</u>, the <u>value</u> of his sentiments, preferences,

etc.? The statesman can only say that he loves his brother farmer after helping to pass a bill granting parity prices to farmers. The value of his affection is defined by the act that defines it. There are, of course, other modes of orientation of political action. The statesman may not have an opinion before he votes in favor or against a certain proposed measure, and then, after voting he may construct his theory or organize his sentiments accordingly. Or he may take counsel from his economist adviser, or his political expert, but the moment he chooses whom to consult he has already the answer he is willing to hear.

12. In summary, we may say that, in the realm of political action, the changes in the values of the variables are such that they favor the interests of some individuals and injure that of others.[59] Such differences of treatment are sanctioned by the acts of public authority which enforces them by coercion, based upon force and persuasion. However, in order to acquire legitimacy, government must justify its acts in terms that it is "good" for the community, although it may be detrimental to the interests of some of its members. By force or persuasion, or both, a government must always dominate over any possible nonconformist coalision of those that have been sacrificed,

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[59]Vilfredo Pareto, op. cit., loc. cit. Political action is a "zero sum game" in John von Neumann and Oskar Morgenstern, op. cit., p. 504, footnote 1.

and are able to implement the coalision in an effective way; it must dominate by "charismatic" magesty, by power of persuasion, or by police enforcement. The political acts of a government must conform with the distributive standards in terms of which the authority is operating. To the scientific observer they appear arbitrary, and randomized. But an empirical society could not subsist upon such basis. In fact, unscientific considerations exist that render more or less homogeneous the individual organizations of norms of behavior. These unscientific considerations are the common system of ultimate ends that a society, as a unity, pursues as a sui generis organic entity endowed with historical or physiogomic meaning. This has certain important implications for the ultimate end systems of the individuals who are the participants in the actions of that society, for once the concept of end is understood as a subjective category, the end of a society can only mean the system of ends that is common to the members of the society in question. This gives a key to the meaning of expressions such as distributive justice, legitimate authority, consent, etc., in the integration of these individual organizations of norms within an established, existent, factual social order. Except, of course, in some limiting cases, social integration is never complete, i.e., conflict of interests is always

latent or overt. The point that should be emphasized in this summary is that political action can never be exhaustively analyzed by the observation of the behavior of its member actors in social isolation. There must always be a social order to make the resultant political action a determinate system, in the same way that there must exist a political organization to determine a specific economic system operating within it in a stable way.

13. Institutional elements of economic action. In the actions or activities of everyday life we need, or believe we need, particular goods and services as means to our ultimate ends. Thus, our intentions permit us to capture the meaning of goods and services as something useful, as utilities.[60] From the subjective point of view, then, usefulness is not only a characteristic of utilities, but their very essence. To a Trobriand Islander a radio is many things, except, perhaps, what it is to an expert radioman, but this does not prevent the radio to be useful to the Trobriander, as an idol, for instance, for only when we use a good or a service, or when we believe we know how to use a good or a service, do we perceive an utility in the object or persons that happen to be merely present. Thus a piece of yellowish, greasy paste becomes butter on

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[60]For this philosophical interpretation of economic utility see Alberto Wagner de Reyna, La Ontologia Fundamental de Heidegger, Editorial Losada, S. A., Buenos Aires, 1939, chap. 10.

our breakfast table, and that man there, who may happen to be our brother, is captured by our consciousness as a skilled plumber repairing our kitchen sink. By utility, therefore, we shall understand a particular and concrete, real or imaginary advantage the necessity of which is estimated, and the satisfaction of the desire for which is sought, as a means for present or future use, by one or more acting individuals.[61] The controllable elements of a situation, that is, its means, acquire an economic aspect, that is, economic utility, when, by having been made, through scarcity, an object of desire, they have been chosen or selected as useful to the attainment of a certain end among other alternative, not indifferent, ends. Thus, any action, social or non-social, political, military, affective, cognitive, positive or normative, technological as well as teleological, become economically oriented when (a), though primarily pursuing non-economic advantages, takes account of the necessity for economic prudence in the choice of scarce means capable of alterative, not not indifferent, applications; or (b) when, although primarily directed to the acquisition of economic utilities, makes use of force or coercion as a means to attain that objective.[62] We wish to eliminate the use of force from

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[61]Max Weber, op. cit., pp. 145, 151.

[62]Ibid., pp. 135, 146. Lionel Robbins, An Essay on
(Continued)

economic action. We shall however reserve the term economic action to designate the peaceful use of the agent's control over means, involving a conscious, primary orientation to economic considerations. Thus, the achievement of a program of armaments, although being a projected exercise of force, will be understood as an economic action insofar as it involves a peaceful provision for the means, and aims at success as an economic organization for war. On the other hand, the act of a burglar, in obtaining by threat of death the victim's purse, shall not be called an economic action but at most a military action economically oriented. As political action involved legislative, executive, and judiciary acts, or political order, organization, and technique (III,C,9), so economic action involves an economic order of distribution of purchasing power, an economic organization of production and consumption, and an economic technique of exchange. The theoretical study of economic action, i.e., economic analysis, takes as given the results of the political action. An economic order, or the distribution of purchasing power, is determined by the social, political, legal, and institutional framework under which the economic order operates. This economic

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the Nature and Significance of Economic Science, Macmillan and Co., London, 1946, p. 14. And part II of this thesis, where the definitions of positive as well as normative science is examined more closely.

order, in its turn, determines the distribution of the economic means for production and consumption, that is, the economic organization to prevail in the economic system. Finally, the economic organization, by defining the schedules of supply and demand, constrains by the imposition of a cost the domain of exchange, i.e., determines the relative rates of exchange between which technological choices are economically possible. Thus, the range of economic studies is delimited at one extreme by political variables taken as parameters, and at the other extreme by technical variables selected by considerations of cost. The proper field of normative economics, also called theory of economic policy, or, more broadly, political economy, is the study of the economic effects of political decisions upon the distribution, production and consumption, and exchange of utilities as goods and services. Normative economics are only possible if we have some kind of economic theory by which it is possible to grasp the economic meaning of the concrete facts of empirical reality. This body of abstract, theoretical propositions is called "pure" or positive economics which, then, may be defined as the study of the laws of casuality linking the empirical phenomena of an economic reality into a theoretically closed economic system. Positive economics aims at forecasting what will supervene if the predictable trends of a

certain situation are allowed to take their course without active intervention, and normative economics aims at determining what will happen as a result if active intervention is allowed to manipulate the variables of the economic system presented by the initial situation. Both are rational and theoretical, and both are ideological, but the economic system studied by positive economics is autonomous, whereas that which is the proper field of normative economics is heteronomous. Positive economics takes the economic system as a given economic order established as if upon the authority of the collective economic agent who pursues the economic action. Normative economics takes the economic system as an economic organization under the authority of outsiders. Applied economics takes as given not only a certain economic organization but also an economic order. It aims at knowing how action should be oriented, or what means should be chosen, in order to realize or approach a predetermined state of affairs which differs, in whole or in part, from that which will probably occur without active intervention. Applied economics may also be called economic planning, or, more broadly, economic technology. Its proper fields are the various techniques of central banking, rationing, taxation, labor legislation, commodity agreements, collective bargaining, anti-trust legislation and measures, etc.

14. The political superstructure of social action determines the basic parameters of the economic system to be adopted in the economic range of the social action function. The legal system, as enforced by the state, is one of the main constraints placed upon the economic system by the political system. In order to visualize this structure of hieranchical actions it is perhaps convenient to illustrate the concept of economic action as subordinate to a political action structure by means of a brief examination of one of the two typical, rigid systems of normative economics: capitalism, and socialism. Let us extricate from the enormous volume of data (a) the political, and juridic constants that are placed upon the economic order of capitalism; (b) then, let us examine, statically and dynamically, the operation of the positive system working under these normative constraints; (c) let us circumscribe the results of this economic system operating under these political and legal parameters; (d) finally, let us appraise the theory of anti-trust policy as a normative measure of applied economics, or a legal norm for effective competition.

15. Capitalism, as a system of economic policy, is upheld (a) by an interpretation of history based on progress; (b) by the juridical doctrine of "natural rights," and private property; (c) by the ideology of individual

responsibility based on the philosophical notion of utilitarianism and private initiative; (d) by the political institution of the sovereign national state; (e) and by the economic principles of production for profit, of consumption for utility, and of exchange based upon division of labor.[63] It is assumed that (a) if the individual citizen obeys, in action, exclusively to impulses of personal interest; (b) if the pursuance of personal interests guides the individual to the maximization of his satisfaction through attainment of his ends with a minimum of effort or sacrifice; (c) and if the social value of production is proportional to the social utility of the product; then the individual spontaneously directs his economic activity towards the obtention of the maximum social utility for the product, and thereby provides for society at the same time that he best attends to his own interests. This closes the system by making it realize, simultaneously, the maximum satisfaction of the individual and the maximum social utility for the collectivity. We have already seen (III,C,10) that, except in perfectly well integrated communities, such as the Calvinists of Geneva in Calvin's own time, this coincidence does not

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[63]Etienne Antonelli, L'Économie Pure du Capitalisme, Marcel Riviere et Cie., Paris, 1939, pp. 73-83, 271-387. Joseph A. Schumpeter, Capitalism, Socialism, and Democracy, Harper and Bros., New York, 1947, chap. XI.

obtain. But the legal system of the capitalistic society, enforced by the state, maintained this general economic structure as corresponding, in the economic range of social action, to that of distributive justice in the political realm: it was a matter of simple justice that the individual, as the atom of the social group, be considered responsible for the efficacy and adequacy of his economic activity; it is also a matter of justice that the individual, who gives utility, not merely work, to society, be able to take from society advantages which are proportional to his contribution in utility. Thus, in the capitalistic society, distributive justice and private property, were exhaustively justified by private responsibility. And thus, a political structure based upon individual responsibility, private property, and power equivalence in exchange, determined unambiguously a stable economic structure corresponding to perfect competition.

16. The moment, however, than an obstacle was placed in such a way that it prevented the normal work of at least one of this fundamental principles, the whole mechanism would become jammed. These "impurities" could be inequality of personal capacities, disequilibrium of economic power, uneven political power relationships, social position, ignorance, immobility of factors, decreasing costs, etc. And under "impure" competition the

individual could not longer, with justice, be considered responsible for acts which were not his acts. The moment, for instance, that private property originated from other sources than the individual contribution of utility to society, i.e., once property could be acquired by violence, coercion, fraud, or any other extra-market activity, static equilibrium could not be obtained upon the basis of the declared, theoretical, economic order. Equivalence of power in exchange requires the fulfilment of some essential conditions: the participants must command over a certain amount of purchasing power in order that their demand for commodities be effective; the individual must dispose of means to satisfy his own needs; and commodities must be scarce to have exchange value, i.e., to command over a price. Finally, it is assumed that the individuals who are parties in an exchange be juridically free, that is, not subject to mutual coercion of any kind, and, indeed, of no influence of one over the other. This last condition is simply a denial of the definition of economic action as a social action which is proposed in this thesis.

17. These are the ideological foundations of capitalism as seen from a static point of view. We shall now extend our illustration of the political constraints placed upon economic action in a certain typical system of economic policy, by considering these interrelations

from a dynamic point of view. Here, again, individualism is basic: the economic actor is responsible for the economic activity of the society in which he is living. In economic statics it is the institution of private property, defined as the right to dispose of property legally acquired, that results from the principle of individual responsibility. In economic dynamics it is also the juridical institution of private property that expresses the individualistic principle, but now through a new characteristic: that of perpetuity of property.[64] Private property is not only absolute, but it is also perpetual, i.e., the power of alienation is an inherent attribute of the property itself.[65] The individual perpetuates himself through the institution of succession. In economic statics, the economic actor accepts as legitimate the responsibility resulting from the application of the individualistic principle to economic activity moved by the pursuance of private interest: the juridical institution of bankruptcy proceedings shows, empirically, that the principle is still considered legitimate. But, as in economic statics personal interest was applied to immediate

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[64]J. Peritch, Les Conceptions Sociales dans le Droit de Succession "Ab Intestat" Academies des Sciences Morales et Politiques, Pris, May-June, 1935, p. 428.

[65]W. R. Vance, "Alienation of Property," Encyclopaedia of Social Sciences, ed. Edwin R. A. Seligman, Macmillan Co., 1948, Vol. 1, pp. 639-641.

needs, in economic dynamics it takes the less definite form of anxiety over the future, of need for security, or of expectation regarding the realization of possibilities. This forces the individual to take account of the actions of others, or, in our own terms, it introduces subjective dependence in the atomistic working of the system. As in economic statics private property gives rise to division of labor and exchange, in economic dynamics it gives rise to the business enterprise, and credit, and also money as a holder of rights on future values.[66] As long as it is a matter for the economic actor to obtain a profit from a production for which there is already a demand in the market, as it was the case with the medieval artisan, i.e., as long as the conditions of production were validly considered as constants in the static system, there was no need for the producer to forecast a future consumption in a probable market. The entrepreneur appeared, between the artisan and the consumer, to fill up this coordinating and forecasting function. Then, later on, within the business enterprise itself, the entrepreneur becomes the owner, a business man, and entrepreneurship ceases to be a gift, a "charismatic" endowment, and becomes a function, a

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[66]On the function of the entrepreneur see Marcel Porte, Entrepreneurs and Profits Industriels, 1901; Joseph A. Schumpeter, "Der Unternehmer," in the Handwörterbuch der Staatswissenschaften, Iena, 1928, Vol. VIII; E. Schwiedland, Zur Soziologie des Unternehmers, Leipzig, 1933.

routinized, administrative affair. The place of the entrepreneur, as the owner, is taken over by the management, an indistinct body of men presided by an executive equally indistinguishable in the bureaucratic organization of the enterprise. But where the role of the entrepreneur has lost in importance as a dynamic factor in the capitalistic system bank credit has maintained its former preponderance. As money is a symbol of a property right over a thing, credit is a symbol of a symbol, and the thing itself over which the transaction is based may very well never come to existence: rights are created, are transmitted, and are cancelled without consideration for the object to which they refer.[67] Thus, individual responsibility, private and perpetual property, personal interests, profits and gains, determine in the economic range of social action the establishment and maintenance of two basic capitalistic institutions: the business enterprise, and bank credit. This, again, is a matter of distributive justice. It is a matter of justice that the individual who is the prime mover of the economic system get all its profits and advantages. However, and once more, any obstacle to the proper function of the system blocks its normal performance.

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[67]On the role of credit in capitalism see Jacques Rueff, L'Ordre Social, Librairie de Médicis, Paris, 1948; R. G. Hawtrey, Currency and Credit, Longmans, Green and Co., London, 1950; G. Haberler, Properity and Depression, United Nations, Lake Success, 1946, chap. 2.

Some of these obstacles are exogenous, and some endogenous. The exogenous obstacles are social, historical, ideological, or utopian in character. As for the endogenous obstacles they are many, and we shall limit ourselves to point out a few of the more important ones: (a) there is no perfect accord between the individual consumer living in the present, statically, and the individual producer living in the future, dynamically; (b) individual initiatives are uncoordinated in production: it is easy to demonstrate that inefficient producers must disappear, but in reality they continue to fight for their survival as producers, and may very well succeed in doing so; (c) the impact of innovations is also uncoordinated; the institution of patent rights refers to an obsolete economic reality, and is quite incoherent in the modern framework of full employment policy; (d) decreasing costs resulting from technological economies of mass production invite coalitions to market control by restriction of output.

18. State non-interventionism promoted a concentration of wealth that a growing dispersion of political power could not tolerate. On the other hand the increasing intensity of the so called "capitalistic crises" pressed legislatures for social control of industry. Antitrust action appeared as a compromise which would satisfy the community without damaging too much the basic principles of capitalism. The

term "effective competition" was coined to mean a dynamic market situation[68] which, once it is given a certain accepted standard of behavior based on some preconceived principles of social purpose, is characterized by a solution of the conflict between a government's attempt at obtaining the highest gain for the community or for a group within the community that its administration can enforce without being overthrown by revolution or defeat at the polls, and the highest gain that private business can realize without being punished by law. Thus, in most capitalistic countries, governments were bound by political and social necessity to curb the tactics of those upon whom the economic system was based. Antitrust legislation resulted in a paradoxical compromise. Competition in law means free competition and designates a standard of ethical value,[69] it is a normative concept of economic policy which, as a future and desired state of affairs must differ from what is, in fact, the case. On the other hand, competition in economics means pure or impure competition and describes deductively formulated market

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[68] J. M. Clark, "Towards a Concept of Workable Competition," in Readings in the Social Control of Industry, Philadelphia, 1947, pp. 452-475.

[69] M. A. Adelman, "Effective Competition and the Antitrust Laws," in Harvard Law Review, September, 1948, p. 1289. E. S. Mason, "Monopoly in Law and Economics," in Readings in the Social Control of Industry, Philadelphia, 1947, pp. 25-47.

situations under certain postulated conditions, they are terms of positive economic theory whereas free competition is already a statement of ends, which, in order to serve as a standard of evaluation, must hold for the judge as well as for the defendant. In order to justify antitrust legislation capitalistic governments had to refer to the advantages of a market situation which obliged governments to enact antitrust laws, i.e., they attempted at remedying the evils of free capitalistic enterprise by depriving it of some of its freedom. The juridic prop of the "rule of reason" did not solve the dilemma: reasonable economic behavior for the judge is not identical with rational economic behavior for the monopolist. The identification of reasonableness with rationality resulted in that no monopolist is to be condemned by judicial action simply because he is what he ought to be.

19. Having, thus, illustrated to the extent that such a digression may be permissible within the narrow scope of this thesis the structure of social action as a hierarchically arranged system of political and economic actions, each one of which manifests itself by means of normative, positive, and technological acts, we must now turn our attention to the precise formulation of the social action as a function, as well as of its variables, and the general and special conditions for maxima. This formulation is of capital importance in this study, since it will relate the structure of

social action as it has been developed to this point, to the concept of national economic action as an element in the system of international economic action, which is the objective of this thesis.

20. Formal characterization of the social action function. We define social action function as a relation which for each individual organization of specific norms, states a corresponding social order of norms for individual behavior.[70] This general definition will be extensively qualified later in this thesis, but for our purposes now this is sufficient. As indicated by the formulations (32) and (33), this correspondence may be represented in matric notation[71] as follows:

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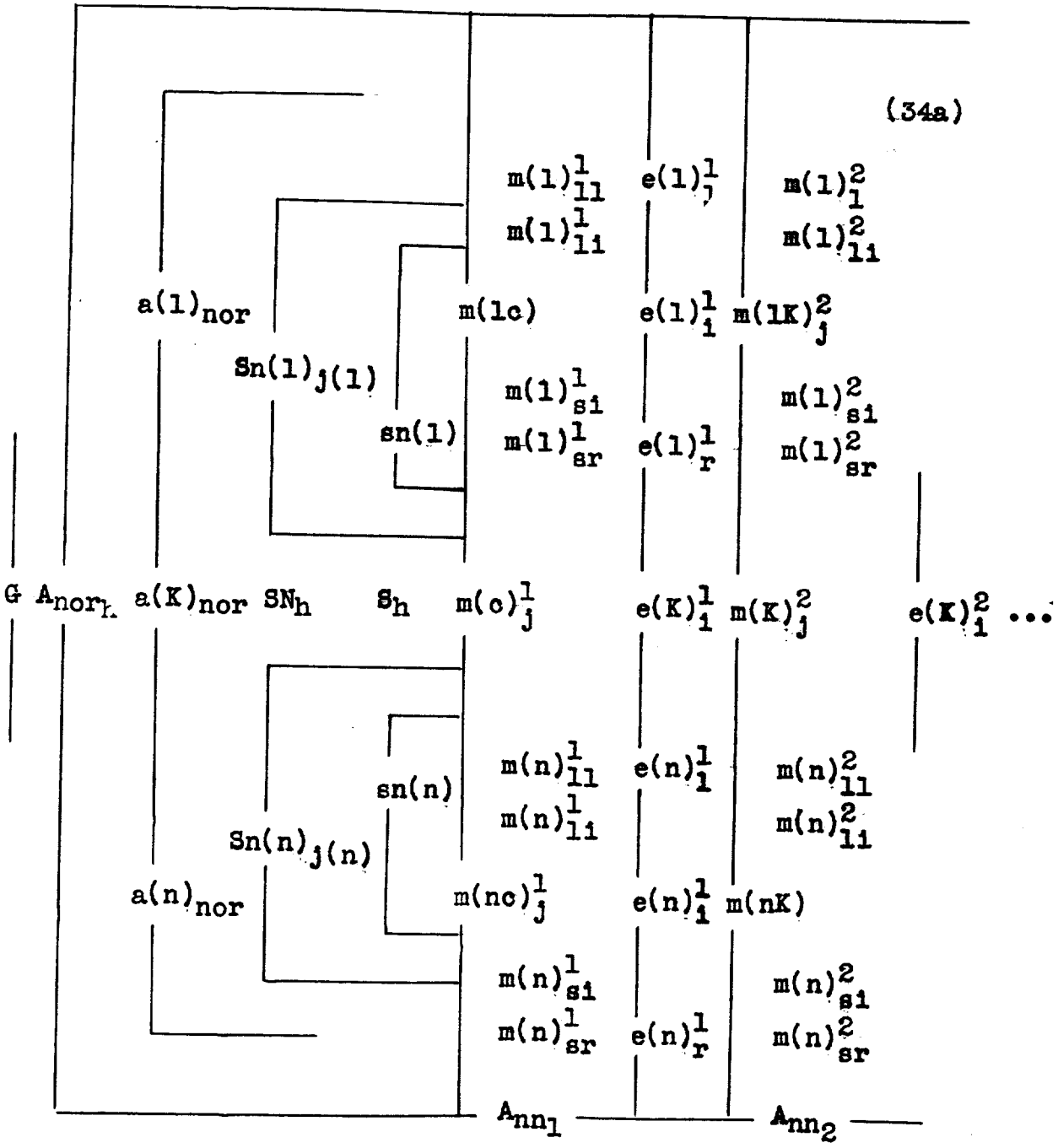
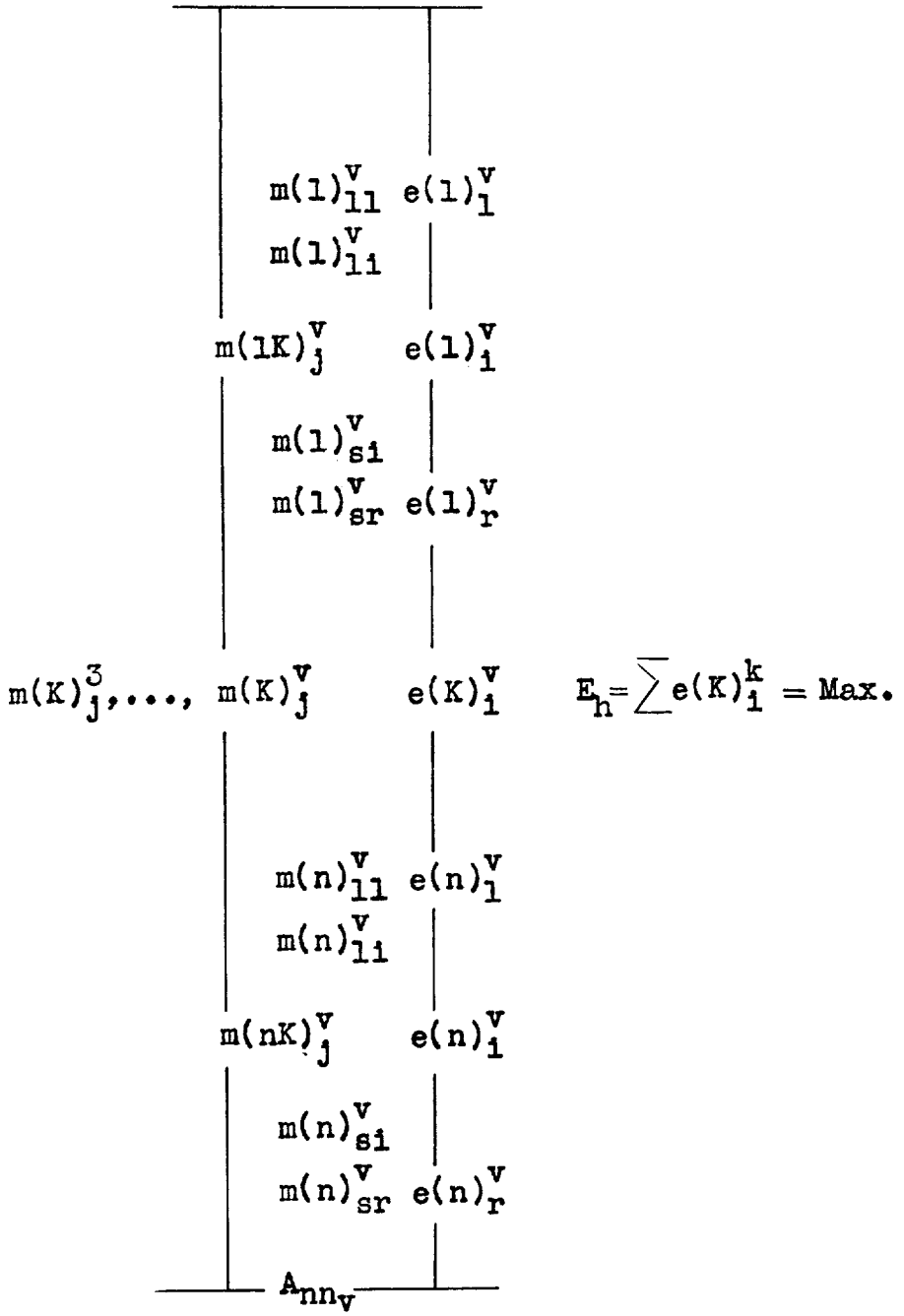
[70]For a similar concept see Kenneth J. Arrow, "A Difficulty in the Concept of Social Welfare", Journal of Political Economy, August 1950, vol. LVIII, n. 4, p. 335 and passim; idem, Social Choice and Individual Values, Cowles Commission Monograph 12, John Wiley, New York, 1951, ch. III. This concept resembles that of social welfare function, but it is not identical with it, nor is it an useless duplication of a well defined and accepted concept in the economic theory of welfare. The differences will be made explicit in the last part of this study.

[71]George B. Dantzig, "Programming of Interdependent Activities - II Mathematical Model", Econometrica, July-October 1949; idem, Programming in a Linear Structure, United States Air Force, February 1948; Wassily W. Leontief, "Computational Problems Arising in Connection with Economic Analysis of Inter Industrial Relationships", Proceedings of a Symposium on Large Scale Digital Computers, Harvard University Press, Cambridge, Mass., 1948.

(34a)


$m(1)^1_{11}$ $e(1)^1_j$ $m(1)^2_1$
$m(1)^1_{1i}$ $m(1)^2_{1i}$
$a(1)_{nor}$ $m(1c)$ $e(1)^1_i$ $m(1K)^2_j$
$Sn(1)_{j(1)}$ $m(1)^1_{si}$ $m(1)^2_{si}$
$sn(1)$ $m(1)^1_{sr}$ $e(1)^1_r$ $m(1)^2_{sr}$
G A_{nor_k} $a(K)_{nor}$ SN_h S_h $m(c)^1_j$ $e(K)^1_i$ $m(K)^2_j$ $e(K)^2_1$ ...
$m(n)^1_{11}$ $e(n)^1_1$ $m(n)^2_{11}$
$sn(n)$ $m(n)^1_{1i}$ $m(n)^2_{1i}$
$Sn(n)_{j(n)}$
$a(n)_{nor}$ $m(nc)^1_j$ $e(n)^1_i$ $m(nK)$
$m(n)^1_{si}$ $m(n)^2_{si}$
$m(n)^1_{sr}$ $e(n)^1_r$ $m(n)^2_{sr}$
A_{nn_1} A_{nn_2}

(34b)



based upon the following assumptions:

a) there is a set G, identical to the set G in formulation (32a, 32b), consisting in a set of normative actions of a collective agent g, any one of

which, A_{nor_h}, h=1,...., z, is in its turn a set of normative acts, $a(1)_{nor}$,....,$a(1)_{nor}$. These normative acts, $a(K)_{nor}$, K=1,...., n, develop themselves through discrete non-normative actions, A_{nn_1},...., A_{nn_v}. The magnitudes of these intermediary, non-normative actions may be specified either as continuous over the time involved, or as discrete time periods, this latter alternative being the one that is adopted here. These schedules of non-normative actions, A_{nn_k}, k=1,...., v, are intermediary stages or states of affairs, or merely sections of the social action function, through which a collective actor or an agent moves from one initial state of affairs or situation to some specifically defined objective as a final set of ultimate ends.

b) Any one of these normative acts, $a(K)_{nor}$, K=1,...., n, consists, as in formulation (33), of possible specific norms for action, $Sn(1)_{j(1)}$,...., $Sn(n)_{j(n)}$, any one of which, $Sn(K)_{j(K)}$, K=1,...., n, j=1,...., u, is the normative actor K's ordering of norms of behavior, i.e., his normative organization for action. These individual ordering of norms of behavior are assumed to be the elements of the partition SN_h, h=1,...., z, which is the

legitimate social, political, and economic order under which the action in question, A_{nor_h}, takes place (III,C,7,13). The partition SN_h includes all these socially imposed, economic and political constraints placed over the individual ordering of norms of behavior.

c) Out of $Sn(K)_{j(K)}$, $K=1,\ldots, n$, $j=1,\ldots, u$, the normative actor K chooses the specific norm, $sn(K)$, with the guidance of which he will pursue the particular act, $a(K)_{nor}$, in which he is engaged at the moment of the action A_{nor_h}. It is also assumed that these various $sn(1),\ldots, sn(n)$ consist in particularized plans to carry out the selection of means when the occasion for this selection comes up along the means-end sequence linking the initial situation, S_h, to the ultimate end, E_h. These means and ends will generically consist of "commodities," resources, goods and services, leisure, money funds, stocks and savings, etc., that is to say, "utilities," objects of desire.

d) Each normative act, $a(K)_{nor}$, $K=1,\ldots, n$, has a characteristic flow of commodities, which is cumulative at each non-normative action, A_{nn_k}, $k=1,\ldots v$, and additive between any two consecutive non-normative actions. These utilities or commodities

are measured in terms of quantities of each commodity type used, produced, or consumed, which are functions of the magnitude of the non-normative action through which they flow towards the ultimate end. The action is social because the participants are interdependent in their normative acts, $\underline{a(1)_{nor}}$,..., $\underline{a(n)_{nor}}$, because they share a limited amount of commodity, as means or intermediary ends.

e) At each non-normative action, $\underline{A_{nn_k}}$, $\underline{k}$=1,..., $\underline{v}$, the flow of commodities is characterized by an imput coefficient $\underline{m(1c)^1_j}$, $\underline{m(1K)^2_j}$,... $\underline{m(1K)^v_j}$,...; $m(nc)^1_j$, $\underline{m(nK)^2_j}$,..., $\underline{m(nK)^v_j}$, where $\underline{m}$ denotes means; 1,... $\underline{n}$, denotes the number of normative participant actors K, the first symbol between the parenthesis indicating the "owner" of the means, and the second symbol the origin of the means; $\underline{c}$ denotes the conditions where the actor is "nature," or the result of exogenous activities flowing into the action $\underline{A_{nor_h}}$ at the moment of its initiation as a datum of its situation.

f) Within each non-normative action, $\underline{A_{nn_k}}$, there are implicit transformation curves changing means into intermediary or final ends. Those are production functions which may be characterized by

coefficients of flow of any commodity i=1,..., r. The first subscript in each argument $\underline{m(K)}^{k}_{ji}$ of the production function denotes the type of the means, j=1,..., s; and the second subscript, i=1,..., r, the commodity to which it is applied. If the means are taken to be input coefficients, the resulting $\underline{e(K)}^{k}_{i}$ will of course denote the unit of output, or output coefficient, at the non-normative action $\underline{Ann}_{k}$, $\underline{k}$=1,..., $\underline{v}$.

g) Between two consecutive non-normative actions, $\underline{A}_{nn_k}$, $\underline{Ann}_{k}$ + 1, there are the supply schedules of any commodity $\underline{i}$=1,..., $\underline{r}$, as an intermediary end, $\underline{e(K)}^{k}_{i}$, and the demand schedules for imputs, $\underline{m(K)}^{k+1}_{j}$, $\underline{j}$=1,..., $\underline{s}$ denoting the kind of the imput needed, and $\underline{K}$=1,..., $\underline{n}$ denoting the actor demanding it to apply in his own production functions. The technological problem involved in any action is to determine that course of action, plan or program, which will most fully accomplish the predetermined objectives (maximization of ultimate ends) without exceeding or infringing stated limitations (minimization of means or resources). Thus, the configuration (34a and 34b) takes place of a large system of simultaneous equations developed dynamically along time.[72] It

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[72]John von Neumann, "A Model of General Economic Equilibrium," Review of Economic Studies, vol. 13 (1), n. 33, 1945-46, pp. 1-9.

is assumed, of course, that the participants know precisely what they want.

21. In summary, this normative social action, A_{nor_h}, $h=1,\ldots,z$, is defined by the ultimate social objective at which it aims as a normative action, hence the selection of means $m(K)^k_j$, by any actor $K=1,\ldots,n$, at any intermediary non-normative action, among s possible means, $j=1,\ldots,s$, are made to depend on the maximization of a social action function, and at a minimization of means to reach that end. As a program, the contemplated action consists in a set of legal norms guaranteeing the legitimacy of a structure of prices, for in SN_h a legitimate price establishing mechanism (whatever it may be) is also included among the socio-juridical conditions of action.[73] In these circumstances it does not seem at all unrealistic to assume that the actors, before "contracting" for action, have eliminated all possible "psychological" hesitation, or "political" conflict remaining to be settled. In other words, for such an ideal type of social action as formulated above, A_{nor_h}, it is assumed that the integration of individual ends is complete, although it may be disagreement and division of opinion about values involved in some other possible action which is not the particular action contemplated in formulation (34).

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[73] "A legal norm is the legal stipulation of a sanction." Hans Kelsen, op. cit., pp. 45 ff.

22. Is such a social action possible? Is it possible to translate individual ordering of values into a social order? We have met this question already under the name of "utilitarian dilemma": individual preferences when atomistically brought together in social action tend to break down into permanent, Hobbesian conflict, and, then, the only way to introduce order, or equilibrium, in the system, is by subjecting the social action to the authority of an outside agency, i.e., by dictatorial imposition. This may be illustrated by the well known "paradox of voting":[74] if individual A prefers x to y, and y to z, and therefore x to z; if B prefers y to z, and z to x, and therefore y to x; if C prefers z to x, and x to y, and therefore z to y; then a majority prefers x to y, and a majority prefers y to z, and a majority prefers z to x: so that the method for passing from individual to collective decisions (voting) fails to satisfy the conditions of rationality. Any social order, then would be either imposed or dictatorial: either the individual chooses freely, and the action breaks down into conflict, or he does not choose freely, and there will be order, but the individual is not choosing at all, and the order is dictatorial. The way out of this dilemma is to assume, as we did in this study, that the individual organization of specific norms of

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[74] Kenneth J. Arrow, op. cit., passim.

behavior must satisfy certain requirements in order to be capable of translation into a social order. This conforms literally with Barone declaring that the ultimate value judgments that will make a "social welfare function" determinate are set in accordance with some ethical preference, or, as Pareto says, "d'accord avec la norme qu'il plaira d'adopter."

23. The general assumptions may be summarized in two headings: (a) political: there must be a socially accepted order of "distributive justice" in any given social action structure; this refers to value judgments; and (b) economic: if everybody is at least as well off, and one person is better off in one social state of affairs than at another, then the first social state is better than the second; this is a matter of taste. Politically it is impossible to allocate coercive power in such a way that the gain of one participant be not the loss of another; there may be, then, a maximum of social utility for the collectivity as a whole, but not for each individual simultaneously. Economically it is possible to increase individual utility to each member of the collectivity, but a maximum cannot be reached as long as individual utilities cannot be compared and added together.[75]

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[75] Vilfredo Pareto, Traité de Sociologie Générale, op. cit., pp. 2128-9.

24. In closing this section on the theory and structure of social action we shall like to outline the substance of what is to come in the remainder of this work. We intend to apply this structure of social action to the international economic action of countries engaged in trade and in capital transactions. This will be divided into two more sections. In the next section we shall apply the structure of social action as above outlined to the building of a model describing the international channels of propagation of business cycles in an international capitalistic system. That is to say, we shall analyze the international economic order in terms of a few socio-politico-economic variables, in order to deduce from their behavior a set of norms for international economic action. In the last section we shall intellectually experiment with these norms, within the context of deliberate organization, in order to see whether there is a theoretical possibility of successful application of these norms to contemporary international economic situation.

IV. THE POSITIVE THEORY OF INTERNATIONAL ECONOMIC ORDER

A. Characterization of a typical national economy

1. Retrospect and perspective. In the preceding section we have detailed a conception of the structure of social action underlying national economic systems. Although we have not specifically dealt with the central subject of this thesis, i.e., international economic action, we expect to have been able to expound the sociological background on which a positive as well as normative theory of international economic order and organization may now be distinguished and analyzed. By defining national economies as the collective agents of international economic action, we shall now attempt to analyze the international pattern of economic relations as it emerges from the observation that the trading world is neither one universal economic unit of decision nor a conglomeration of closed action systems, but a complex interaction of economic relationships between individuals and groups living within the political boundaries of different, and sometimes antagonistic, institutional environments.[1] Our

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[1] G. Haberler, Prosperity and Depression, op. cit., p. 406; R. F. Harrod, International Economics, Pitman Publishing Co., N. Y., 1947, pp. 6-9.

aim in so doing is rigorously to prove the central theme of this thesis that it is not possible to derive, either statically or dynamically, a unique and stable equilibrium position for an economic system, unless a set of ethically conceived, politically determined, and juridically implemented ultimate ends is given, such that it is possible to say that the economic system tends to their fulfilment as the objectives of its economic action. The current tendency to base economic welfare propositions on purely economic considerations is meaningless and self-contradictory, since these judgments must be based on a consensus of the community with respect to socio-ethical norms.[2]

2. We have already attempted to demarcate the three distinct but interrelated domains of a plausible social action function by interpreting social action as being conceptually passive of visualization at three different levels of activity.[3] At the most general level of social action coercive power is politically distributed in accordance with ethical value judgments which appraise the quality of the ultimate social ends themselves. The social action function, which

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[2] Kenneth J. Arrow, Social Choice and Individual Values, Cowles Commission Monograph 12, University of Chicago, John Wiley, New York, 1951, passim.

[3] Hla Myint, Theories of Welfare Economics, Harvard University Press, Cambridge, Mass., 1948, pp. 229-235.

is understood initially to be entirely general in character, has its form determined by the specific decisions on ends that are introduced into the analysis at this ethical level. Given these decisions, the social action function is transformed into an ordinal scale of values for the economic valuation of alternative use of resources.[4] Thus, a capitalist free-enterprise economy is only possible in a society which does not loathe acquisitive behavior, or does not repeal the laws of an automatic market system as inefficient, cruel, or immoral.[5] The question, for instance, of whether and to what extent consumers are to be "sovereign" with respect to saving and investment, education, health care, etc., where the individual choice may run against the social interest, and other questions of allocation of collective activity, such as police protection, the use of public utilities, etc., are decided at this ethical level of social activity.[6]

3. At the next level of generality, social action is determined by the distribution of income which has already been politically prescribed and juridically maintained at the ethical level. This income distribution and subjectively

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[4]K. Polanyi, The Great Transformation, Rinehart, New York, 1944, passim.

[5]M. Dobb, Political Economy and Capitalism, International Publishers, New York, 1940, pp. 298-9, 311-12; O. Lange, "On the Economic Theory of Socialism" in On the Economic Theory of Socialism, ed. B. Lippincott, University of Minnesota Press, Minneapolis, 1948, pp. 90 ff.

[6]L. H. Robbins, op. cit., ch. VI.

given taste considerations determine exchange and division of labor, which are specifically concerned with the quantitative measurement of success in achieving the ends dictated at the ethical level. From this point of view the definition of economic theory as the study of scarce means with alternative uses is at the same time too broad and too narrow, for different patterns of income distribution are incommensurable and their evaluation depends on a set of principles which, as an ordering of ultimate ends for social action, are ethically established and not logically or empirically deducible from utility calculation.[7] On the other hand, it is necessary that there be agreement, or consent, or legal enforcement, on the principles according to which incomes are to be distributed, in order that, then, the optimum economic allocation of resources be formulated in terms of this scale of values. As individual consciousness is intentional so every economic act implies motivation, and every economic system a direction towards more or less definite objectives. If the ethically given scale of values were completely detailed, and if a precise computation of initially given technical and physical resources were available, the purely economic problem of allocation of these resources among alternative uses would be theoretically solved, but only then, also, would the series

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[7] Ibid., loc. cit.; Philip H. Wicksteed, The Common Sense of Political Economy. Routledge, London, 1933. Vol. I, pp. 155-157.

of conditions be sufficient in number to determine the amount of goods and services to be allocated to every different use.[8]

4. Finally, the third and last level of social action is concerned with these physical and technological possibilities of production, and then consideration of allocation of productive power will be symmetrical with and dependent for determination upon the allocation of purchasing power at the exchange level, and of coercive power at the political level. At this third level the economic problem is based upon physical laws as premises, but never as conclusions, since economic laws, as contrasted with purely physical laws, imply human action rather than simply the physical processes by which production is carried on.[9] In other words, economic production, as a social phenomenon, exhibits a hierarchical character, or frame of reference, within which the economic agent behaves rationally, and there may usually be a whole hierarchy of such frames of order,[10] among which the choice of adoption of the appropriate norm lies always in the upper strata of social action. As we shall see in detail the optimum conditions of production determine a locus of "efficient points"[11]

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[8] Ibid., and idem, "Interpersonal Comparison of Utility," Economic Journal, December 1938, vol. XLVIII, pp. 635-41.

[9] J. N. Keynes, The Scope and Method of Political Economy, Macmillan, London, 1891, pp. 82-3.

[10] John von Neumann, The General Theory of Automata, as discussed by H. A. Simon, Econometrica, vol. 19, January 1951, p. 72.

[11] T. C. Koopmans, Activity Analysis of Production and Allocation, John Wiley, New York, 1951, (forthcoming), passim.

but the problem is not determinate until there is the addition to the technology of exchange activities at certain relative prices. Thus, it is possible for markets fulfilling the production requisites of perfect competition never to lead *per se* to a stable allocation of resources, but to oscillate perpetually, as the "cobweb theorem" provides an appropriate example.

5. Besides this three-layer structure there are, as we have seen, problems of organization as well as of order, i.e., normative and positive problems at each one of these three levels of social action. Thus, the political problem of distribution of coercive power is normative and organizational, whereas the juristic problem of application of these political decisions is positive and legal. The economic problem of distribution of income is a welfare normative problem of organization of exchange, whereas monetary and banking problems are purely technical and positive. And even the technological problem of production may be normative and organizational if it still admits choice and decision as to what goods shall be produced, and how should they be produced among different alternative solutions and possibilities. On the other hand, production may simply be guided by positive criteria of efficiency once the normative decisions at the upper levels have been reached and thereafter taken as given.

6. Having in mind these sociological considerations, which summarize what has been already stated about the theory and structure of social action, we shall, in the remaining

two sections of this thesis, exclusively deal with order and organization of national and international economic action at the exchange and technological levels of economic activity. In this section we shall be concerned with the static and dynamic determination of the necessary and sufficient conditions for an uniquely given optimum and stable equilibrium of production and exchange in a national as well as in an international economic system. We shall try to demonstrate that sufficient conditions for such an uniquely given stable equilibrium can only be deduced if a stable political and juridical structure is assumed to exist. This analysis will proceed in two stages. In the first stage we shall attempt at a characterization of a typical national economy, and, in the second stage, we shall try to mesh national economies thus defined into an international economic system. The analysis shall be positive in the sense that only frameworks of order, not of organization, shall be considered. These will form the subject matter of the last section of this dissertation. By order we mean that the aim of the analysis conducted in this section is to determine in what sense, if at all, perfect competition should be considered a framework for an international economic system, and in what sense there may be conflict between the requirements of a perfectly competitive international economic order and the interests of national groups.[12] We aim here, precisely, at examining in

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[12]Lionel Robbins, Economic Planning and International Order, Macmillan, London, 1938, ch. XI.

which way there may be conflict between, for instance, a policy of maintaining an international balance in order to achieve international stability, as against achieving domestic prosperity and stability.[13] Starting with the extreme hypothesis of a spaceless, timeless, closed economy embracing a typical national economic region, and then by meshing internationally these national economies into an economic system, we shall try to describe, in each case, very simple models working under optimum conditions of production and exchange. After a static analysis these models will be dynamized, and new conditions will be deduced to fit cyclical patterns. This section, therefore, must of necessity be abstract and schematic. For brevity as well as exhaustiveness, it may often be presented in mathematical terms, which, however, we cannot choose otherwise than very elementary, but we shall be careful to translate in words all conclusions and considerations, so that the trend of reasoning be not swamped in the pure formalism of symbols.

7. A fundamental mathematical proposition of analysis. A typical economic system is said to be expressible, in most general terms, by a set of simultaneous equations describing the structural functional interrelationships among variables and parameters, defined as endogenous and exogenous variables. It is a matter of convenience which variables shall be

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[13] National and International Measures for Full Employment, Lake Success, New York, December 1949, p. 28.

considered endogenous and which shall be classified as exogenous. Here we shall adopt the criterion of classifying them in accordance with the region of the social action function upon which our attention is for the moment concentrated. If, for instance, we are focusing upon exchange relationships we shall consider both political as well as technological forces as exogenous, and prices, profits, rents, interest, etc., as endogenous. But if we are considering production relationships exclusively we may consider prices as given parameters, and output, employment, engineering technical data as unknown variables.[14] Given, therefore, $\underline{m}$ exogenous variables or parameters $\underline{a}$, and $\underline{n} \gtrless \underline{m}$ endogenous or unknown variables $\underline{y}$, the mathematical model of the economic system will consist, if determined, of $\underline{n}$ independent structural or equilibrium equations, equal in number to that of the endogenous variables in the system, as follows:

$$T^i(y_1, \ldots, y_n; a_1, \ldots, a_m) = 0 \qquad i = 1, \ldots, n \qquad (35)$$

where these implicit functions are transformation functions, utility possibility functions, marginal productivity equations, demand equations of consumer behavior, equations of inventory fluctuations, etc., the exogenous variables or parameters, the $\underline{a}$'s, being technical coefficients of input, retention,

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[14] T. C. Koopmans, "When is an Equation System Complete for Statistical Purposes?" in Statistical Inference in Dynamic Economic Models, Cowles Commission Monograph 10, John Wiley, New York, 1950, pp. 393-99.

and output, social welfare coefficients, demand elasticities, marginal propensities, etc.[15] If omniscience were assumed all possible implications contained in (35) would be instantly known. The economic system would then be understood as analogous to a tautological Leibnizian theodicy, where, by faultless deductive reasoning, we would be able to grind out of the equilibrium system exactly those implications already included in its structure, and the system would then be totally explained. Short of omniscience, the equilibrium system (35) is bare and formal as long as we do not introduce, as working hypotheses, some specific operational relationships supposedly holding between the endogenous unknown variables and the explicit parameters. These hypotheses may be formulated in the reduced form:

$$y_i = y^i(a_1, \ldots, a_m) \qquad i = 1, \ldots, n \qquad (36)$$

whose public validity may presumably be checked, by epistemological correlation, against the empirical observation of economic reality. By means of this set of working hypotheses (36), the equilibrium conditions (35) may plausibly be assumed to hold within a certain environment and of certain data. In the absence of complete quantitative infor-

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[15] L. R. Klein, Economic Fluctuations in the United States, 1921-1941, Cowles Commission Monograph 11, John Wiley, New York, 1950, p. 4; Jan Tinbergen, "Econometric Business Cycle Research," Review of Economic Studies, vol. VII, 1940, reprinted in Readings in Business Cycle Theory, Blakiston, Philadelphia, 1944, pp. 63-6.

mation concerning (35), it is, then, supposed as empirically valid and operationally meaningful to express the unknown variables as functions of the explicit parameters, thereby placing immediately observable qualitative restrictions, such as those implied by the concept of diminishing marginal productivities or utilities, upon the responses of the equilibrium system (35) to parametric changes.[16]

8. For the moment we are interested in determining the extreme necessary and sufficient conditions of equilibrium for functions given implicitly, such as those in (35), when they define any one variable as function of the parameters, as in (36). The philosophical implications of and objections to the adoption of these fundamental mathematical propositions have already been expounded to some extent in section (I) of this thesis.[17] Now we seek, specifically, to find these necessary and sufficient conditions for an extreme value of any $\underline{T}^i$ in (35), defined as a function with continuous partial derivatives in a certain region, whenever subsidiary conditions of the form (36) are imposed upon the admissible values on the $\underline{n}$ endogenous variables $\underline{y_i}$. If the $\underline{n} + \underline{m}$ endogenous and exogenous variables in (35) are interrelated between themselves by $\underline{n}$ independent and differentiable

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[16] Paul A. Samuelson, Foundations of Economic Analysis, Harvard University Press, Cambridge, Mass., 1948, ch. II.

[17] Arthur F. Bentley, Linguistic Analysis of Mathematics, Principia Press, Bloomington, Indiana, 1932, ch. XIII.

equations (36), then the various $\underline{T}^i$ only depend upon the $\underline{m}$ independent, exogenous variables or parameters. Abstracting discontinuities, all the values of these $\underline{m}$ exogenous variables bringing $\underline{T}^i$ to an extreme position will reduce its total differential to zero.[18] On the other hand, the equations (36) can be differentiated totally, so that the following system of $\underline{n} + 1$ equations may be written:

$$\frac{\partial T^i}{\partial y_1}dy_1 + \ldots + \frac{\partial T^i}{\partial y_n}dy_n + \frac{\partial T^i}{\partial a_1}da_1 + \ldots + \frac{\partial T^i}{\partial a_m}da_m = 0$$

$$\frac{\partial y^1}{\partial a_1}da_1 + \ldots + \frac{\partial y^1}{\partial a_m}da_m = dy_1$$

$$\frac{\partial y^n}{\partial a_1}da_1 + \ldots + \frac{\partial y^n}{\partial a_m}da_m = dy_n$$

By substituting the last $\underline{n}$ equations into the first, the increments of the dependent variables, $dy_1, \ldots, dy_n$, can be eliminated. The resulting equation, valid for each T^i,

$$\left(\frac{\partial T^i}{\partial y_1}\frac{\partial y^1}{\partial a_1} + \ldots + \frac{\partial T^i}{\partial y_n}\frac{\partial y^n}{\partial a_1} + \frac{\partial T^i}{\partial a_1}\right)da_1 + \ldots$$

$$+\left(\frac{\partial T^i}{\partial y_1}\frac{\partial y^1}{\partial a_m} + \ldots + \frac{\partial T^i}{\partial y_n}\frac{\partial y^n}{\partial a_m} + \frac{\partial T^i}{\partial a_m}\right)da_m = 0$$

for all the $\underline{m}$ arbitrary increments in $a_1, \ldots, a_m$, can be developed into $\underline{m}$ equations of the form

$$\frac{\partial T^i}{\partial y_1}\frac{\partial y^1}{\partial a_j} + \ldots + \frac{\partial T^i}{\partial y_n}\frac{\partial y^n}{\partial a_j} + \frac{\partial T^i}{\partial a_j} = 0 \qquad j = 1, \ldots, m$$

which, together with the $\underline{n}$ equations of the set (36), will constitute a system of $\underline{n} + \underline{m}$ simultaneous equations sufficient

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[18] Ch.-J. de La Vallée Poussin, Cours d'Analyse Infinitésimale, Dover, New York, 1946, vol. 1, pp. 151-3.

in number to determine the $\underline{n} + \underline{m}$ exogenous as well as endogenous variables in (35). At equilibrium the numerical values of the partial derivatives $\partial T^i/\partial y_k$, for k=1,..., n, will be determined. In general, this results in extrema between loci of restraint and contour loci so familiar in economic theory. The necessary first order conditions for a constrained maximum or minimum may be written as follows:

$$\frac{\frac{\partial T^i}{\partial y_1}}{\frac{\partial T^i}{\partial y_n}} = \cdots = \frac{\frac{\partial y^n}{\partial a_j}}{\frac{\partial y^1}{\partial a_j}} = \frac{\partial T^i}{\partial a_j}$$

9. In addition to these necessary conditions upon first order partial derivatives, there are sufficient conditions on the second partial derivatives. The meaning of these secondary conditions, requiring the definiteness of certain quadratic forms, will not be dealt here in detail, since this would lead us much too far afield.[19] To obtain sufficient conditions we write:

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[19] Paul A. Samuelson, op. cit., appendix A, section IV, pp. 365 ff.; R. G. D. Allen Mathematical Analysis for Economists, Macmillan, London, 1947, pp. 498-500; J. R. Hicks, Value and Capital, Clarendon Press, Oxford, 1946, mathematical appendix, pp. 303-5; S. Barnard and J. M. Child, Advanced Algebra, Macmillan, London, 1939, ch. II; R. Courant, Differential and Integral Calculus, Interscience, New York, 1947, vol. II, appendix to ch. III, pp. 204-9; W. L. Crum and Joseph A. Schumpeter, Rudimentary Mathematics for Economists and Statisticians, McGraw-Hill, New York, 1946, footnote 2, p. 178; William F. Osgood, Advanced Calculus, Macmillan, New York, 1937, ch. VII, especially pp. 177-80.

$$\frac{\partial T^i}{\partial y_1} d^2y_1 + \frac{\partial^2 T^i}{\partial y^2_1} dy^2_1 + \frac{\partial^2 T^i}{\partial y^2_2} dy^2_2$$

$$+ 2 \frac{\partial^2 T^i}{\partial y_1 \partial y_2} dy_1 dy_2 + \ldots + \ldots = d^2 T^i$$

which must be a negative definite quadratic form for all increments d^2y_i satisfying

$$\frac{\partial y^i}{\partial a_1} d^2 a_1 + \frac{\partial^2 y^i}{\partial a^2_1} da^2_1 + \frac{\partial^2 y^i}{\partial a^2_2} da^2_2 + \ldots$$

$$+ 2 \frac{\partial^2 y^i}{\partial a_1 \partial a_2} da_1 da_2 + \ldots + \ldots = d^2 y_i$$

10. An alternative to the above treatment is provided by the method of the so-called Lagragean multipliers.[20] There is, in fact, some loss of symmetry in the outlined procedure, since endogenous and exogenous variables are not treated alike. The Lagrangean method consists of multiplying the n last equations in (IV,A,8) above by undetermined constants $\lambda_1, \lambda_2, \ldots, \lambda_n$, thus

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[20] Ch.-J. de La Vallée Poussin, op. cit., vol. I, pp. 152-3; R. G. D. Allen, op. cit., pp. 366-7; R. Courant, op. cit., vol. II, pp. 190-9; William F. Osgood, op. cit., pp. 180-5; Paul A. Samuelson, op. cit., appendix A, section III, p. 363; as for the various economic interpretations of Lagrangean multipliers, ibid., pp. 37, 66 ff., 98, 131, 166, 192, 231, and W. L. Crum and Joseph A. Schumpeter, op. cit., pp. 129-33, and in welfare economics, Enrico Barone, "The Ministry of Production in the Collectivist State," in Cellectivist Economic Planning, Routledge, London, 1947, p. 233, and Paul A. Samuelson, op. cit., p. 231, and H. Hotelling, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," Econometrica, vol. VI, 1938, pp. 242-269.

$$\frac{\partial T^i}{\partial y_1}dy_1 + \ldots + \frac{\partial T^i}{\partial y_n}dy_n + \frac{\partial T^i}{\partial a_1}da_1 + \ldots + \frac{\partial T^i}{\partial a_m}da_m = 0$$

$$-\lambda_1\, dy_1 + \lambda_1 \frac{\partial y^1}{\partial a_1}da_1 + \ldots + \lambda_1\frac{\partial y^1}{\partial a_m}da_m = 0$$

$$-\lambda_n dy_n + \lambda_n \frac{\partial y^n}{\partial a_1}da_1 + \ldots + \lambda_n\frac{\partial y^n}{\partial a_m}da_m = 0$$

Then we add these equations, term by term, getting

$$\left(\frac{\partial T^i}{\partial y_1} - \lambda_1\right)\, dy_1 + \ldots + \left(\frac{\partial T^i}{\partial y_n} - \lambda_n\right)\, dy_n + \ldots$$

$$+ \left(\frac{\partial T^i}{\partial a_1} + \lambda_1\frac{\partial y^1}{\partial a_1} + \cdots + \lambda_n\frac{\partial y^n}{\partial a_1}\right)\, da_1 + \ldots$$

$$+ \left(\frac{\partial T^i}{\partial a_m} + \lambda_1\frac{\partial y^1}{\partial a_m} + \ldots + \lambda_n\frac{\partial y^n}{\partial a_m}\right)\, da_m = 0$$

Then we <u>pretend</u> to maximize this function treating all the variables <u>as if</u> they were independent, and treating the <u>n</u> arbitrary multiplicative factors as undetermined constants. Equating to zero the coefficients of the various differentials, we obtain <u>n</u> + <u>m</u> equations, which, together with (36) will comprise a set of <u>m</u> + 2<u>n</u> equations sufficient in number to determine the values of the <u>m</u> + <u>n</u> variables and of the <u>n</u> unknown multipliers. The system of equations formed with the coefficients equated to zero is identical with a linear expression of the general form

$$\Phi = f + \lambda_1 F_1 + \lambda_2 F_2 + \lambda_3 F_3 + \lambda_4 F_4 + \cdots + \lambda_n F_n \qquad (38)$$

in which we consider the <u>y</u>'s and <u>a</u>'s as independent variables and the λ's as constants. This expression (38) is also

very convenient for consideration of the sufficient conditions depending on the sign of d^2T_i when (35) is written explicitly as a function of T_i. In virtue of (36) we have $T_i = \Phi$, and $d^2T = d^2\Phi$. After the necessary substitutions an expression will be found whose properties will permit us to discuss the sign of d^2T_i starting from an immediate elimination of the various second order differentials. This is about all we need as a mathematical foundation to consider the economic problems that follow.

11. General equilibrium in a closed economy. Suppose a spaceless, timeless, closed economic system, consisting of a very large but finite set of instantaneous economic acts. This pure mechanism, from which even human beings are abstracted, may be conceived as a frictionless action system, such as tending to the maximization or minimization of a given amount of energy. As there is no entropy in that system, at each possible cross section of its path the inflow of energy potential is equal to its outflow. This simplest of all possible "economic" models may be expressed by the following trivial identity:

$$S(Y) \equiv D(Y) \qquad (39)$$

where S denotes supply or production; D, demand or consumption, and Y, the energy potential supplied and demanded. But, going a small step ahead, suppose now that this energy is identified, in economic terms, with a "circular flow"[21]

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[21] As in Schumpeter.

of commodities Y, thus

$$S^h(Y_1, \ldots, Y_r) = D^h(Y_1, \ldots, Y_r) \qquad h=1, \ldots, r \quad (40)$$

where there are r unknown variables, denoting groups of commodities,[22] and whose values emerge as a solution of the set of r relationships specifying the hypothetical economic system. But, again, all sorts of physical and organic constraints may be placed as conditions upon the situation expressed in the equilibrium system (40). Let, for instance, the economic system consist of n products or goods X, and m productive factors or services V. Then, the system (40) may alternatively be specialized into (a) the "classical" expression of equilibrium:

$$S^i(X_1, \ldots, X_n) - D^i(\bar{V}_1, \ldots, \bar{V}_m) = 0 \qquad i = 1, \ldots, n \quad (41)$$

where the X_i, i=1,..., n, are the unknown endogenous variables, and the V_j, j=1,..., m, the parametric exogenous variables; or (b) into a "Keynesian" counterpart of (41):

$$S^j(V_1, \ldots, V_m) - D^j(\bar{X}_1, \ldots, \bar{X}_n) = 0 \qquad j = 1, \ldots, m \quad (42)$$

where, conversely, the V_j are the unknown variables, and the X_i, the parameters. Both systems (41) as well as (42) may be presented as implicit functions like (35), constrained by side relation of the explicit form of (36).

12. Equilibrium here means simply that the values of the variables are determined by the set of conditions and

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[22] Meaning, always, goods and services.

nothing else. The systems (41) and (42) together imply a general equilibrium system like (40), and involve $\underline{n} + \underline{m}$ variables for $\underline{n} + \underline{m}$ equations, the parameters, then, being taken as data referring to such non-economic matters as tastes, technology, governmental and institutional framework, etc.[23] Thus, a general equilibrium system may be inspected (a) from the production side of the economy, by taking productive factors as parameters, i.e., "classically":

$$T^i(X_1, \ldots, X_n; V_1, \ldots, V_m) = 0 \qquad i = 1, \ldots, n \quad (43)$$

which are explained (1) by $\underline{n}$ explicit production functions of the general form:

$$X^i(V_{i1}, V_{i2}, \ldots, V_{im}) = X_i \qquad i = 1, \ldots, n \quad (44)$$

where the first subscript of the arguments indicates the product "row", and the second subscript, the factor "column"[24] in the matrix of production conditions restricting the generality of (43) to a specific technological environment, and in such way that $\underline{V_{ij}}$ means that a certain amount of the jth factor is applied to the production of the ith good; and (2) by $\underline{m}$ full employment equations of the form:

$$\bar{V}_j = V_{1j} + V_{2j} + \ldots + V_{nj} \qquad j = 1, \ldots, m \quad (45)$$

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[23] R. Frisch, "On the Notion of Equilibrium and Disequilibrium," Review of Economic Studies, vol. III, 1936, pp. 100-5; J. Tinbergen, "Annual Survey: Suggestions on Quantitative Business Cycle Theory," Econometrica, vol. III, 1935, pp. 241-308.

[24] A. C. Aitken, Determinants and Matrices, Oliver and Boyd, London, 1949, p. 4.

expressing the parametric relationships in (44), and where the same notation regarding subscripts applies in relation to the jth factor column.

13. As long as equations (43) are assumed to be symmetrical, they can be reversed. As it is heuristically convenient also to consider products as parameters and productive services as unknown variables, let us interpret the equilibrium system now as (b) a set of "Keynesian" transformation functions:

$$T^j(V_1, \ldots, V_m; X_1, \ldots, X_n) = 0 \qquad j = 1, \ldots, m \qquad (46)$$

which are explained (1) by m employment functions[25]

$$V^j(X_{j1}, X_{j2}, \ldots, X_{jn}) = V_j \qquad j = 1, \ldots, m \qquad (47)$$

where the employment of the jth factor is a function of the demand for products, and where the first subscript indicates the employed factor "row", and the second subscript the line of employment "column" in the matrix of employment conditions constraining (46), such that X_{ji} means the prospective or final demand for the ith product necessary for the employment of the jth factor in the ith production line; and (2) by n inputation equations:

$$\bar{X}_i = X_{1i} + X_{2i} + \ldots + X_{mi} \qquad i = 1, \ldots, n \qquad (48)$$

expressing a parametric relationship in (47), and where the same convention regarding "rows" and "columns" applies to the ith product column.

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[25] As suggested in W. Leontief, "Structural Matrices of National Economies," Econometrica, vol. 17, supplement, July 1949, p. 278.

14. These sets of equations (44-5) and (47-8) specialize the sets (43) and (46), which in their turn are reformulations of (41) and (42), further developing (40) and (39). They are sufficient in number to determine the values of the $n + m$ variables, and they form the core of a general equilibrium system expressing the transformation of factors into products and products into factors, in two coincident phases of production and consumption, or supply and demand. The sets (43) and (46) can be aggregated into two simple implicit equations by equating to zero the summed squares of the n implicit equations in (43), and the m in (46). This practice, although evidently convenient, effaces the fact that goods (services) divide up into two or more groups such that no productive service (product) is employed (consumed) by more than one group. In a national economy there are at least as many such independent transformation functions as there are possibilities of partial equilibrium within non-competing product or factor groups. However, for simplicity, we shall, for the moment, adopt the first alternative, by assuming that the conclusions resulting from the general equilibrium analysis apply, under *ceteris paribus* hypothesis, to each partial equilibrium sub-system. We must also now emphasize that the basic assumption underlying the general equilibrium system expressed in (43) and (46), and their side relations, is that of a maximizing energy operating in

a purely physical world and realizing along its circular path the fundamental equalization of the real value of the marginal product and the real value of the marginal factor inputation, or the marginal value product and the value of the marginal product.[26]

15. This may be translated in mathematical terms.[27] By differentiating (44) and (47) we write, for (44),

$$\frac{\partial X^i}{\partial V_{il}} dV_{il} + \ldots + \frac{\partial X^i}{\partial V_{im}} dV_{im} = dX_i \qquad i = 1, \ldots, n \qquad (49)$$

and, for (47),

$$\frac{\partial V^j}{\partial X_{jl}} dX_{jl} + \ldots + \frac{\partial V^j}{\partial X_{jn}} dX_{jn} = dV_j \qquad j = 1, \ldots, m \qquad (50)$$

We multiply both sides of (49) by the price of the ith product, pi, and both sides of (50) by the jth factor price w_j. Denote the value of the marginal productivity of any jth factor in any ith production line as the value of the jth factor's share in the increment of the ith product:

$$p_i \frac{\partial X^i}{\partial V_{ij}} = w_j \qquad (51)$$

Denote, moreover, the marginal value of the ith product as

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[26] George J. Stigler, The Theory of Price, Macmillan, New York, 1947, p. 244; J. Robinson, The Economics of Imperfect Competition, Macmillan, London, 1933, chs. 8-12, and 14; E. Chamberlin, The Theory of Monopolistic Competition, Harvard University Press, Cambridge, Mass., pp. 178 ff., 188 ff., 215 ff.; R. F. Kahn, "Some Notes on Ideal Output", Economic Journal, vol. XLV, 1933, pp. 1-35.

[27] J. R. Hicks, The Theory of Wages, Peter Smith, New York, 1948, appendix, pp. 236-9; R. Triffin, Monopolistic Competition and General Equilibrium Theory, Harvard University Press, Cambridge, Mass., 1947, pp. 110-2.

the marginal cost of employing an increment of any jth factor in the ith production line:

$$w_j \frac{\partial V^j}{\partial X_{ji}} = p_i \tag{52}$$

We get, for (49) and (50), respectively,

$$\sum_{j=1}^{m} w_j dV_{ij} = p_i dX_i \tag{53}$$

and

$$\sum_{i=1}^{n} p_i dX_{ij} = w_j dV_j \tag{54}$$

implying a constant product-price factor-wage rate, or, in Marshallian terms, that the "marginal utility" of money is constant, if we wish to interpret (53) and (54) this way. But it would not be too difficult to reformulate these expressions in terms of partial elasticities of product or factor substitution. As a linear approximation we may assume that (44) and (47) are homogeneous of the first degree, and applying Euler's theorem[28] (53) and (54) become, respectively,

$$\sum_{j=1}^{m} w_j V_{ij} = p_i X_i \tag{55}$$

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[28] George J. Stigler, Production and Distribution Theories, Macmillan, New York, 1949, ch. XII; Philip H. Wicksteed, Co-ordination of the Laws of Distribution, London School of Economics and Political Science, London, 1932, pp. 8-10; K. Wicksell, Lectures on Political Economy, op. cit., vol. I, pp. 178 ff.; Leon Walras, "Note sur la Refutation de la Theorie Anglaise du Fermage de M. Wicksteed," republished as an appendix to the third edition of Walras' Elements, 1896, and omitted in subsequent editions; Etienne Antonelli, L'Economie Pure du Capitalisme, Marcel Riviere, Paris, 1939, for L. Walras' correspondence with Enrico Barone on the marginal productivity theory of distribution.

and

$$\sum_{i=1}^{n} p_i X_{ji} = w_j V_j \qquad (56)$$

These formulations, however, restrict the validity of (53) and (54) to cases where factor supply and product demand are perfectly elastic, and there are constant returns to scale in all lines of production, as well as linear shapes in factor employment functions.

16. The necessary as well as sufficient conditions for equilibrium of this simple model can now be stated. First we have to minimize real costs of production subject to the technological restrictions of the production functions. The necessary condition is that (53) vanish subject to (49) being zero. Using direct or undetermined multiplier methods as outlined above (IV,A,8-10), the necessary condition takes the form

$$\frac{w_j}{\frac{\partial X^i}{\partial V_{i1}}} = \frac{w_i}{\frac{\partial X^i}{\partial V_{i2}}} = \cdots = \frac{w_j}{\frac{\partial X^i}{\partial V_{im}}} \qquad i = 1, \ldots, n \quad (57)$$

Then, we have to maximize employment of factors subject to the distribution restrictions of the employment functions. The necessary condition is that (54) vanish subject to (50) being zero, that is,

$$\frac{\frac{\partial V^j}{\partial X_{j1}}}{p_1} = \frac{\frac{\partial V^j}{\partial X_{j2}}}{p_2} = \cdots = \frac{\frac{\partial V^j}{\partial X_{jn}}}{p_n} \qquad j = 1, \ldots, m \quad (58)$$

There are $m - 1$ equations in (57) and $n - 1$ in (58), but these sets each one of which together with their side relations are sufficient to determine: (a) the equilibrium employments of the factors in terms of given output and the given prices of the factors expressed as marginal productivities of these factors in the various lines of production; and (b) the equilibrium consumption of the products in terms of given input and the given prices of the products expressed as marginal costs of the factors in the various lines of production. The sufficient conditions, in both cases, refer to the second order differentials of (49) and (50) being negative definite quadratic forms as in (IV,A,9). With these introductory remarks regarding some important properties of general equilibrium systems we shall now turn to the determination of the optimum, necessary as well as sufficient, conditions of production and exchange in a simplified microstatic model of a typical national economic system.

17. The optimum production conditions. In order to derive the optimum conditions of production in this simple model we must either maximize (43) subject to the boundary conditions (44) and (45), or, in an equivalent way, to minimize (46) subject to the side relations (47) and (48), i.e., either maximize "national product" or minimize its dual "national expenditure." If we can specify arbitrarily all but one output (input), we can maximize (minimize) the

remaining one. This may be derived either by direct methods or by using Lagrangean multipliers. Each method has its own peculiar conveniences and disadvantages. With $\underline{n}$ side relations (44), we seek to maximize (43) involving $\underline{n} + \underline{m}$ unknown variables and parameters constrained by technological relationships of the production functions (44). Following the steps indicated in (IV,A,8) the necessary condition for a maximum follows:

$$\frac{\partial T^i}{\partial X_1} \frac{\partial X^n}{\partial V_{n1}} = \cdots = \frac{\partial X^n}{\partial V_{nm}} \qquad (59)$$
$$\frac{\partial T^i}{\partial X_n} \frac{\partial V_{11}}{\partial X^1} \qquad \frac{\partial V_{1m}}{\partial X^1}$$

We arrive at this result by the direct method not only with a loss of mathematical elegance in the treatment of the unknown and parametric variables but also with some loss of insight into the working of the economic system formalistically expressed in mathematical terms. This can be remedied by using the method of the undetermined multipliers. We follow now the steps described in (IV,A,10). The following Lagrangean multiplier expression may be written _in extenso_:

$$\Phi = \left(\frac{\partial T^i}{\partial X_1} - \lambda 1\right) dX_1 + \cdots + \left(\frac{\partial T^i}{\partial X_n} - \lambda_n\right) dX_n + \cdots$$
$$\sum_{j=1}^{m} \lambda 1 \frac{\partial X^1}{\partial V_{1j}} dV_{1j} + \cdots + \sum_{j=1}^{m} \lambda n \frac{\partial X^n}{\partial V_{nj}} dV_{nj} \qquad (60)$$

If we compare the role of these various λ_i, i=1,..., n, with that of the various p_i, i=1,..., n, in (IV,A, 15-16) we shall readily see that these undetermined multipliers may be interpreted here simply as market prices for products taken as parametric constants.[29] They are, in fact, the expression of marginal costs, and the Lagrangean expression (60) may in its turn be interpreted as the formulation of the national economy's "national output." By disposing the n arbitrary factors λ_i in such a way as to make the coefficients of the n differentials dX_i, i=1,..., n, vanish, thus

$$\frac{\partial T^i}{\partial X_i} = \lambda_i \qquad (61)$$

clearly exhibiting the marginal cost character of these λ_i, we see that, in (60), there will remain only arbitrary differentials, and if, then, the other coefficients also vanish, (60) yields the same set of equations as in (59). Note moreover that the same procedure may be applied to the minimization of (46) subject to (47) and (48). The Lagrangean multipliers will, this time be passive of interpretation as factor prices equal to the various factors' marginal value produc-

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[29] Enrico Barone, "The Ministry of Production in the Collectivist State" in Collectivist Economic Planning, op. cit., appendix A, pp. 253 ff.; H. Hotelling, op. cit., loc. cit.; Paul A. Samuelson, Foundations of Economic Analysis, op. cit., p. 231; Melvin W. Reder, Studies in the Theory of Welfare Economics, Columbia University Press, New York, 1949, ch. II; Abram (Burk) Bergson, "A Reformulation of Certain Aspects of Welfare Economics," Quarterly Journal of Economics, February 1938, pp. 313-4; Oscar Lange, "On the Economic Theory of Socialism" in On the Economic Theory of Socialism, University of Minnesota Press, Minneapolis, Minn., pp. 67-72.

tivities. The alternative set of necessary conditions could then be expressed as follows:

$$\frac{\partial T^j}{\partial v_1} \frac{\partial v^m}{\partial x_{m1}} \quad \frac{\partial v^m}{\partial x_{mn}}$$
$$\frac{\partial T^j}{\partial v_m} = \frac{\partial v^1}{\partial x_{11}} = \cdots = \frac{\partial v^1}{\partial x_{1n}} \tag{62}$$

which, according to (51) and (52), may alternatively be reformulated as follows:

$$\frac{\partial T^j}{\partial v_1} \frac{\partial x^1}{\partial v_{11}} \quad \frac{\partial x^n}{\partial v_{n1}}$$
$$\frac{\partial T^j}{\partial v_m} = \frac{\partial x^1}{\partial v_{1m}} = \cdots = \frac{\partial x^n}{\partial v_{nm}} \tag{63}$$

which, together with (59) define a locus of minimax "efficient points" along which the model economy's "national output" maxima coincides with a path of "national expenditure" minima.[30]

18. This, now, may be translated back to words. The necessary first order conditions for an extreme value of (43) and (46) constrained by (44-5) and (47-8) may be stated as follows:[31] (a) productive factors will be correctly allocated among production activities when the ratio of any factor's

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[30] T. C. Koopmans, "A Mathematical Model of Production," Econometrica, vol. 17, January 1949, p. 74.

[31] Paul A. Samuelson, op. cit., pp. 232-3.

marginal physical productivities in producing any two goods is the same as that of any other factor in the same two lines of production, the common ratio of proportionality being equal to the reciprocal of the marginal cost of one good expressed in terms of the other, displaced, good; (b) products will be correctly imputed to factors when the ratio of any two factor's marginal value productivities in producing the same good is the same as that of these two factors in any other line of production, the common ratio of proportionality being equal to the reciprocal of the marginal revenue of one factor expressed in terms of the other, displaced, factor.

19. These are merely necessary conditions for a regular relative constrained extreme value of (43) and (46), but now the question arises whether and when the "generalized locus of efficient points" implied in (59), (62) or (63) yields true extreme values of (43) and (46), or simply stationary ones.[32] In addition, therefore, to these first order necessary conditions second order sufficient conditions on the second partial derivatives must be sought. The procedural steps have already been indicated in (IV,A,9). Such sufficient conditions say that in order for the generalized locus of efficient points to give relative maximum (minimum) values of T^i (or T^j) they must satisfy the necessary conditions, and, moreover, d^2T^i must be a negative definite

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[32] Ibid., appendix A, pp. 364-5; R. Courant, op. cit., vol. II, appendix to ch. III, pp. 204 ff.

quadratic form for all increments d^2X_i. Substituting, one by one, each d^2X_i, i=1,..., n, in the expanded expression for d^2T^i, there will be a relative maximum value of T^i if the resulting quadratic form is negative definite, i.e., if the determinant formed from the coefficients in d^2T^i bordered with the partial derivatives for the marginal productivities, and all its principal minors, are alternatively positive and negative. For T^j to be at a minimum the sufficient second order condition is that its quadratic form be positive definite as shown by these determinantal properties. These same conclusions would, of course, have been reached by using Lagrangean multipliers instead of direct methods. In summary, it will be only in exceptional cases in which (44) and (47) are homogeneous of the first degree that the generalized locus of efficient points, determined by (59), (62) or (63), will contain in its path the extreme values of (43) and (46). It is only under constant returns to scale assumption, or, at least, in absence of decreasing costs, that it is possible to find the optimum conditions of production as of fixed prices, for only under constant returns to scale will prices, wages, marginal value productivities, costs, and revenues be kept in line, and competition be the way automatically to determine the optimum productive position for the economy.[33] Having thus apparently exhausted the

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[33] For a graphical demonstration by means of an Edgeworth-Bowley-Lerner box diagram, in the two-product two-factor case see W. F. Stolper and Paul A. Samuelson, "Protection and Real Wages," Review of Economic Studies, vol. IX, 1941, pp. 58-74.

principal theoretical implications for production of this first approximation static model, we now turn to the determination of the optimum exchange conditions.

20. The optimum conditions of exchange. In dealing exclusively with the optimum conditions of production at the technological level of the social action function it has been possible to abstract human beings from the economic model, and speak, we hope meaningfully, exclusively in terms of a maximizing energy potential not very dissimilar from certain thermodynamic concepts of analysis.[34] This procedure, however, cannot be maintained beyond the limits of a purely technological economy. The existence of human beings happens to be mandatory at the economic realm of exchange. Let, then, the economic system consist not only of n products X, and m factors V, but also of s individuals U, who are assumed to be completely identifiable with their personal and supposedly invariant indifference-preference subjective maps. Let us, for convenience, lump together in r commodities Y, as in (40), the n goods X and the m services V. The amount of commodities owned, temporarily controlled, chosen for consumption, or bought by each individual can be written with a superscript denoting its owner, or controlling agent, and

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[34] L. Amoroso, Lezioni di Economia Matematica, Laterza, Bologna, 1921, pp. 460-72; François Moch, "Sur l'Évolution des Systémes Économiques" in X Crisis, October-December 1933, January-February 1934.

a subscript denoting the commodity type. Then, Y_h^k, $k=1,\ldots, s$; $h=1,\ldots, r=1,\ldots, n, n+1,\ldots, n+m$. With these notations in mind, we may set up the following transformation function characterizing the social action function along its exchange domain:

$$T^k(U_1,\ldots, U_s; Y_1,\ldots, Y_r) = 0 \qquad (64)$$

which is explained (1) by s utility functions of the form

$$U^k(Y^k_1, Y^k_2,\ldots, Y^k_r) = U_k \qquad k = 1,\ldots, s \qquad (65)$$

and (2) by r national product equations

$$Y_h = Y^1_h + Y^2_h +\ldots+ Y^s_h \qquad h = 1,\ldots, r \qquad (66)$$

expressing the parametric relationship existing in (64).

21. In a purely technological economy the assumption of marginal analysis applicability implied that factors of production should be regarded as being indifferent between different uses. Otherwise, there would be no meaning in transformation functions. Analogously, it is assumed now that commodities and services consumed or provided by any one individual in no way differ from those consumed or provided by another, and also, in order to deduce meaningful marginal conditions that a given type of productive service may be used indifferently in a number of uses.[35] Thus, the implicit relationship (64) is interpreted as meaning that there is *a priori* in any economic system a number of possibilities for

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[35] Abram (Burk) Bergson, *op. cit.*, pp. 310-2.

transforming particular configurations of commodities into individual preferences for specific social states of affairs exhibited by this particular distribution of economic resources. Of course, there will be as many transformation functions as there are individuals in the system. These conceivable transformation functions T^k, k=1,..., s, although forming a system, will for the moment be regarded as a single representative transformation function carrying a superscript to differentiate from the previous T^i and Tj. This aggregation will be relaxed later.

22. We must now maximize (64) after arbitrary specification of all unknown variables, U^k, for all individuals but one, and subject to the restriction imposed by the utility function (65) and the constraint (66) that there be fixed totals of all goods and services in the economy.[36] As the only ethical judgment underlying the maximization of (43) and (46) was that more of any one output other goods and services being constant, is desirable, and, similarly, that less input for the same amount of output is desirable, in analogous form it may now be plausibly assumed that only if all individuals are made better (worse) off can we definitely state that a

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[36]Paul A. Samuelson, op. cit., pp. 236-7; Kenneth J. Arrow, "A Difficulty in the Concept of Social Welfare," Journal of Political Economy, vol. LVIII, August 1950, n. 4, p. 333; O. Lange, "The Foundation of Welfare Economics," Econometrica, vol. X, 1942, pp. 215-28.

given movement of commodities is good (bad). Moreover, the transformation function (64) implies other less evident assumptions, such as, for instance, that in this hypothetical economic system the well-being of individuals, i.e., the satisfaction of individual preferences as to a certain combination of goods and services is to count.[37] And it is perhaps convenient to stress that, following a modern trend, the notion of utility is here taken as ordinal instead of cardinal, that is, that the individual U^k, $k=1,\ldots, s$, cannot be made identical or even comparable on the basis of their personal indifference-preference maps, and that, therefore, individual utilities cannot be added either in the same person and much less collectively. However, the assumption of rational choice is upheld, i.e., of the transitivity of either preference or rejection in regard to some collection of goods.[38] For simplicity, moreover, we assume in this

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[37] Abram Bergson, "Socialist Economics," in A Survey of Contemporary Economics, Blakiston, Philadelphia, 1948, pp. 414 ff.; Theo Suranyi-Unger, Private Enterprise and Governmental Planning, McGraw-Hill, New York, 1950, appendix to part II, pp. 327-8; Vilfredo Pareto, Manuel d'Economie Politique, Marcel Giard, Paris, 1927, pp. 661-2.

[38] I. M. D. Little, A Critique of Welfare Economics, Clarendon Press, Oxford, 1950, ch. II; R. T. Norris, The Theory of Consumer's Demand, Yale University Press, New Haven, 1941, ch. 3; Paul A. Samuelson, "A Note on the Pure Theory of Consumer's Behavior," Economica, February 1938, vol. V, pp. 61-2.

first approximation that the infinitesimal approach yields meaningful conditions for an extreme value of various functions, although we cannot deny that, with the aid of some other tool of analysis, such as the topological theory of convex sets, a more realistic perception of the economic system may in general be realized. It is perhaps advisable to insist that, for the moment, we shall simply assume that the familiar indifference curve is a sort of behavior line placed as a frontier between preferences and rejections as revealed by an infinite number of behavior statements of individuals U^k, $k=1,\ldots,s$, concerning their future economic conduct. Therefore, in this typical national economy under consideration it is implicitly supposed that each individual citizen behaves in the way in which he declared he would behave, so that all types of bluffing are abstracted from the picture, and also that, for each individual, this infinite number of ex-ante declarations of intention are known by every other individual in the system. This is, we agree, a very strict assumption, to say the least, but, we hope, justifiable on grounds of simplicity and generality of analysis.

23. Indeed, apropos of this last assumption, we should like to point out that the "realistic," normative, sociological, and institutional theory of economic behavior, as implied, for instance, in the modern theory of production and allocation known as "linear programming" or "activity

analysis," is nothing else but a special case of the "pure," positive, classical, and marginal theory of economic behavior. Smooth indifference surfaces, even in hyper-space, are extreme cases of polyhedral ones, and our excuse for not considering special cases at this stage is that any such consideration, though, in principle, making the theory appear more realistic, would in practice only lead to no general conclusions, failing thereby to justify its adoption. Moreover, had we attempted to include specific economic behavior in our analysis, many other peculiarities of conduct, perhaps more considerable than the knowledge of particular shapes of indifference curves or surfaces, would claim admission to the array of arguments in (64), such as random disturbances, weather changes, sunspots, wars, revolutions, warts on Cromwell's nose, etc. For the sake of simplification and generalization these elements, however important they may be, were thoroughly abstracted. Thus, the transformation function (64), expressing the social action function in its purely economic domain of exchange is supposed to consist exclusively of commodities, taken as parameters, and individual utilities as unknown variables. Unlike the transformation functions (43) and (46) expressing the social action function at the technological level of production, the transformation function (64) does not admit a symmetrical reversion, as long as precise assumptions are not made concerning its political and juridical superstructure.

24. With these numerous qualifications in mind we shall now try to determine the pure exchange conditions for an optimum distribution of the national product in the simple model of a typical economic system. We must, therefore, maximize (64), where the national "basket" of goods and services, Y_h, is the parametric aggregate, and the various U^k the unknown variables, subject to the side relations (65) and (66). Using Lagrangean multipliers or direct methods, the first order necessary conditions for a maximum take the form[39]

$$\frac{\partial U^1}{\partial Y^1_1} = \ldots = \frac{\partial U^s}{\partial Y^s_1} \qquad (67)$$
$$\frac{\partial U^1}{\partial Y^1_r} \qquad\qquad \frac{\partial U^s}{\partial Y^s_r}$$

or, alternatively, by subdividing commodities into goods and services, and considering services as negative goods:

$$\frac{\partial U^1}{\partial X^1_i} = \ldots = \frac{\partial U^s}{\partial X^s_i} \qquad i,g=1,\ldots,n \qquad (68)$$
$$\frac{\partial U^1}{\partial X^1_g} \qquad\qquad \frac{\partial U^s}{\partial X^s_g}$$

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[39] Paul A. Samuelson, Foundations of Economic Analysis, op. cit., p. 237 and footnote 33; Jacob L. Mosak, General Equilibrium Theory in International Trade, Principia Press, Bloomington, Indiana, Cowles Commission Monograph n. 7, 1944, pp. 5-8; J. R. Hicks, Value and Capital, op. cit., appendix pp. 305-6; idem, "Foundations of Welfare Economics," Economic Journal, vol. XLIX, December 1939, pp. 696-712; Melvin W. Reder, Studies in the Theory of Welfare Economics, op. cit., ch. II.

and

$$\frac{\frac{\partial U^1}{\partial v^1_j}}{\frac{\partial U^1}{\partial v^1_h}} = \ldots = \frac{\frac{\partial U^s}{\partial v^s_j}}{\frac{\partial U^s}{\partial v^s_h}} \qquad j,h=1,\ldots,m \qquad (69)$$

or, combining (68) and (69), considering (67):

$$\frac{\frac{\partial U^1}{\partial v^1_j}}{\frac{\partial U^1}{\partial x^1_i}} = \ldots = \frac{\frac{\partial U^s}{\partial v^s_j}}{\frac{\partial U^s}{\partial x^s_i}} \qquad \begin{matrix} j=1,\ldots,m \\ i=1,\ldots,n \end{matrix} \qquad (70)$$

where only marginal ratios of substitution for the same individual are ever involved, no common ratio of proportionality between individual utilities being postulated, due to the absence of specific assumptions on interpersonal utility comparison.

25. These first order necessary conditions can be stated in words as follows;[40] goods and services will be correctly

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[40] Paul A. Samuelson, op. cit., loc. cit.; I. M. D. Little, op. cit., pp. 121-7; or graphically in F. Y. Edgeworth, Mathematical Psychics, C. Kegan Paul, London, 1881, pp. 20-31; idem, Papers Relating to Political Economy, Macmillan, London, 1925, vol. II, pp. 306-7, 315-9; A. L. Bowley, The Mathematical Groundwork of Economics, Clarendon Press, Oxford, 1924, p. 9; W. Leontief, "The Pure Theory of Guaranteed Annual Wage Contract," Journal of Political Economy, February 1946, pp. 76-9.

allocated among individuals when (a) the marginal rate of substitution between any two goods is the same for every individual who consumes them both; (b) the marginal rate of substitution between any two services is the same for every individual who supplies them both; (c) the marginal rate of substitution between providing more (less) of any service and obtaining more (less) of any good is the same for every individual who provides that service in exchange for that good. There is a "locus of contract points" satisfying these necessary exchange conditions.

26. Combining now these optima given by (59), (62), and (67) the full first order conditions of equilibrium which must hold for an optimum position of production and consumption or exchange may be mathematically expressed as follows:[41]

$$\frac{\partial U^k}{\partial X^k_i} \Big/ \frac{\partial U^k}{\partial X^k_g} = \cdots = \frac{\partial T^i}{\partial X_i} \Big/ \frac{\partial T^i}{\partial X_g} = \cdots = \frac{\partial X^g}{\partial V_{gj}} \Big/ \frac{\partial X^i}{\partial V_{ij}} \tag{71}$$

and

$$\frac{\partial U^k}{\partial V^k_j} \Big/ \frac{\partial U^k}{\partial V^k_h} = \cdots = \frac{\partial T^j}{\partial V_j} \Big/ \frac{\partial T^j}{\partial V_h} = \cdots = \frac{\partial X^i}{\partial V_{ij}} \Big/ \frac{\partial X^i}{\partial V_{ih}} \tag{72}$$

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[41] Paul A. Samuelson, op. cit., p. 239; A. P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly Power," Review of Economic Studies, June 1934, vol. I, pp. 157-75.

or, combining (71) and (72):

$$\frac{\partial U^k}{\partial v^k_j} \cdots = \frac{\partial T^j}{\partial v_j} \cdots = \frac{\partial x^i}{\partial v_{ij}} \frac{1}{\partial v^j} \qquad (73)$$

$$\frac{\partial U^k}{\partial x^k_i} \qquad \frac{\partial T^i}{\partial x_i} \qquad \frac{\partial x_{ji}}{}$$

where $k=1,\ldots, s$; $i,g=1,\ldots, n$; $h,j=1,\ldots, m$.

27. If by individual we mean now <u>in lato sensu</u>, not only physical persons but also collective economic agents (Wirtschaftssubjekt), as households and business firms; if we take account of the restrictions imposed upon the systems by equations (45) and (48); if it is assumed that every factor is used in every production line, and something is produced of every good; and, finally, if marginal properties are not denied by indivisibilities, then, the conditions (71-3) can be expressed in words as follows: commodities will be correctly allocated in production and consumption when (a) there is a common marginal rate of substitution between any two goods for every individual who consumes or uses them both, the common proportionality ratio being equal to the ratio at which one of these goods can be transformed into the other by transferring any factor from the production of one good to that of the other; (b) there is a common marginal rate of substitution between any two productive services for every individual who provides or produces them

both, the common proportionality ratio being equal to the ratio at which one of these services can be replaced by the other in the production of the same amount of output; (c) there is a common marginal rate of substitution between supplying more of any productive service and enjoying more consumption or use of any good for every individual who supplies that service and consumes or uses that good, or, alternatively, between enjoying more leisure and enduring less consumption or use of any good for every individual who enjoys that leisure and suffers its consequent scarcity, the common ratio of proportionality in both cases being equal to the marginal (value) productivity of the factor in the production of this good, or to the reciprocal of the ratio at which consuming more of that good results in an increased supply of the factor in question. These conditions can be restated in terms of costs by saying that, under the constant returns to scale assumption, when it is possible to derive consistent second order sufficient conditions for an extreme value, the total cost incurred in the production of the optimum output must be at a minimum and, then, price must be equal, and not merely proportional to marginal cost. This rule is perfectly general and holds regardless whether there are "profits" or "losses."[42] Note, however, that no

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[42]A. P. Lerner, "Economic Theory and Socialist Economy," Review of Economic Studies, October 1934, vol. II, pp. 51-61; idem, "Statics and Dynamics in Socialist Economics," Economic

(continued)

matter how we express these joint supply-demand, production-consumption necessary conditions of an optimum position of equilibrium, we must observe that we have not yet been provided with a unique solution for the system, either along the locus of efficient production or on the locus of exchange contracts. In (71-3) we are still short of $s - 1$ equations, and these can only be supplied on the basis of a further assumption concerning the exact form of the social action function, which can only be defined in terms of a set of ethical values, politically determined, and juridically implemented. Thus, we hope to have briefly but exhaustively demonstrated the central theme of this thesis, i.e., that propositions of economic organization, based exclusively on economic considerations of production and consumption, do not provide a unique, optimum equilibrium position for a national or an international economic system.

28. Optimum conditions of general equilibrium of a national economy. It has been the central theme of this dissertation that, in society, no optimum position can ever be deliberately attained and maintained by the free play of automatic, purely mechanistic economic forces. As this is

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Journal, June 1937, vol. XLVII, pp. 253-70; idem, Economic of Control, Macmillan, New York, 1947, pp. 72-8; E. F. M. Durbin, "Economic Calculus in a Planned Economy," Economic Journal, December 1936, vol. XLVI, pp. 676-90; R. H. Coase, "The Marginal Cost Controversy," Economica, August 1946, vol. XIII, pp. 167-82.

a theorem, and not an axiom, in the theory of social action here outlined, we have tried to demonstrate its consistency and adequacy by philosophical and sociological reasoning. In concentrating our attention now on economics this theorem has acquired an expected acuteness in the question of determining whether and in what sense perfect competition theoretically realizes the optima of production and allocation. We have so far tried rigorously to demonstrate that, under certain rigorous assumptions regarding the shape of production functions, perfect competition realizes equilibrium at an infinity of positions, but that it is not possible to deduce which is the optimum point of equilibrium if we are not provided with more than atomistically competitive markets to build upon. This is only as it should be, for the sense of what is good or bad is a value orientation which can only be given from outside any scientific system. In order, therefore, to determine, unambiguously, the theoretical characteristics of the optimum position of production and allocation in a mincrostatic general equilibrium economic model, we need a set of ethical judgments expressing, in terms of good and bad, the intentions, objectives, or ends of social action of our hypothetical national economy. This set of ethical judgments, defining <u>what</u> commodities shall be produced and in what quantities, <u>how</u> shall they be produced and <u>for whom</u> are they to be produced[43] will provide a scale by

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[43]Paul A. Samuelson, <u>Economics: an Introductory Analysis</u>, McGraw-Hill, New York, 1948, pp. 12-3; George J. Stigler, <u>The Theory of Price</u>, <u>op. cit.</u>, pp. 32-3; Frank H. Knight, "Social Economic Organization" in <u>Syllabus for the Second-Year Course in the Social Sciences</u>, University of Chicago Press, Chicago, 1933, pp. 130-7.

which to evaluate, in economic terms products and factors, satisfactions and efforts, as a system of rewards and penalties.[44] We have called this scale of values, this hierarchical frame of reference concerning ends, the order of social action.

29. Before any historical or cultural determination of such order for a certain society there is, conceivably, a number of alternative possibilities for social integration. Suppose that there had been, for our economic model, z alternative possibilities for the existential realization of this order W. Aprioristically, therefore, we can express this in a transformation possibility function as follows:

$$P(W_1, \ldots, W_z; U_1, \ldots, U_s; Y_1, \ldots, Y_r) = 0 \qquad (74)$$

Once a society is nationally organized this social order becomes politically explicit, by imposition or consent, and thereafter it will be juridically assured through legal implementation and police coercion as the sovereign authority of the state. This constitutionally reduces the possibilities for social existence expressed in (40), to a social action function of the form

$$W^e(U_1, \ldots, U_s; Y_1, \ldots, Y_r) = W_e \qquad (75)$$

which defines the economic system in terms of action as consisting essentially of (a) a situation, amounting to a set

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[44] J. M. Clark, "Distribution" in Encyclopaedia of Social Sciences, op. cit., vol. 5, pp. 167-73.

of constraining physical conditions as well as of a set of means given as an initial factor endowment; (b) an objective, consisting of a set of ends arranged in order of importance, and whose realization is to be maximized, as well as of a set of norms conducive to the realization of these ends. These elements, as we have already seen (II,C,7), are entirely general in character, since they are synthetic a priori categories of intentional consciousness,[45] but as such they are entirely formal, acquiring specificity only when certain assumptions are expressed concerning the functional relationships existing between them. We proceed to make these assumptions and relationships explicit for the microstatic general equilibrium system we are trying to characterize.

30. The first basic assumption concerns the political structure of social action in a typical nationally integrated economic system. This assumes that the state allocates, on legal and institutional basis, to the economic agents, i.e., physical as well as juridical persons, control or coercive power over a certain amount of commodities, i.e., goods and services. The state thereby assures to these economic agents a given real income, expressed in abstract purchasing power, and equal to their receipts from selling goods or services

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[45] F. von Hayek, "The Facts of Social Sciences," Ethics, October 1943, pp. 11-3; Paul M. Sweezy, The Theory of Capitalist Development, Oxford University Press, New York, 1942, pp. 4-5.

they own or control. This is a purely definitional budget identity, and it is no equilibrium assumption in strict sense, for it holds independently of whether the economic system is in equilibrium or not. Nevertheless, it is absolutely necessary to make equilibrium determinate by giving an economic meaning to resource scarcities, and providing demand and supply curves with the appropriate slopes. Properly interpreted, moreover, this political assumption implies that the model has been provided with a fiscal system to be managed by the government in a great number of ways all of which have in common the fact that they define particular configurations of commodities to be assigned to the economic agents under a given political state of affairs. Next to this political assumption there is the second basic subjective assumption concerning the maximization of satisfaction or income and the minimization of effort or expenditure. This is the subjective assumption concerning purchasing power allocation which is characteristic of the exchange level of the social action function. The total market supply of goods and services being assumed as fixed, at each period of time, the economic agents maximize utility given their tastes and their real incomes asa publicly sanctioned control over certain amounts of goods and services; and minimize disutility, given also tastes and real incomes, by selling their productive services to the highest bidder. In both cases the

economic agent acting as demander of goods or as supplier of services necessitates the fulfillment of a third assumption in which he is supposed to act as supplier of goods and demander of services. This third level concerns, as we have already seen, with the structure of production as the technological activity of the social action function. There, the total supply of goods and services is variable, and economic agents maximize real revenue given the physical conditions of production and the social conditions of ownership or control over certain amount of commodities. Rational behavior assures maximization of returns over costs, or the realization of a certain collection of commodities at a preassigned future date.

31. All this can be expressed mathematically as a specialization of the social action function (75). A typical national economy is conceived as a set of economic decisions or activities, obeying norms of economic behavior which is limited by political, psychological, and technical restraints. These decisions are executed by $\underline{s}$ individuals U controlling $\underline{r}$ commodities Y^k_r, $k=1,\ldots, s$, which can be subdivided into $\underline{n}$ goods X^k_i, $i=1,\ldots, n$, and $\underline{m}$ productive factors V^k_j, $j=1,\ldots, m$. The social action function may then be reformulated as follows:

$$W^e\Big(U^1(X^1_1,\ldots, X^1_n; V^1_1,\ldots, V^1_m),\ldots, U^s(X^s_1,\ldots, X^s_n; V^s_1,\ldots, V^s_m)\Big) = W_e \qquad (76)$$

which is explained by the reduced forms (a) ns production functions:

$$X^k_i(V^k_{i1}, \ldots, V^k_{im}) = X^k_i \qquad i = 1, \ldots, n \qquad (77)$$

and (b) ms employment functions:

$$V^k_j(X^k_{j1}, \ldots, X^k_{jn}) = V^k_j \qquad j = 1, \ldots, m \qquad (78)$$

where $k = 1, \ldots, s$. Restraining (77) and (78) there is the full employment or full resource appropriation equation:

$$Y = \sum_{h=1}^{r} Y_h = \sum_{i=1}^{n} X_i + \sum_{j=1}^{m} V_j = \sum_{k=1}^{s} \left(\sum_{i=1}^{n} X^k_i + \sum_{j=1}^{m} V^k_j \right) \qquad (79)$$

32. From (76) and its reduced forms (77) and (78) with their constraint (79) we can extract the necessary first order conditions of final equilibrium of the microstatic system we are considering. Following, once more, the steps outlined in (IV,A,8-10), and using Lagrangean multipliers or direct methods, we will be able to set these conditions in compact form. These will provide us with the still missing s - 1 relationships necessary for the determination of the unique optimum position of production and consumption in a national economic model. Considering productive factors as parameters, i.e., seeing the system from its side of production the necessary first order conditions for an optimum equilibrium position take the form

$$\frac{\partial w^e}{\partial x^k_1} = \cdots = \frac{\partial w^e}{\partial x^k_n} = \frac{\partial x^k_n}{\partial v^k_{nj}} = \frac{\partial x^k_1}{\partial v^k_{ij}} = \frac{\partial w^e}{\partial v^k_j} \qquad j = 1, \ldots, m \qquad (80)$$

whereas, from the side of employment the equilibrium conditions appear as follows:

$$\frac{\partial w^e}{\partial v^k_1} = \ldots = \frac{\partial v^k_n}{\partial x^k_{mi}} = \frac{\partial w^e}{\partial x^k_i} \qquad i = 1, \ldots, n \qquad (81)$$

$$\frac{\partial w^e}{\partial v^k_m} \qquad \frac{\partial v^k_1}{\partial x^k_{li}}$$

in both these sets the following identities hold

$$\frac{\partial w^e}{\partial v^k_j} = \frac{\partial w^e}{\partial U_k} \cdot \frac{\partial U^k}{\partial v^k_j} \qquad (82)$$

and

$$\frac{\partial w^e}{\partial x^k_i} = \frac{\partial w^e}{\partial U_k} \cdot \frac{\partial U^k}{\partial w^k_i} \qquad (83)$$

33. These conditions may be translated in words as follows:[46] at the optimum position of equilibrium (a) the marginal

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[46] Alfred Marshall, Principles of Economics, Macmillan, 8th ed., 1947, appendix, note XIV, pp. 846-52; A. C. Pigou, The Economics of Welfare, Macmillan, 4th ed., 1946, pp. 131-43; Paul A. Samuelson, op. cit., p. 246; A. P. Lerner, "Economic Theory and Socialist Economics," Review of Economic Studies, vol. II, October 1934; Abram (Burk) Bergson, op. cit., pp. 316-7; Melvin W. Reder, op. cit., pp. 35-6; N. Kaldor, "Welfare Propositions of Economics and Interpersonal Comparisons of Utility," Economic Journal, vol. 49, September 1939, pp. 549-52; idem, "A Comment," Review of Economic Studies; T. Scitovsky, "A Note on Welfare Propositions in Economics," Review of Economic Studies, vol. 9, November 1941, pp. 77-88.

social utility (disutility) of the same good (service) must be equal for each individual; (b) the marginal rate of substitution between increments in social utility (disutility) produced by marginal increments of two types of product (factor) must be equal for every individual who consumes or uses these products (factors); (c) each factor of production must be allocated among different possible uses so that its indirect, derived marginal social utility be equal in every use, and each product must be distributed among factors so that the compensation thus provided be equal to the marginal social disutility of providing the factors; (d) the marginal social utility of a good produced by a marginal shift of factors from one production line to another must be equal to the marginal social disutility caused by this adjustment. The essential assumption for these conditions to hold is that (82) and (83) be true identities, a requirement that is satisfied whenever (76) is ordinally well-defined, i.e., that it is unequivocal whether one configuration of the economic system is "better" or "worse" than any other or "indifferent" and that these relationships are transitive. If this assumption is granted as valid, then the sets (80) and (81) define a complete microstatic general equilibrium system.

33. Full characterization of general equilibrium. Besides yielding the final conditions for an optimum and unique

equilibrium of production, allocation and consumption, the sets (76-9) provide us with the essentials for the microstatic description of the structure of our ideal type national economy.[47] The notation convention shall be as follows:

a) The economy consists of U_k, k=1,..., n, economic agents, i.e., individuals, households, business firms, the government, and other countries, the last two classes being for the moment abstracted. Households and business firms control an aggregate of V_j, J=1,..., m, factors of production, and produce X_i, i=1,..., n, finished goods. Denote by Y_h, h=1,..., r=1,..., n, n + 1,..., m, the economy's "national product" computed on the basis of some neutral standard of account as a certain amount of commodities of no particular description. This national product has acquired economic meaning through having been initially distributed among the

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[47] For alternative formulations see Bertil Ohlin, Interregional and International Trade, Harvard University Press, Cambridge, Mass., 1933, appendix I; Gustave Cassel, Traité d'Économie Politique, Giard, Paris, 1929, vol. I, ch. XVI; Leon Walras, Abrégé des Éléments d'Économie Politique Pure, Pichon, Paris, 1938, pp. 202-12; Vilfredo Pareto, Manuel d'Économie Politique, Giard, Paris, 1927, appendix, passim, but especially pp. 605-8; Henry Schultz, "Marginal Productivity and the General Pricing Process," Journal of Political Economy, vol. 37, n. 5, October 1929, pp. 505-51; M. Brodsky and P. Rocher, L'Économie Politique Mathématique, Pichon, Paris, 1949, pp. 263-361; J. R. Hicks, Value and Capital, op. cit., appendix to ch. 8, pp. 323-5.

participants in the national economic action. This distribution of the "national product" among the participant "citizens" is proceeded in accordance with a certain well-defined social scale of values, W^e. The initial endowment of each economic agent is denoted by $Y^k{}_{h_o}$, $\underline{k}=1,\ldots,\underline{s}$; $\underline{h}=1,\ldots,\underline{r}$, and the zero subscript, the initial, or pre-temporal period of timeless, static action.

b) Let, moreover, $X^k{}_i$ and $V^k{}_j$ denote the breakdown of $Y^k{}_h$, respectively, into the amount of goods, X_i, $i=1,\ldots,\underline{n}$, and services, V_j, $\underline{j}=1,\ldots,\underline{m}$, produced, owned, or temporarily controlled by the individual or collective agent U_k, $\underline{k}=1,\ldots,\underline{s}$. This notation, however, shall not imply that each economic agent produces and consumes, or uses some quantity of every type of good and service, but that the pattern of control over commodities is otherwise unspecified, comprising loosely all intermediate patterns between private monopoly and communal ownership. This means that patterns must differ between themselves qualitatively as well as quantitatively but not so much as to lead to fewness in producing commodities, and providing services as well as in consuming commodities and employing productive factors.

c) Let, finally, $X^{k}_{ji_o}$, and $V^{k}_{ij_o}$ denote, respectively, the amount of any good X_i whose final demand by individual U_k will result in an investment of the jth factor V in its line of production; and the amount of any factor V_j invested in the ith production line X by the kth individual U. This notation should be understood as comprising the case of factors used by their owners and of products consumed by their producers, as well as the case when productive services are consumed instead of being employed in the production of finished goods as well as of finished goods not consumed by plowed back to the production of other finished goods.[48] This means, essentially, that a given grade of productive service, no matter how minute its classification shall be, may be used indifferently in a number of uses, in such way that the subscripts shall be interpreted as meaning already an extensive amount of aggregation of factor grades as well as of product types.

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[48] See, for a simpler notation, O Lange, "The Place of Interest in the Theory of Production," Review of Economic Studies, vol. III, 1935-36, pp. 159-92; V. Edelberg, "Elements of Capital Theory," Economica, III, 1936, pp. 314-22.

34. The assumptions shall be as follows:

a) Let us assume the basic conditions for perfect competition. The number of participants in the national economic action, either as producers or consumers, is so great as to make the influence of an individual or collective economic agent negligible over demand for and supply of both factors and products. There is free movement of factors and products entering or leaving producing and consuming units of action, such that there is no spatial, temporal, or social discrimination between commodities, and, furthermore, there are no economies or diseconomies of production as well as consumption, and the supplies of productive services are positive, at least one productive service entering into the production of each good.

b) Let product prices be equal to marginal costs and factor prices to their marginal value productivities, computed in real terms, and let products be function of ns production functions of the form (77). Let, moreover, factors be function of ms employment functions of the form (78). This two sets of equations exhaust the technological level of social action. Let there be, also, se subjective

utility functions of the form (65) at the exchange level of social action, being s_e utility functions for each social state of affairs W_e, $\underline{e}=1,\ldots,\underline{z}$. If we assume that one such state of affairs is given at the political level of social action, W_e, then, the number of utility functions in the system will be reduced to $\underline{s}$, and we shall get a total of $s(n + m + 1)$ independent[49] equations for $s(n + m + 1)$ unknown variables, the X^k_i, the V^k_j, the U_k, and W_e, forming, therefore, a determinate, logically closed system at the $\underline{o}$ period of time, which, but for simplicity of notation should be carried throughout in sub-subscript.

c) Let us, finally, assume that this system is structurally described in infinitesimal terms by the following set of marginal coefficients supposed constant throughout the $\underline{o}$ time period:

$$\frac{\partial W^e}{\partial U_{k_o}} = \omega^{e k_o} \qquad (84)$$

which is to be called the marginal social utility

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[49] K. Schlesinger, "Über die Produktionsgleichungen der ökonomischen Wertlehre," in Ergebniss eines Mathematischen Kolloquins, VII, 1933-34, pp. 10-11, and the article by A. Wald, "Über die eindeutige positive Losbarkeit der neuen Produktionsgleichungen," ibid., loc. cit., pp. 12-18.

coefficient[50] denoting the marginal increment of social utility per purchasing power or "numeraire" unit with respect to the kth individual, and stating simply that if all individuals except any kth individual remain in positions which are indifferent to them, and if the kth individual moves to a position which is preferable to him, then the coefficient indicates, per money unit worth, the increase in social utility of the present social state of affairs over the preceding social state of affairs. The marginal social utility of commodity X^k_{io}, being the ith good X to the kth individual U, at the o period of time, shall be denoted by

$$\frac{\partial W^e}{\partial X^k_{i_o}} = \omega^{e_{k_o}} \cdot p_{i_o} \qquad (85)$$

where p_{i_o} is the price of the ith commodity X at the o "timeless" time period. The marginal social disutility of service V^k_{jo}, being the jth productive factor V provided by the kth individual U, at the o period of time, shall be denoted by

$$\frac{\partial W^e}{\partial V^k_{j_o}} = \omega^{e_{k_o}} \cdot w_{j_o} \qquad (86)$$

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[50] Abram (Burk) Bergson, op. cit., pp. 314, 331-2, where this coefficient is interpreted as Marshall's "marginal utility of money."

where w_{j_o} is the price of the jth factor V at the o static time period. Let us have, furthermore,

$$\frac{\partial x^{k}{}_{i_o}}{\partial v^{k}{}_{ij_o}} = \pi^{k}{}_{ij_o} \tag{87}$$

which is to be called the variable technical output coefficient[51] and denoting the marginal increment of the ith product, belonging or controlled by the kth individual, at the o initial period, and due to a marginal increase in the employment of the jth factor in the ith production line by the kth employer at the same static period of time. Also,

$$\frac{\partial v^{k}{}_{j_o}}{\partial x^{k}{}_{ji_o}} = \rho^{k}{}_{ji_o} \tag{88}$$

which is to be called the variable technical input coefficient[52] and denoting the marginal increment in the employment of the jth factor by the kth

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[51] Vilfredo Pareto, op. cit., appendix, pp. 605-8; N. Georgescu-Roegen, "Fixed Coefficients of Production and Marginal Productivity," Review of Economic Studies, vol. 3, October 1935, pp. 40-9; idem, "Leontief's System in the Light of Recent Results," Review of Economics and Statistics, vol. 32, August 1950, pp. 214-22.

[52] W. Leontief, "Structural Matrices of National Economies," Econometrica, vol. 17, supplement, July 1949, p. 278.

employer at time o caused by the increment in the final demand for the ith product, in the production of which the jth factor concurs, as expected by the kth producer. Two identities (82) and (83) obtain, may be introduced now for the sake of completeness of notation. They are (a)

$$\frac{\partial U^{k_o}}{\partial X^{k}{}_{i_o}} = \upsilon^{k}{}_{i_o} \tag{89}$$

which is an (ordinal) utility index, or the (cardinal) expression, for an arbitrary numbering system for preferences and indifferences, of the kth individual's utility index with respect to the ith good; and (b)

$$\frac{\partial U^{k}}{\partial V^{k}{}_{j_o}} = -\upsilon^{k}{}_{j_o} \tag{90}$$

being an (ordinal) disutility index of the kth individual with respect to the jth productive service, and where a minus sign is attached for convenience.

d) In an equilibrium position of production and consumption the following relationships must emerge among these various coefficients:

$$p_{i_o} \pi^{k}{}_{i j_o} = w_{j_o} \tag{91}$$

and

$$w_{i_o} \rho^{k}{}_{j i_o} = p_{i_o} \tag{92}$$

as in (51) and (52), and as long as it is assumed that factors are indifferent between different uses, and products, being homogeneous, are assumed to be indifferent to different consumers or users. In equations (89) and (90), the ω's, which were present in all terms, have been divided out.

35. With these assumptions and notation convention in mind, the general equilibrium of the system is defined, unambiguously, by the following sets of equations:

a) sn product-supply equations obtained by total differentiation of the sn production functions:

$$\pi^{k}{}_{il_o}\ dV^{k}{}_{il_o} + \ldots + \pi^{k}{}_{im_o}\ dV^{k}{}_{im_o} = dX^{k}{}_{i_o} \qquad (93A)$$

or, multiplying throughout by p_{i_o} and using (89),

$$w_{l_o} dV^{k}{}_{il_o} + \ldots + w_{m_o} dV^{k}{}_{im_o} = p_{i_o}\ dX^{k}{}_{i_o} \qquad (93B)$$

b) sm factor-demand equations obtained by total differentiation of the sm employment functions:

$$\rho^{k}{}_{jl_o}\ dX^{k}{}_{jl_o} + \ldots + \rho^{k}{}_{jn_o}\ dX^{k}{}_{jn_o} = dV^{k}{}_{j_o} \qquad (94A)$$

or, multiplying throughout by w_{j_o} and using (90),

$$p_{l_o}\ dX^{k}{}_{jl_o} + \ldots + p_{n_o} dX^{k}{}_{jn_o} = w_{j_o} dV^{k}{}_{j_o} \qquad (94B)$$

c) sm product-demand equations obtained by total differentiation of the utility functions considering factors as parameters:

$$\upsilon^{k}{}_{l_o}\ dX^{k}{}_{l_o} + \ldots + \upsilon^{k}{}_{n_o}\ dX^{k}{}_{n_o} = 0 \qquad (95A)$$

or, explicitly,

$$X^{k}_{i_o} = D^{k}_{i_o} (p_{1_o}, \ldots, p_{n_o}; w_{1_o}, \ldots, w_{m_o}) \qquad (95B)$$

d) sn factor-supply equations obtained by total differentiation of the utility functions considering products as parameters:

$$U^{k}_{1_o} dV^{k}_{1_o} + \ldots + U^{k}_{m_o} dX^{k}_{m_o} = 0 \qquad (96A)$$

or, explicitly,

$$V^{k}_{j_o} = S^{k}_{j_o} (p_{1_o}, \ldots, p_{n_o}; w_{1_o}, \ldots, w_{j_o}) \qquad (96B)$$

We have got so far $2s(m + n)$ equations to determine $2s(m + n)$ unknowns, i.e., the supply and demand for factors, and the supply and demand for products. Apparently, therefore, the system is determinate. However, any one equation follows from the others. Any one equation may, then, be dependent. But we have, in fact, one equation missing, and this is the social action equation:

e) After differentiation equation (76) yields:

$$\omega^{e}_{1_o} dU_{1_o} + \ldots + \omega^{e}_{s_o} dU_{s_o} = dW^{e} \qquad (95)$$

which is to be maximized, i.e., $dW^{e} = 0$, subject to the technological, psychological, and political constraints of the system.

36. These functions may be arranged so as to represent a "panel" of the "cell" or act of the national economic action in microstatic equilibrium, as follows:

(96)

$$
\begin{aligned}
&U^{1o}\,(X^{1}{}_{1_o}\,,\ldots,\,X^{1}{}_{n_o}\,;\;V^{1}{}_{1_o}\,,\ldots,\,V^{1}{}_{m_o}\,)=0\\
&\quad+\qquad\qquad+\qquad\quad+\qquad\qquad+\\
&U^{so}\,(X^{s}{}_{1_o}\,,\ldots,\,X^{s}{}_{n_o}\,;\;V^{s}{}_{1_o}\,,\ldots,\,V^{s}{}_{m_o}\,)=0\\
&\quad=\qquad\qquad=\qquad\quad=\qquad\qquad=\\
&V^{k}{}_{1_o}(X^{k}{}_{11_o},\ldots,\,X^{k}{}_{1n_o})=V^{k}{}_{1_o}\\
&\quad+\qquad\qquad+\\
&V^{k}{}_{m_o}(X^{k}{}_{m1_o},\ldots,\,X^{k}{}_{mn_o})=\qquad\qquad V^{k}{}_{m_o}\\
&\quad=\qquad\qquad=\qquad\qquad=\\
&\qquad X^{k}{}_{1_o}\qquad\qquad=(V^{k}{}_{11_o},\ldots,\,V^{k}{}_{1m_o})\;X^{k}{}_{1_o}\\
&\qquad\qquad\qquad\qquad\quad+\qquad\qquad+\\
&\qquad\qquad X^{k}{}_{n_o}\;=(V^{k}{}_{n1_o},\ldots,\,V^{k}{}_{nm_o})\;X^{k}{}_{n_o}
\end{aligned}
$$

This is a development of (76) using (77) and (78). Similar arrangements could be made by differentiating the functions and using any of the alternative formulations mentioned in (IV,A,35) above. Product and factor prices as well as the various coefficients could then be included, and (96) could then be interpreted as a cross section view of this model economy's "national income" or "national product" formulated in gross terms. One of these possible alternative arrangements is particularly helpful to indicate how to solve problems of aggregation which we are going to face later in this dissertation. The n goods X may be classified into consumption

goods, C, and investment goods, I. The m productive services V may be aggregated into capital, K, and labor, L. The panel (96) may, then, be written:

(97)

$$
\begin{array}{lll}
U^{1}_{o}\,(C^{1}_{o}\,,\ I^{1}_{o}\,;\ K^{1}_{o}\,,\ L^{1}_{o}\,) = 0 & & \\
\quad + \quad + \quad + \quad + & & \\
U^{s}_{o}\,(C^{s}_{o}\,,\ I^{s}_{o}\,;\ K^{s}_{o}\,,\ L^{s}_{o}\,) = 0 & & \\
\quad \# \quad \# \quad \# \quad \# & & \\
Y^{o}_{K}\,(C^{o}_{K}\,,\ I^{o}_{K}\,) = & K^{o} & \\
\quad + \quad + & & \\
Y^{o}_{L}\,(C^{o}_{L}\,,\ I^{o}_{L}\,) = & L^{o} & \\
\quad \# \quad \# \quad \# \quad \# & & \\
C^{o} & = (K^{o}_{C}\,,\ L^{o}_{C}\,)\ P^{o}_{C} & \\
 & \quad + \quad + & \\
I^{o} & = (K^{o}_{I}\,,\ L^{o}_{I}\,)\ P^{o}_{I} &
\end{array}
$$

After government has redistributed income, by means of taxation, rationing, etc., and in accordance with some ethical criteria, politically established and juridically implemented, the anticipated final demand for C and I calls to the market K and L which are, then, invested or employed in the consumption goods and the investment goods industries. Starting from <u>gross expenditure</u> the "flow" of payments and credits leads to <u>gross product</u>, then, by distribution of revenue, to <u>gross income</u> and finally, after direct taxation or governmental appropriation, to <u>gross receipts</u>. The final bill of goods available to any one individual in the form

of gross receipts obviously do not have to equal his gross expenditures. But, for the nation as a whole, gross national expenditure is the same as gross national receipts. As a necessary result of the system of accounting, the savings shown by those agents whose gross receipts exceed their gross expenditures are exactly offset by the dissavings of all other agents whose gross expenditures exceed their gross receipts. Any of the s individuals may be among the savers or dissavers. Since gross receipts or gross expenditures add up to the market value of goods and services, the funds which originate with the savers and the funds which are supplied to the dissavers are generated and absorbed in the production process itself. This is the reason why in the "timeless" time period o no net savings appear for they are equal to net investment. All this, of course, could be expressed by means of the familiar Keynesian equations connecting consumption and investment to income and postulating an identity of savings to investment.[53]

37. We hope to have conclusively demonstrated that no economic system can by itself discover its own optimum position of equilibrium of production and allocation. This is, indeed, as it should be. The economic system must be provided with a political structure which will determine the

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[53]Paul Boschan, National Income, Kelley, New York, 1950, p. 15; Harold M. Somers, "A Theory of Income Distribution," Journal of Political Economy, vol. LVIII, December 1950, pp. 523-41; Alvin H. Hansen, "The Robertsonian and Swedish Systems of Period Analysis," Review of Economics and Statistics, February 1950, pp. 24-29.

sense in which an equilibrium position shall be considered a standard of excellence. But only under the rigorous assumption of constant returns to scale, as applicable to the whole economy, do the second order sufficient conditions for an extreme value of the social action function W coincide with those conditions bringing a true maximum to that function. If we relax this assumption of linearity and homogeneity of production nowhere else in microstatics shall we find the conditions under which the attained optimum, where and when discovered and conquered, shall be maintained as a stable position. Under decreasing costs the scale of values or the system of imputations politically provided may be <u>discredited</u> by another system of imputations, which, already contained in the first system, <u>dominates</u> it because some participants in the economic action will have separately greater gains under this new system than under the old one, and can, by acting together, enforce it.[54] In other words, the general conditions of <u>stable</u> equilibrium can only be found in a theory of dynamics.[55] Having deduced the conditions for an optimum position of equilibrium of production,

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[54] J. Marschak, "Neumann's and Morgenstern's New Approach to Static Economics," <u>Journal of Political Economy</u>, vol. 54, October 1946, pp. 100-5.

[55] Paul A. Samuelson, "The Stability of Equilibrium, I and II," <u>Econometrica</u>, vol. 9, 1941, pp. 97-120; <u>ibid.</u>, vol. 10, 1942, pp. 1-25; idem, "Dynamic, Statics, and the Stationary State," <u>Review of Economic Statistics</u>, February 1943, pp. 58-68.

allocation, and consumption, we shall now consider (a) how, in a general way, the rates of change of any unknown variable with respect to any parameter may be computed from a set of equilibrium equations; (b) how the general conditions of stable equilibrium can be deduced under the assumption of stationary state.

38. A mathematical proposition concerning displacement of equilibrium. We have already seen in (IV,A,8) above how, in a general way, the necessary first order conditions for constrained maxima or minima can be deduced, after a series of differentiations and substitutions, from a system of simultaneous equations involving only first order partial derivatives. Since these are linear equations, their solution for non-singular cases is not very difficult to find. Let us find these solution values for a general equilibrium system like (96). We follow, once more, the steps outlined in (IV,A,8). We may take either factors or products as parameters, and, then, either products or factors as unknown variables. Let us take (a) factors as parameters and products as unknown variables. We differentiate, in (96), any kth individual U's utility function $U^k{}_o$, with respect to any jth factor V's departure from the equilibrium position. We get

$$\frac{\partial U^k{}_o}{\partial X^k{}_{l_o}} dX^k{}_{l_o} + \ldots + \frac{\partial U^k{}_o}{\partial X^k{}_{n_o}} dX^k{}_{n_o} + \frac{\partial U^k{}_o}{\partial V^k{}_{j_o}} dV^k{}_{j_o} = 0 \qquad k=1,\ldots, s$$

Then we differentiate, with respect to the jth factor V, the n production functions of the kth individual producer. We get

$$\frac{\partial X^k_{i_o}}{\partial V^k_{ij_o}} dV^k_{ij_o} = dX^k_{i_o} \qquad i=1,\ldots, n$$

Substituting the last n equations into the first, the increments of the dependent variables can be eliminated. The resulting equation valid for each U^k is of the form

$$\frac{\partial U^{k_o}}{\partial X^k_{1_o}} \frac{\partial X^k_{1_o}}{\partial V^k_{1j_o}} + \ldots + \frac{\partial U^{k_o}}{\partial X^k_{n_o}} \frac{\partial X^k_{n_o}}{\partial V^k_{nj_o}} + \frac{\partial U^{k_o}}{\partial V^k_{j_o}} = 0$$

this is a system of ns linear equations with constant marginal productivity coefficients in ns unknowns. The solution may be represented in determinantal form[56]

$$\frac{\partial X^k_{i_o}}{\partial V^K_{ij_o}} = - \frac{\sum_{i=1}^{n} \frac{\partial U^{k_o}}{\partial V^k_{j_o}} \Delta_{ki}}{\Delta} \qquad \Delta = \left| \frac{\partial U^k}{\partial X^k_{i_o}} \right|$$

Taking (b) products as parameters and factors as unknown variables, and following the same procedure outlined above and in (IV,A,8), we find the solution of the resulting equations obtained by differentiating any kth individual U's utility function U^k_o with respect to any ith product X's departure from the equilibrium position, to be of the form

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[56] R. G. D. Allen, op. cit., pp. 482-5; Paul A. Samuelson, Foundations of Economic Analysis, op. cit., pp. 14, 30, 259; Ragnar Frisch, "On the Notion of Equilibrium and Disequilibrium," Review of Economic Studies, vol. III, 1935-36, pp. 100-6.

$$\frac{\partial v^k_{j_o}}{\partial x^k_{ji_o}} = -\frac{\sum_{j=1}^{m} \frac{\partial u^k_o}{\partial x^k_{i_o}} \Delta_{kj}}{\Delta} \qquad \Delta = \left| \frac{\partial u^k}{\partial v^k_{j_o}} \right|$$

With these results in mind, we turn again to economics.

39. The stability of equilibrium in the stationary state. We wish now explicitly to introduce time into the economic system in order to observe the behavior of its social action function, in its three domains, when inputs and outputs vary in magnitude, either at a constant rate of change, as above expressed, or in a periodically repetitive way, or when these variations at different points of time are an irremovable or essential part of the economic system. We have already studied the system as static, and we are now going to develop it as stationary, leading thereby to its treatment as dynamic.[57] In order to go from the previous static pattern to a stationary one we must cut the circular flow of commodities expressed in (39), and more elaborately in (96) and (97), into a time vector having an origin and a magnitude. Thus, the formulation (39) becomes:

$$S(Y)_{t-n} \equiv \ldots \equiv D(Y)_t \equiv S(Y)_t \equiv \ldots \equiv D(Y)_{t+n} \qquad (98)$$

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[57] W. Leontief, "Recent Developments in the Study of Interindustrial Relationships," American Economic Review, vol. 39, supplement, May 1949, pp. 220-1.

Let us call the state of affairs, $S(Y)_{t-n}$, at the beginning of the causal concatenation the initial situation of the system, where t-n=o, and let us call the state of affairs at some future point in time, $S(Y)_{t+n}$, the final objective or target of the system, where t+n = t, so that we get, instead of (98) the following formulation

$$S(Y)_o \equiv D(Y)_{t-v} \equiv S(Y)_{t-v} \equiv D(Y)_{t-v-1} \equiv \ldots \equiv S(Y)_{t-1} \equiv D(Y)_t \quad (99)$$

We have explicitly substituted (99) by (98) in order once more to stress our theme that no social or economic system is possible on a mechanistic basis. In (98) we have cut the static circularity of (39) into a time segment having two loose ends, but once the closed system became open the number of available relationships of supply and demand became insufficient to determine uniquely the magnitude of the unknown variables.[58] This means that human volition must be introduced into the hitherto purely mechanistic model, to prescribe magnitudes to some variables and by endowing them with a parametric character to determine the magnitudes of all the other variables on the basis of the still available equations. Exactly as a microstatic system cannot yield the

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[58] W. Leontief, op. cit., loc. cit.; Ph. Le Corbeiller, "Les Systemes Auto-entretenus et les Oscillations de Relaxation," Econometrica, vol. I, July 1933, pp. 328-32; Ragnar Frisch, "Propagation Problems and Impulse Problems in Dynamic Economics," in Economic Essays in Honour of Gustav Cassel, Allen and Unwin, London, 1933, pp. 171-205.

conditions for optimum equilibrium until an exogenous political structure is supposed to constrain it, so a stationary system cannot find its level of stable equilibrium until intentionality of human agency concerning the objective or target is supposed to direct that system towards its future and desirable objective. Human volition introduces dissatisfaction with the results of purely physical, and mechanical processes, i.e., a will, a deliberateness, an intentional consciousness to seduce reality to fit human desires. This also mathematically transmutes the space-time segment of action (98) into the vector (99), by providing it with a direction of vision, and thereby endowing it with an origin as well as with an orientation. In the terminology adopted in this thesis the vectorial presentation (99) subdivides the situation, conceptually, into uncontrollable conditions, i.e., distinguishes in the situation an exogenously given, original and primary set of inputs, and controllable means. The conditions will be understood as flowing into the system during the undetermined "timeless" time period preceding the moment of inception of action at o. The means, on the other hand, will be understood as the endogenous variables, flowing throughout the system from the initiation of action at o to its prescribed target at t. Moreover, the orientation of action vectorially provided by the free decision of the hypothetical individual or collective agent regarding the

objective of the action, further qualifies that objective as a future, desirable state of affairs, consisting of a final supply of goods and services facing a final demand at t to be called the ultimate end or target of action, as well as a set of specific norms of behavior for selecting the appropriate means in the supply-demand chain of relationships linking the situation to the objective.

40. The economic action characterizing the system described in (99) in terms of supply and demand may be expressed as follows:

$$W^e(U_{l_t}, \ldots, U_{s_t}, U_{l_{t-1}}, \ldots, U_{s_{t-1}}, \ldots\ldots, U_{l_{t-v}}, \ldots, U_{s_{t-v}}; U_{l_o}, \ldots, U_{s_o}, Y_{l_o}, \ldots, Y_{r_o}) = W_e \qquad (100)$$

which is a dynamic version of (75), and where e is the possible social action function (IV,A,29) among z potentialities for social integration, and comprises a duration of action of v regressive time lags starting from the initial situation at time o; and where Y_{h_o}, $h = 1, \ldots, r$, is the initial factor and resource endowment which has initially been provided to the national economy, and where any

$$U^{kt-p}(Y^k_{l_{t-p}}, \ldots, Y^k_{r_{t-p}}) = U_{k_{t-p}} \qquad p = 1, \ldots, v, t \qquad (101)$$

and any

$$Y^k_{h_{t-p}} = X^k_{l_{t-p}} + \ldots + X^k_{n_{t-p}} + V^k_{l_{t-p}} + \ldots + V^k_{m_{t-p}} \qquad (102)$$

for $k = 1, \ldots, s$; $h = 1, \ldots, r$, meaning that each economic

agent at each period of time, including the initial period, is provided with a certain amount of commodities over which he is supposed to have politically determined and juridically implemented control power. Thus, (100) may be expressed in axiomatic form as follows:

a) there is a set of economic acts, consisting in a chain of demand and supply relationships, proceeding through time period lags from an initial configuration of given conditions and available means, to a final desired state of affairs defined as an ultimate configuration of real income imputations given as ends for the national economic action;

b) this concatenation of economic acts of production and consumption is bounded by a set of specific norms of behavior which are accepted as an expression of legitimate order by the economic actors collectively involved in action as if they were a perfectly integrated individual economic agent.

This normativeness of objective conceptually exhausts the deliberate, freely volitional, human side of the picture, as thoroughly as the introduction of time and space conceptually exhausts the physical, purely mechanistic aspects of economic phenomena. The objective of an economic action, conceived

as an ultimate end and an adopted set of norms, is the cultural element of impulse which, in general terms, may be translated into a specific political, juridical, as well as philosophical superstructure constraining a particular economic system. The situation of an economic action, in its turn, provides the physical and temporal network for transmission of impulses, and which may be qualified as inputs, outputs, stocks and flows per unit time.[59] A price structure, the juridical institution of private property and free enterprise, of individual economic responsibility and consumer's sovereignty, etc., are particular instances and specific elaborations of this fundamental framework of social action, which, as already pointed out, corresponds to the structure of discursive action and to familiar categories of the human mind. It is upon this general conceptual foundation that we assume every economic system, from the most primitive to the most elaborate, as passive of complete characterization by description (a) of its situation, that is, the conditions of its performance as well as the means at its disposal; and

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[59]For a presentation of these same concepts in econometric terms see Jan Tinbergen and J. J. Polak, The Dynamics of Business Cycles, University of Chicago Press, 1950, ch. 23; Jan Tinbergen, "Econometric Business Cycle Research," Review of Economic Studies, vol. 7, 1940, pp. 73-90, reprinted in Readings in Business Cycle Theory, Blakiston, Philadelphia, 1944, pp. 61-89; Erik Lindahl, Études sur la Theorie de la Monnaie et du Capital, Librairie de Medicis, Paris, s.d. pp. 17-65.

(b) of the exogenously given norms of economic conduct as well as the socially desired future state of affairs as the objective for action. We shall demarcate these elements and the conditions for their equilibrium, at the three levels of social action, in the simple stationary model the characterization of which is here attempted.

41. The optimum conditions of stable equilibrium of firms and households. In order to study the stability of stationary equilibrium of production and consumption, we shall aggregate the s economic agents U into an unspecified number of business firms and households. And, in order to present a unified theory of households and business firms we shall assume that these collective economic agents are as much concerned about the structure of their assets as about the size of their economic gains. We assume, precisely, that similarly to individuals, both households as well as business firms, and even national governments, for that matter, have preference scales according to which they choose, as if they were individuals, among different and alternatively possible types of assets and profits.[60] The remainder of this section

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[60] H. Makower and J. Marschak, "Assets, Prices and Monetary Theory," Economica, August 1938, vol. V, pp. 271-82; A. G. Hart, "Risk, Uncertainty, and the Unprofitability of Compounding Probabilities," in Studies in Mathematical Economics and Econometrics, University of Chicago Press, Chicago, 1942, pp. 110-8; M. Kalecki, "The Principle of Increasing Risk," Economica, vol. IV, November 1937, pp. 440 ff.

will be devoted to the description of the behavior of these economic agents in a closed national economy as well as within an international economic system.

42. The utility maximization theory of the firm. In order to derive, firstly, the optimum conditions of intertemporal production and allocation of commodities, assuming a stationary state and the balance sheet-asset behavior of business firms,[61] we shall formulate the firm's planned or anticipated utility function as follows:

$$U^{ft}(X^{f}_{it}, V^{f}_{jt}, S^{f}_{gt}, X^{f}_{it-1}, V^{f}_{jt-1}, S^{f}_{gt-1}, \ldots, X^{f}_{it-v}, V^{f}_{jt-v}, S^{f}_{gt-v}; X^{f}_{io}, V^{f}_{jo}) = U_{ft} \quad (103)$$

which could, of course, be formulated in terms of a flow function of time, and where f stands for any firm, f=1,..., s; the X_i, i=1,..., n, and the V_j, j=1,..., m, as well as the S_g, g=1,..., n, 1,..., m, denoting, respectively, products or outputs, productive factors or inputs, and stocks or savings of these commodities when retained longer than one period of time. These are planned quantities as long as the period in which they are anticipated to occur has not been reached.

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[61] Kenneth E. Boulding, A Reconstruction of Economics, John Wiley, New York, 1950, chs. 6, 8 and 10; Lawrence R. Klein, Economic Fluctuations in the United States, 1921-1941, op. cit., pp. 27-32; Joseph Schumpeter, Das Wesen und der Hauptinhalt der theoretischen Nationalökonomie, Dunken and Humblot, Leipzig, 1908, ch. 32, pp. 626 ff.

At the end of each period, however, the realized amounts of goods and services, and inventories will be equal to the algebraic sum of the planned and the unplanned quantities. This utility function for the firm (103) is to be understood as a vector function whose components are the various commodity configurations at each period of time. It expresses, looking forward to the future from the standpoint of any period of time, except the last, the entrepreneur's or management's opinion as to the best course of intended action evaluated on the basis of what happened in the past; and, looking backwards to the past, it expresses the entrepreneur's or the management's knowledge as of the extent to which its past anticipations had been realized. The firm starts its action from an initial situation of liquid asset computation:

$$Y^{f}_{h_o} = X^{f}_{1_o}, \ldots, X^{f}_{n_o}; \; V^{f}_{1_o}, \ldots, V^{f}_{j_o} \qquad (104)$$

which may be expressed, as in (102), as a summation in terms of some common unit of reckoning, but which expresses a configuration of commodity ownership, or control. The firm possesses a plan of its activities along its economic horizon,[62] determining its policy and aiming at a future asset

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[62] Jan Tinbergen, "The Notion of Horizon and Expectancy in Dynamic Economics," Econometrica, vol. 1, 1933, pp. 247 ff.; G. Tintner, "The Maximization of Utility over Time," ibid., vol. 6, 1938, pp. 154 ff.; J. Marschak, "Money and the Theory of Assets," ibid., vol. 6, October 1938, pp. 311-25; A. G. Hart "Anticipations, Uncertainty and Dynamic Planning," in Studies in Business Administration, vol. II, no. 1, University of Chicago Press, 1940; L. A. Metzler, "Factors Governing the Length of Inventory Cycles," Review of Economic Studies, vol. 29, 1947, pp. 1-15.

objective or target. This may be expressed, from any period of time, as a future and expected sequence of stocks and flows, inputs and outputs, retentions and releases, along a concatenation of "locks" connecting the situation to the final end.

The norm of behavior for the firm is assumed to be that of its management's trying to maximize the realization of its intentions as expressed in the utility function (103), and subject to (a) nv technological restraints of the production functions:

$$X^{f}{}_{i\,t-p}(V^{f}{}_{il\,t-p}, \ldots, V^{f}{}_{im\,t-p}) = X^{f}{}_{i\,t-p} \qquad (105)$$

where i=1,..., n, and p=1,..., v; (b) to mv exchange restraints of the employment functions:

$$V^{f}{}_{j\,t-p}(X^{f}{}_{jl\,t-p}, \ldots, X^{f}{}_{jn\,t-p}) = V^{f}{}_{j\,t-p} \qquad (106)$$

where j=1,..., m, and p=1,..., v; (c) to nv product flow restraints of the inventory planning functions:

$$S^{f}{}_{i\,t-p}(S^{f}{}_{il\,t-p}, \ldots, S^{f}{}_{im\,t-p}) = S^{f}{}_{i\,t-p} \qquad (107)$$

together with (d) mv factor flow restraints of the savings planning functions:

$$\mathcal{S}^{f}{}_{j\,t-p}(\mathcal{S}^{f}{}_{jl\,t-p}, \ldots, \mathcal{S}^{f}{}_{jn\,t-p}) = \mathcal{S}^{f}{}_{j\,t-p} \qquad (108)$$

43. Following the steps outlined in (IV,A,8-10), and using direct methods or Lagrangean multipliers, the necessary

first order conditions for an optimum position of equilibrium will easily be obtained. Here, again, rather restrict assumptions concerning linearity and homogeneity of (105-8) are required to guarantee obtention of second order sufficient conditions for an extreme value of (103) that will in fact coincide with a true extreme value of that function. If, moreover, it is assumed that the entrepreneur plans under certainty all unplanned amounts will, of course, disappear. Then, the initial asset situation being given, and the target asset configuration being precisely known, the solution of the problem will be determinate in general. Adding two flow coefficients to those mentioned in (IV,A,34,c), namely

$$\frac{\partial S^{k}{}_{it-p}}{\partial S^{k}{}_{ij_{t-p}}} = \varsigma^{k}{}_{ij_{p-1}} \tag{109}$$

meaning the <u>coefficient of product flow</u>, being positive when stocks accumulate and negative when they are depleted. The technical output coefficient (87) minus this marginal coefficient of product flow yields the <u>net marginal productivity coefficient</u>. Coefficient (109) is to be interpreted as the rate of output accumulation or depletion of the ith product due to the engagement or release of the jth factor at the t-p time period. And

$$\frac{\partial \mathcal{S}^{k}{}_{jt-p}}{\partial \mathcal{S}^{k}{}_{ji_{t-p}}} = \sigma^{k}{}_{ji_{t-p}} \tag{110}$$

meaning the coefficient of factor flow, being positive when there are savings or unemployment and negative when there are dissavings, or depreciation of plant and equipment. The technical input coefficient (88) minus this marginal coefficient of factor flow is equal to the net marginal depreciation coefficient. Coefficient (110) is to be interpreted as the rate between a decrease or an increase in employment of the jth factor due to a deliberate increase or decrease in the ith output planned for the t-p period of time. With these new elements, we are now in a position mathematically to state the necessary first order conditions for an optimum entrepreneurial planning, as follows:

$$\frac{\frac{\partial U^{f}t}{\partial x^{f}i_{t-p}}}{\frac{\partial U^{f}t}{\partial x^{f}i_{t-q}}} = \frac{\pi^{f}ij_{o}\ \pi^{f}ij_{t-v} \cdots \pi^{f}ij_{t-p}\ dv^{f}ij_{t-p}}{\pi^{f}ij_{o}\ \pi^{f}ij_{t-v} \cdots \pi^{f}ij_{t-q}\ dv^{f}ij_{t-q}} \qquad (111)$$

and

$$\frac{\frac{\partial U^{f}t}{\partial v^{f}j_{t-p}}}{\frac{\partial U^{f}t}{\partial v^{f}j_{t-q}}} = \frac{\rho^{f}ji_{o}\ \rho^{f}ji_{t-v} \cdots \rho^{f}ji_{t-p}\ dx^{f}ji_{t-p}}{\rho^{f}ji_{o}\ \rho^{f}ji_{t-v} \cdots \rho^{f}ji_{t-p}\ dx^{f}ji_{t-q}} \qquad (112)$$

and, also,

$$\frac{\partial U^{ft}}{\partial s^{fi}_{t-p}} \Big/ \frac{\partial U^{ft}}{\partial s^{fi}_{t-q}} = \frac{\varsigma^{fij}_{t-v}\,\varsigma^{fij}_{t-v-1}\cdots\varsigma^{fij}_{t-p}\,ds^{fij}_{t-p}}{\varsigma^{fij}_{t-v}\,\varsigma^{fij}_{t-v-1}\cdots\varsigma^{fij}_{t-q}\,ds^{fij}_{t-q}} \tag{113}$$

and, finally,

$$\frac{\partial U^{ft}}{\partial \mathcal{S}^{fj}_{t-p}} \Big/ \frac{\partial U^{ft}}{\partial \mathcal{S}^{fj}_{t-q}} = \frac{\varrho^{fji}_{t-v}\varrho^{fji}_{t-v-1}\cdots\varrho^{fji}_{t-p}\,d\mathcal{S}^{fji}_{t-p}}{\varrho^{fji}_{t-v}\varrho^{fji}_{t-v-1}\cdots\varrho^{fji}_{t-q}\,d\mathcal{S}^{fji}_{t-q}} \tag{114}$$

other combinations between these four sets not being written in full.

44. This may be repeated, with loss of compactness, in words. These are the necessary first order conditions for entrepreneurial planning or the optimum allocation of initial investment expenditures on goods and services along the production horizon of the enterprise. It is assumed that the entrepreneur adopts exclusively a norm of efficiency in the technical performance of economically striving to attain a predetermined asset target: he does not try to influence prices by means of extra-market[63] operations. Moreover, it is assumed that the entrepreneur plans, by intelligent use of past experience, the distribution over time of the means and resources whose availability he anticipates at certain future time period. These conditions for an optimum

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[63] E. Ronald Walker, From Economic Theory to Policy, University of Chicago Press, Chicago, 1947, chs. 5 and 6.

equilibrium position are quite independent of the assumption of constant prices, i.e., constant marginal productivities and real returns to scale. This is necessary, not with regard to the isolated firm, but in order to maintain the constant cost assumption in order to maintain empirically intact the phenomenon of competitive equilibrium over the whole economy. Under these circumstances, the entrepreneur will correctly plan the production and allocation of goods and services for a maximum stream of anticipated incomes, and maximum attainment of a final commodity configuration, when:[64] (a) the marginal rate of substitution between any two planned outputs for any two time periods is equal to the ratio of their discounted expected marginal real costs; (b) the marginal rate of substitution of any two planned inputs of any two time periods is equal to the ratio of their discounted expected marginal real revenue productivities; (c) the marginal rate of substitution of any two planned inventories for any two time periods is equal to the ratio of their discounted expected marginal real storage costs; (d) the marginal rate of substitution of any two planned savings for any two time periods is equal to the

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[64] Jacob L. Mosak, op. cit., p. 138; Sune Carlson, A Study on the Pure Theory of Production, P. S. King, London, 1939, pp. 118-25; Erik Lindahl, "The Concept of Income" in Economic Essays in Honour of Gustav Cassel, op. cit., p. 400.

ratio of their foregone discounted expected marginal real efficiencies; (e) the marginal rate of transformation of a planned input (output) of any time period into a planned output (input) of any time period is equal to the ratio of their discounted expected marginal real revenue productivities (costs) to their discounted expected marginal real costs (revenue productivities); (f) the marginal rate of transformation of a planned input (output) of any time period into a planned stock of any other period is equal to the ratio of their discounted expected marginal real revenue productivities (costs) to the discounted expected marginal real storage costs; (g) the marginal rate of transformation of a planned stock of any period into a planned input (output) of any other period is equal to the ratio of their discounted expected marginal real storage costs to the discounted expected marginal revenue productivity of the input (marginal cost of the output).

45. These conditions may be stated in a variety of alternative formulations. Under the assumption of perfect competitive equilibrium, the market supply price of any factor is assumed to be equal to the demand price for it.[65] This is evident by inspection of the system in (IV,A,35),

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[65] J. M. Keynes, The General Theory of Employment, Interest and Money, Harcourt Brace, New York, 1936, ch. 11; Irving Fisher, The Theory of Interest, Macmillan, New York, 1930, ch. VII, pp. 150-77.

and we take it as a consistent conclusion. Since the supply price of any factor, at any period of time, is, then, supposed to be equal to the sum of its prospective yields discounted by its current marginal revenue productivity; and, since its demand price, at any period, is supposed to be equal to the same sum discounted at the current factor price, then, necessarily, at any period of time, and under the familiar conditions of perfect competition, the marginal revenue product of the factor must be equal to its current market price. This tautology may be restated in various ways, but mainly as a translation of the Keynesian principle that, in static or stationary equilibrium, the marginal efficiency of capital must be equal to the rate of interest, or that the marginal productivity of labor must be equal to the current wage rate, under constant returns to scale, which is, then, a condition sine qua non for perfect competition. Or, again, all this may be stated in terms of "circular flow" where the costs of every firm exactly equal to its receipts; profit opportunities are non-existent, and there is no involuntary unemployment of resources. Thus, in the sets of equations (111-4), the various output coefficients may be regarded either as current or realized marginal revenue productivities; the various input coefficients, as the current realized factor prices; and the various flow coefficients as the price of correct foresight, or planning skill exactly matching

anticipation to realization. As we have already assumed the initial time period as a base period, and there, necessarily, since the system is in static equilibrium, the π's will be equal to the reciprocal of the ρ's, and either the π's or the ρ's being then equal to unity, we can now formally interpret all the other π's for subsequent periods as the anticipated marginal revenue productivity of all the factors in all lines of production; the ρ's as the expected replacement costs of the factors in all lines of production at any time period except period o; and, finally, the various ς's and $\wp$'s, which do not exist at the base period, by definition, as the time rate of accumulation of any asset, destined to be used at a predetermined period of time for output as well as input adjustments. When, for instance, the productive factor is new capital or newly employed labor the output coefficients will be the discount rate anticipated at a certain future date for expenditure loans on capital or labor; and the input coefficients will be the interest or the wage rate to prevail at that time. Of course, when anticipations are realized the input coefficient of a certain period will be equal to the input flow coefficient at that time, and the output coefficient will be equal to the output flow coefficient then. This says, simply, that at any period investment must equal saving, and production must equal stocks or inventories, in absolute terms.[66]

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[66] J. R. Hicks, Value and Capital, op. cit., pp. 185-6; R. G. D. Allen, op. cit., pp. 232-4; Frank H. Knight, (continued)

46. The utility maximization theory of the household. After this rather lengthy treatment of entrepreneurial planning, the theory of the economic behavior of households may be briefly summarized. In a rather unfamiliar way we shall assume that households are, like business firms, interested in maintaining the best possible balance sheet or structure of assets. In other, more familiar words, this restates in real terms the Keynesian principle of liquidity preference. Households decide, on the basis of their income, either to spend or to save today, and, on the basis of the market rate of interest level, to hold their accumulated savings in form of either money or securities, and, on the basis of the market wage rate level, whether to supply more labor to employers or to impute their labor to themselves, in the isolation, for instance, of the family farming. In short, households decide, on the basis of business firms' demand for factors, whether to supply the factors they possess or control, or to impute to themselves the product of these factors; and, on the basis of business firms' supply of product, whether to demand these products of industry, or to refrain

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"Interest" in Encyclopaedia of Social Sciences, op. cit., pp. 131-43; Knut Wicksell, Lectures on Political Economy, Routledge, London, 1946, vol. 1, pp. 158, 167, 178, 207; W. S. Jevons, The Theory of Political Economy, Macmillan, London, 1911, p. 230; F. A. Hayek, Prices and Production, Routledge, London, 1931, p. 37; O. Lange, "The Place of Interest in the Theory of Production," Review of Economic Studies, vol. III, 1935-36, pp. 152-92.

from demanding them.[67] The households' decisions are, therefore, the exact counterpart of the business firms' decisions: firms supply products and demand factors; households supply factors and demand products. Thus, the set of equations denoting the decisions of the households in our model national economy, exactly matches the form of the utility function (103), except that the X's denote now the intended demand for consumption or use of the ith product at the pth period of time before the final date t; the V's denote the intended supply of the jth factor owned or controlled by the household at the t-p period of time; and the various S's denote the household's intended or planned holding of the gth commodity, good or factor, at the same future date. This product-demand factor-supply commodity-saving plan is decided at the o time period, but the same observation regarding planned as well as unplanned amounts could be repeated here. The household is not necessarily assumed to plan under certainty, and it will, if planning intelligently,

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[67] Heinrich von Stackelberg, Grundlagen der Theoretischen Volkswirtschaftslehre, op. cit., pt. III, pp. 105-61; W. S. Jevons, op. cit., chs. 5, 6 and 7; Vilfredo Pareto, "Economie Mathematique," in Encyclopédie des Sciences Mathematiques, Plon, Paris, 1911, vol. I, pt. 4, pp. 626 ff.; Lawrence R. Klein, op. cit., pp. 46-50; Kenneth E. Boulding, op. cit., pp. 151-4; Harold T. Davis, The Theory of Econometrics, Principia Press, Bloomington, Indiana, 1941, ch. 8, especially pp. 170-6; Hans Staehle, "Family Budgets," Econometrica, vol. 3, 1935, pp. 106-18.

modify its plan along its consumption horizon whenever its anticipations are not realized.

47. Similarly with (103) this unwritten utility function for households could also be construed in functional form, but in order to simplify the analysis we have chosen to express it with independent variables as discreet functions of time. The boundary conditions may, again, be expressed in exactly the same form as (105-8), but they must be reinterpreted to fit the meaning adequate to the economic behavior of households. The production functions (105) which, in the theory of the firm were product supply functions of productive factors regarded as parameters, now become, in the theory of the household, nv consumption functions expressing the household's intended demand for the ith consumption good X at the future date t-p as a function of the anticipated employment of the jth factors V, j=1,..., m, owned or controlled by the household in all lines of production in which these factors are used. This is a microview of the Keynesian principle that consumption is a function of income. Moreover, the exchange restraints (106) which, in the theory of the firm, were factor-demand functions of final demand for the various products, now become, in the theory of the household, mv factor supply functions expressing the household's intended supply of the jth factor V at a future date t-p as a function of the anticipated compensation that these

factors will be expected to receive from business firms in all lines of production in which they are employed. Finally, the stock-saving policy restraints (107-8), which, in the theory of the firm where inventory-savings functions of the firm's expectations regarding the probability of its income to remain stable, now become, in the theory of the household the v(m + n) liquidity preference functions expressing the household's intention to retain unused or to use itself a portion of its own endowment of commodities, i.e., goods and services until the time period t-p, as resulting from its expectations regarding the real value of these goods and services at that future date. After the differentiations and substitutions outlined in (IV,A,8-10) the necessary first order conditions for a maximum of the household's utility function will assume the same form as (111-4). But, again, these optimum conditions must be reinterpreted to fit the meaning adequate to the economic behavior of households. The optimum conditions of inter-temporal equilibrium of the household may be stated in words as follows:[68] households

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[68] I. M. D. Little, A Critique of Welfare Economics, Clarendon Press, Oxford, 1950, pp. 137-8; A. Lerner, Economics of Control, Macmillan, New York, 1947, chs. s and 3; J. R. Hicks, Value and Capital, op. cit., p. 205, chs. XI-XIII; F. A. Lutz, "The Structure of Interest Rates," Quarterly Journal of Economics, vol. 53, no. 1, November 1940, pp. 36-63, reprinted in Readings in the Theory of Income Distribution, Blakiston, Philadelphia, 1946, pp. 499-529.

correctly plan their demand for consumption goods, and their supply of productive factors, as well as the change in their wealth holdings along a stream of income possibilities when: (a) the marginal rate of substitution between consuming two goods at any two time periods is equal to the ratio of their anticipated discounted marginal real costs (prices); (b) the marginal rate of substitution between providing any two services at any two dates is equal to the ratio of their anticipated discounted marginal real value productivities (factor prices); (c) the marginal rate of substitution between holding any two forms of wealth to any two time periods is equal to the ratio of their anticipated discounted prices in real terms; (d) the marginal rate of substitution between real wealth or "cash" balances at deflated prices and any other form of holding purchasing power such as any given bond or share, at any two dates is the same for every household which possesses these forms of wealth; (e) the marginal rate of transformation between any good, service, or security of any date into the same good, service, or security at any future date must be equal to the ratio of their discounted expected marginal storage, obsolescence, depreciation, or employment opportunity costs.

48. Both these conditions for the equilibrium of households as well as the formerly deduced (IV,A,44) conditions for the equilibrium of business firms are merely necessary

conditions, not sufficient ones. If commodity prices, wage, interest, and discount rates are not given as constants, and if there is the possibility of unexpected changes in technology and tastes, the second order conditions for an extreme value of the utility functions may not coincide with the sufficient conditions for a true extreme of these functions for the firm as well as for the household. If there are external or internal economies of production and consumption the above stated theoretical conditions will be purely formal or else negative. It can be shown, and it has already been shown in the static case, that this can be avoided by introducing into the analysis a set of normative constraints provided by a social action function of the dynamic form (100) expressing the economic policy decisions of a national government. Guided by political criteria, juridically implemented, the national government intervenes in the private economy so as to modify, in a predetermined way, by taxation, expropriation, etc., the initial real income configurations over which firms and households will have control power during the course of the national economic action, generally a fiscal year. We must now fit the utility functions of firms and households into the social action function (100) in order to derive the stability conditions of stationary equilibrium of our typical national economy.

49. The stability conditions of stationary real national income equilibrium. In the stationary model economy so far described we have not yet introduced specific assumptions concerning less than full employment of resources nor about the eventual partial investment of disposable savings. We have merely tried to show how and why retentions and releases of goods and services appear within the system as brought up by the independent decisions of firms and households acting on the basis of expectations and intelligent application of past experience. Whenever these decisions are geared to complementary intentions of action, receipts will be turned into income which will be fully and regularly expended generating an equal volume of aggregate demand which will maintain the circulation steady and undiminished. If saving is necessary to provide capital goods, it will be invested within the period, the "circular flow" panels (96) and (97) not reflecting the appearance and disappearance of such instantaneous savings. It is easy to see, however, that in an uncontrolled economy the decisions to save will only by chance match the decisions to invest, since they will, then, be independent of each other, and even when made by the same individual they will nevertheless be made in different, sometimes opposite, institutional and psychological environments such as those of households and firms. Governments, for instance, may and often do adopt contradictory policies

regarding revenues and expenditures. This will be the case in an economy not affected by outside influences. We must now search for the factors explaining why at times certain national community is unable to secure full utilitzation of its resources, or why and in which way, if government activities and foreign influences are abstracted, the interactions of the decisions to save and the decisions to invest are heuristically sufficient to provide a valid explanation of the eventual fluctuations in income and employment within a closed national economic system.

50. We have already seen (IV,A,29,40) that, before being historically and culturally given, a hypothetical national economy may a priori be conceived as passive of a number of possibilities for social integration, one of which may appear as feasible.[69] Let us re-write (74) as follows:

$$P(W_1, \ldots, W_z; W_o) = 0 \qquad (115)$$

where the various social states of affairs $W_1, \ldots, W_z$ are the various possible ways of social integration within the limits imposed by given, uncontrollable social conditions W_o. One

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[69] Paul A. Samuelson, "Evaluation of Real National Income," in Oxford Economic Papers, Clarendon Press, Oxford, vol. 2, n. 1, January 1950, pp. 1-21, but especially pp. 18-9; idem, Foundations of Economic Analysis, op. cit., pp. 244-5; A. C. Pigou, Economics of Welfare, op. cit., pt. 1, chs. 2, 3, 5 and 6; I. M. D. Little, "The Valuation of Social Income," Economica, February 1949, pp. 11-29; idem, A Critique of Welfare Economics, op. cit., ch. 12.

of these various possible social states appears as politically feasible and juridically implementable. This feasible social action function, already formulated in (100), may be compactly restated here as follows:

$$W^e(U_{l_t}, \ldots, U_{s_t} ; U_{l_o}, \ldots, U_{s_o}) = W_e \qquad (116)$$

where W^e denotes a specific feasible national economic action function consisting of a v-"year plan," t-p, p=1,..., v, all indications or random disturbances being omitted; and where every

$$U^k (X^k{}_{l_t}, \ldots, X^k{}_{n_t}, V^k{}_{l_t}, \ldots, V^k{}_{m_t}, \ldots\ldots, X^k{}_{l_{t-p}}, \ldots, \qquad (117)$$
$$X^k{}_{n_{t-p}}, S^k{}_{l_{t-p}}, \ldots, S^k{}_{n_{t-p}}, V^k{}_{l_{t-p}}, \ldots, V^k{}_{m_{t-p}}, S^k{}_{l_{t-p}},$$
$$\ldots, S^k{}_{m_{t-p}}, \ldots\ldots; X^k{}_{l_o}, \ldots, X^k{}_{n_o}, V^k{}_{l_o}, \ldots, V^k{}_{m_o}) = U_{k_t}$$

meaning that the feasible social action function is a function of the utility levels of the various firms and households integrating the national society the exact numerical form of these utility functions being arbitrary, no importance attaching to the curvature properties of this locus. The (ordinal) utility levels of firms and households are function of the particular configuration of commodities owned or controlled by the economic agent at the end of each time period. Let us assume, as formerly, that the initial bill of goods and services was admitted into the causal system under consideration at the time period o immediately preceding the first

time period, t-v, of the time lag of v periods, t-p, p=1,..., v. In (117), as previously, the X's are goods, the V's are productive services, the $\mathcal{S}$'s are factor savings, and the S's are product stocks. These arguments are explained as follows:

$$X^{it-p}(V_{il_{t-p}}, \ldots, V_{im_{t-p}}, -S_{il_{t-p}}, \ldots, -S_{im_{t-p}}) = X_{i_{t-p}} \quad (118)$$

being the nv vector components of the production function of time extending from o to t, and from which the superscripts denoting ownership have been omitted since this already refers to aggregative production of the ith output. We have also

$$V^{j}{}_{t-p}(X_{jl_{t-p}}, \ldots, X_{jn_{t-p}}, -\mathcal{S}_{jl_{t-p}}, \ldots, -\mathcal{S}_{jn_{t-p}}) = V_{j_{t-p}} \quad (119)$$

being the mv vector components of the employment function of time extending similarly from o to t, and from which, again, superscripts denoting the employer of the factor has been omitted for it refers to aggregative employment of the jth input. We differentiate totally (117-119), and replacing the partial derivatives by the input, output and flow coefficients (87-8, 109-10), we get a vectorial expression[70]

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[70] Activity Analysis of Production and Allocation, ed. Tjalling C. Koopmans, Cowles Commission Monograph 13, John Wiley New York, 1951, (forthcoming), passim; George B. Dantzig, Programming in a Linear Structure, U. S. Air Force, February 1948; idem, "Programming of Interdependent Activities - II Mathematical Model," Econometrica, vol. 17, July-October 1949, n. 3, 4; Tjalling C. Koopmans, "Utility Analysis of Decisions Affecting Future Well-Being," Econometrica, vol. 18, no. 1, January 1950, p. 174; Lawrence R. Klein, "Stock and Flow Analysis in Economics"; idem, "Stock and Flow Analysis: Further Comment," ibid., vol. 18, May 1950, pp. 236 ff., 246 ff., and comment by William Fellner and Harold M. Somers, ibid., loc. cit.

for (117) as a stream of "national income" configurations of the form[71]

$$\sum_{k=1}^{s}\sum_{i=1}^{n} X^k{}_{i_o} + \sum_{k=1}^{s}\sum_{j=1}^{m} V^k{}_{j_o} + \sum_{k=1}^{s}\sum_{i=1}^{n}\sum_{j=1}^{m}(\rho^k{}_{ji_{t-v}} - \qquad (120)$$

$$- \wp^k{}_{ji_{t-v}})dX^k{}_{ji_{t-v}} - \sum_{k=1}^{s}\sum_{j=1}^{m}\sum_{i=1}^{n}(\pi^k{}_{ij_{t-v}} - \varsigma^k{}_{ij_{t-v}}) \times$$

$$\times dV^k{}_{ij_{t-v}} + \ldots + \sum_{k=1}^{s}\sum_{i=1}^{n}\sum_{j=1}^{m}(\rho^k{}_{ji_{t-1}} - \wp^k{}_{ji_{t-1}})dX^k{}_{ji_{t-1}} -$$

$$-\sum_{k=1}^{s}\sum_{j=1}^{m}\sum_{i=1}^{n}(\pi^k{}_{ij_{t-1}} - \varsigma^k{}_{ij_{t-1}})dV^k{}_{ij_{t-1}} = \sum_{k=1}^{s}\sum_{i=1}^{n} X^k{}_{i_t} +$$

$$+ \sum_{k=1}^{s}\sum_{j=1}^{m} V^k{}_{j_t}$$

This may be reformulated in general linear approximation terms, as follows:

$$A_o + a_v A_{t-v} + \ldots + a_1 A_{t-1} = A_t \qquad (121)$$

or in matrix notation, or in a block diagram, a flow chart, etc.[72] Using Euler's theorem the differentials in (120) may be replaced by discrete quantities, and the model then becomes a discrete model, where product and factor prices

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[71] Solomon Lefschetz, Introduction to Topology, Princeton University Press, Princeton, 1949, pp. 38-40.

[72] F. Machlup, International Trade and National Income Multiplier, Blakiston, Philadelphia, 1943, passim; J. M. Clark, The Economics of Planning Public Works, Washington, D. C., 1935; J. M. Keynes, The Means to Prosperity, Harcourt Brace, New York, 1933; Paul A. Samuelson, "Dynamic Process Analysis," in A Survey of Contemporary Economics, Blakiston, Philadelphia, 1948, pp. 364-7.

will be constant since they are expressions of marginal value productivities and costs. Each vector component in (120-1) may be called an unit act of a national economic action function, where t = 0 denotes the time period at the initial situation; t-v to t-1, the time periods along the chain of supply-demand or stock-flow relationships linking the situation to the desired, future, final demand configuration; and t, the final time period at which the economy's objective, target, or ultimate end for that segment of action is attained. The set of technical input, output, and flow coefficients may be considered as fixed, or may be understood as a finite set of alternatively possible linear ratios or, again, may simply be conceived, as we did here, as first order partial derivatives denoting marginal concepts, and, as long as the various functions (118-9) are conceived to be homogeneous of the first degree, having second order partial derivatives with vanishing determinants. We may aggregate the various coefficients in (120) to compress that formulation into (121), thus

$$a_p = (\rho - \sigma - \pi + \varsigma)_{t-p} \qquad (122)$$

which, of course, is equal to unity at the o time period o, at which the economy may be conceptually defined as a computation of commodities available to firms and households, which are distributed in accordance with the ethical criteria guid-

ing the political structure of action. Thus the "national income" flow may be expressed as an economic action system based on linear utility maximization functions for firms and households. And it may be vizualized as consisting in a flow, through time, and a series of "locks," or temporary retentions, or stocks, from the state of affairs at the initial situation to a desired, future state of affairs at the objective, and which may be conceived as a bill of goods and services supplied for final demand at the end of the time period t. It is assumed that this bill of goods and services could never be attained by simply allowing the natural mechanistic trends of the situation to run their own course without active intervention by deliberate, normative human agency. The objective of the economy is to maximize the realization of the target national asset at a predetermined time t. This must be achieved in accordance with the imperatives of some legitimate social order, or publicly accepted specific norms of economic behavior, so that the social objective be maximized. This objective may be either that of a free enterprise economy as that of a regimented one. This analysis is perfectly general. Even a price system was abstracted. The only value judgment that we have introduced was to hypostatize that the economic system works in obedience to an integrated volitional political agency, the specific economic norms of which may simply be conceived as

a rule, or a set of rules, generally embodied in a fiscal policy wherever private ownership over means of production is allowed, or as a rationing system when this is not the case, and expressing that net real revenue:

$$\sum_{p=1}^{v}\sum_{k=1}^{s}\sum_{j=1}^{m}\sum_{i=1}^{n}(\pi^{k}{}_{ij}{}_{t-p} - \varsigma^{k}{}_{ij}{}_{t-p})dV^{k}{}_{kj}{}_{t-p} = \text{Max.} \qquad (123)$$

and net real expenditures be

$$\sum_{p=1}^{v}\sum_{k=1}^{s}\sum_{i=1}^{n}\sum_{j=1}^{m}(\rho^{k}{}_{ji}{}_{t-p} - \varsigma^{k}{}_{ji}{}_{t-p})dX^{k}{}_{ji}{}_{t-p} = \text{Min.} \qquad (124)$$

These two normative restrictions (123-4) make determinate an otherwise underdeterminate dynamic system, exactly as, in statics, the optimum equilibrium position was not defined until a political structure were not being assumed to exist as an optimum equilibrium determining organism.

51. From equation (120-1) we may derive the familiar expression of the national income multiplier.[73] From elementary algebra we know that a series of the type (121), where the first term is A_o and the common ratio is $\underline{a}$, sum up over its $\underline{v}$ terms as

$$S_v = a\,\frac{1-a^{v}}{1-a}$$

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[73] G. Haberler, Prosperity and Depression, op. cit., pp. 456-7; Paul A. Samuelson, "Simple Mathematics of Income Determination" in Income, Employment, and Public Policy, Norton, New York, pp. 136-8; R. G. D. Allen, Mathematical Analysis for Economists, op. cit., pp. 448-9.

If a is numerically less than unity, the expression a^v becomes smaller and tends to zero as v increases indefinitely. The geometric series is convergent summing to infinity

$$k = \frac{a}{1-a} \tag{125}$$

provided that a is numerically less than one. In other cases the series is not convergent and the sum of v terms either tends to infinity or oscillates. Assuming that a is numerically less than unity we have for a multiplier of (120-1) the expression

$$\frac{dX}{dV} = \frac{A_0}{1 - \rho - \varsigma + \sigma + \pi} \tag{126}$$

a formulation which may be interpreted as meaning an increase (decrease) of real national income with reference to the kth individual U becoming more (less) satisfied without any other individual becoming less (more) satisfied. Only in this case it is possible unambiguously to state, whenever income distribution has remained the same, that an increase in national income means an increase in real national income.[74]

52. The formulation (120) is perfectly general. However, similarly to our procedure in (97), it may be expressed as a flow chart, and in terms of investment goods, I, consumption

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[74] M. W. Reder, Studies in the Theory of Welfare Economics, op. cit., pp. 14-5.

goods, C, exports, X, and imports, M, savings of productive factors, S, and stocks of finished goods, B. The convention regarding subscripts adopted in (97) will be repeated here. As only one time period will be considered, the time period t-p, the superscript characterizing it will be abstracted. The flow chart is as follows:

(127)

$$
\begin{array}{lccccccccccc}
U^1 & (I^1 & , & C^1 & , & X^1 & , & S^1 & ; & K^1 & , & L^1 & , & M^1 & , & B^1 &) & 0 \\
 & + & & + & & + & & + & & + & & + & & + & & \\
U^s & (I^s & , & C^s & , & X^s & , & S^s & ; & K^s & , & L^s & , & M^s & , & B^s &) & 0 \\
 & " & & " & & " & & " & & " & & " & & " & & \\
Y_K & (I_K & , & C_K & , & X_K & , & S_K &) = & K & & & & & & & \\
 & + & & + & & + & & + & & & & & & & & \\
Y_L & (I_L & , & C_L & , & X_L & , & S_L &) = & & & L & & & & & \\
 & + & & + & & + & & + & & & & & & & & \\
Y_M & (I_M & , & C_M & , & X_M & , & S_M &) = & & & & & M & & & \\
 & + & & + & & + & & + & & & & & & & & \\
Y_B & (I_B & , & C_B & , & X_B & , & S_B &) = & & & & & & & B & \\
 & & & & & & & & & " & & " & & " & & " & \\
 & & & & & & & & & P_I & (K_I & , & L_I & , & M_I & , & B_I &) = I \\
 & & & & & & & & & & + & & + & & + & & + & \\
 & & & & & & & & & P_C & (K_C & , & L_C & , & M_C & , & B_C &) = C \\
 & & & & & & & & & & + & & + & & + & & + & \\
 & & & & & & & & & P_X & (K_X & , & L_X & , & M_X & , & B_X &) = X \\
 & & & & & & & & & & + & & + & & + & & + & \\
 & & & & & & & & & P_S & (K_S & , & L_S & , & M_S & , & B_S &) = S
\end{array}
$$

This system (127) could be expressed by means of the familiar set of Keynesian functions adapted for sequence analysis.[75]

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[75] A. P. Lerner, "Some Swedish Stepping Stones in Economic Theory," Canadian Journal of Economics and Political Science, November 1940, p. 500; A. Smithies, "Process Analysis and Equilibrium Analysis," Econometrica, January 1942, pp. 26-38.

Its multiplier could be expressed in the same form as (126), and can be written as an equation of Y as a function of X and a constant term, as follows:

$$Y = \frac{X}{1 - c + m} + \frac{C_o - M_o}{1 - c + m} \qquad (128)$$

where c is the marginal propensity to consume, and m the marginal propensity to import. This formulation (128) could be expanded to take care of various technical coefficients. If this were done we would see that the algebraic sum of all technical coefficients must be less than unity, and also, that the output coefficient must be equal to the input coefficient after deduction of the coefficients of flow, and these, in their turn must exactly offset the rates of depreciation and depletion of plant and equipment. Moreover, the rate of investment should keep in pace with the rate of population growth, in order that the system could be kept at a stationary plateau. For a constant trend of growth (decay) the coefficients of accumulation (use or consumption) should be greater than the coefficients of use or consumption (accumulation).

53. Full characterization of a typical national economy. To this point our analysis has proceeded on the assumption that the hypothetical national economic system is either static or stationary. We shall now relax this assumption and postulate, dynamically, that, henceforth, the value taken at

any given moment of time by any variable of the system is determined partly or wholly by the values taken by that variable and/or other variables (given the parameters and the functional form of the system) at some moment or moments of time in the past.[76] On this dynamic basis we shall define a national economic system as that which consists of the economic interaction of four units of economic decisions comprising the national economy: (a) households, (b) business firms, (c) government, and (d) the rest of the world. Broadly speaking a national economic system consists of a set of economic decisions, activities or acts, which are constrained by social, political, juridical, and cultural norms of behavior. The market value of these decisions is the national output of goods and services which, at a certain period of time, sum up to the gross national product. This becomes available for purchases by or distribution to the four collective economic agents, on the basis that is determined by the economic organization of the national economy. The gross national expenditure of this national economy in a certain period of time is equal to the sum of its four economic agents' gross incomes. The difference between gross income and gross

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[76] M. Kalecki, "A Macro-Dynamic Theory of Business Cycles," Econometrica, 1935, pp. 327-44; idem, "A Theory of the Business Cycle," Review of Economic Studies, February 1937; idem, Essays in the Theory of Economic Fluctuations, Allen and Unwin, 1939, ch. V.

receipts consists of direct taxes paid to government by business firms and by households. Starting at the beginning of a certain period, from the gross receipts out of the immediately preceding period, there will be a gross expenditure for consumption and investment, the flow of commodities leading to gross product, and from this by distribution of revenue, to gross income, and finally, after direct taxation to gross receipts. It is assumed that the national economic action here typified is oriented towards the fulfillment of a certain pre-established program consisting of a final bill of goods and services set as a production and consumption target, and described, in terms of commodity configurations per unit of time period. This national economic program may not necessarily coincide with other national economic programs, and by economic sovereignty is here meant the authority of a national government to implement the economic program that it finds appropriate to the maximum satisfaction of national needs. We shall not try to determine the origins and foundation of this public conviction, which may have been attained either by democratic voting or by decree of dictatorship. We shall, however, insist, once more, that the definition of policy objectives is the essential element for the maximization of a social action function characterizing a national economy independently of any specific social action structure.

54. All this may be expressed in the familiar terms of Keynesian theory of national income determination. Let there be an international economic community set consisting of (K) = (1),..., (M), subsets each one of which denotes a national economy. Each national economy is compounded by four collective economic agents, g, h, f and w, standing, respectively, for government, households, business firms, and the rest of the world. Let there be a set of specific norms of behavior prevailing politically and juridically over the national economy of country (K), and consisting of four subsets of specific norms of behavior to which government, households, business firms, and the rest of the world obey in their interaction within (K). The specific norms of behavior of the rest of the world must coincide, where they interact peacefully with those accepted within country (K), with those norms therein accepted, in order that there be economic intercourse across national boundaries. The net national product of a country, or the real value of its national income, at any time, may be conceived as thoroughly exhausted by a computation of a bill of goods and services belonging, or under the control, of the residents of that country. After deducting capital consumption allowances, the current net national product, Y, is the algebraic summation of current real expenditures (a) for personal consumption of households and institutions; (b) for net investment of business firms on producers'

equipment, plant, farms, and for new private residential and institutional construction as well as net addition to inventories; (c) for net governmental deficit or surplus, and (d) for net transactions with foreign countries. Call these, respectively, C, I, D, F. Then,

$$Y = C + I + D + F \tag{129}$$

an identity which is an indeterminate system. In order to make it determinate we shall assume that

$$C=cY + Ca;\quad I=iY + Ia;\quad D=G - R, \text{ where } G=Ga, \text{ and } R=rY + Ra,$$
$$\text{and } F=X - M, \text{ where } X=Xa, \text{ and } M=mY + Ma. \tag{130}$$

Substituting these equations (130) into (129) we get the following expression which is a determinate system, being one equation to determine one unknown variable, Y, as a function of given parameters, the c's, the i's, the t's, and the m's, and of constant autonomous factors, Ca, Ia, Ta, Xa, and Ma:

$$Y=cY + Ca + iY + Ia + Ga - (rY + Ra) + Xa - (mY + Ma) \tag{131}$$

where the parameters denote "propensities" to consume, invest, tax, and import; and the constant factors autonomous consumption, investment, governmental spending, change in taxation rates, and importation. This expression (131) could be made somewhat more complete by addition of business savings, B, or net change in inventories, which had been aggregated to net investment; and also by adding net investment in new housing, H, so that (129) becomes:

$$Y=C + I + B + H + D + F \tag{132}$$

which, for the sake of determinacy, must be supplemented by two additional hypotheses explaining the newly introduced variables:

$$B=bY + Ba, \text{ and } H=hY + Ha \tag{133}$$

meaning, respectively, that net change in inventories is a given linear function of income of business firms, the factor of proportionality being the marginal propensity to stock, which is a flow coefficient, and an autonomous factor expressing business expectations; and that investment in construction is a function of current income, and an autonomous factor expressing the stock of past construction. With these two additions, and aggregating expenditures for consumption and investment, as real expenditures for domestic and foreign goods and services, we may state the net national product of country (K) as follows:

$$Y=E\Big(Y - R(Y) - B(Y) - M(Y)\Big) + Ca + Ia + Ba + Ha + Ga + Ra + Xa \tag{134}$$

i.e., the net national product, or real national income of a country (K), at any period of time, is equal to the total amount of expenditures, expressed in real terms, on goods and services, for consumption and investment, both of domestic as well as foreign origin, plus the expenditures made by foreign countries on goods and services exported from the national economy (K). These total expenditures are a function of disposable income and an aggregative term which may

be called domestic autonomous expenditures, i.e., expenditures not "caused" by disposable income.[77] This equation (134) is another way of expressing the net national income at each time period in the flow chart (127). It is also a specific instance of the general equilibrium system vectorially represented in (120). It says, simply, that at any time, in a hypothetical national economy in static or stationary equilibrium, the supply of goods and services is equal to the effective demand for them, or, in more roundabout words, that, in real terms, balance is achieved at a level at which effective demand is adequate to provide full employment of productive resources. This, of course, is a drastic simplification of reality, since, in money terms, balance can be achieved at less than full employment. When there are unemployed resources of all kinds available at prevailing prices, an increase in effective demand expressed in money, i.e., an autonomous, purposive, and sustained unbalanced movement expanding aggregate demand, a corresponding increase in production and employment will normally result. If resources are scarce, or immobile, or when sellers of goods and services

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[77]Paul A. Samuelson, "Simple Mathematics of Income Determination," in Income, Employment, and Public Policy, op. cit., loc. cit.; E. A. Radice, "A Dynamic Scheme for the British Trade Cycle, 1929-1937," Econometrica, vol. 7, January 1939, pp. 47-56; Colin Clark, "A System of Equations Explaining the U. S. Trade Cycle, 1921-1941," ibid., vol. 17, 1949, pp. 210-225.

speculate on the expectation of higher prices, an increase in output and employment will result, partly, in an inflationary gap between the national income expressed in market prices and real national income expressed as a bill of goods and services available at a certain date. If balance is achieved at full employment, and if, from then on, the economy remains stationary, equilibrium will be forever undisturbed at full employment. For the maintenance of such a state the requirements are formidable. There shall be no change in the rate of population growth or decrease. Consumers' tastes shall not vary, and the necessary amount of net investment shall not change. Moreover, the foreign balance must be kept in equilibrium. There shall be no credit inflation or deflation, but the supply of money and credit must be kept syntonized to the trend rate of increase or decrease in demand due to institutional changes. There must also be no governmental disturbances affecting the equilibrium of the economy. Savings must be precisely timed to induced and net investment. Production functions must be homogeneous of the first degree, and there shall not be increasing returns to scale. Major wars and major institutional changes must be abstracted. Factors must be paid in accordance with their marginal value productivities, and marginal revenue shall equal marginal cost all over the economy. Each participant in the economy must be rational in the sense of possessing a transitive ordering

of preferences, and he must, moreover, take prices as parameters, and make his decisions in isolation without taking account of its influence upon others and vice-versa. Finally, coercion, domination, alliance, tolerance, etc., shall be ruled out of the picture.

55. Displacement of equilibrium. Only in intellectual experiment are these requirements to be coincidentally fulfilled. We have already sketched (IV,A,38) a general method to determine the behavior of the system in response to a change in any of its autonomous factors. We have seen also (IV,A, 51) that, once the system is simplified to manageable proportions, the complicate determinantal expression in (IV,A,38) assumes the familiar form of an income multiplier (125-6). By expressing (132) in implicit form, and differentiating totally the result, it may be seen that the effect upon income of a change in the autonomous factors assumes the following "static multiplier" expression:

$$\frac{dY}{dCa} = \frac{dY}{dIa} = \frac{dY}{dBa} = \frac{dY}{dHa} = \frac{dY}{dGa} = \frac{dY}{dRa} = \frac{dY}{dXa} = \frac{1}{1 - \frac{\partial E}{\partial Y}\left(1 - \frac{\partial R}{\partial Y} - \frac{\partial B}{\partial Y} - \frac{\partial M}{\partial Y}\right)} \qquad (135)$$

giving the income response to a change in any of the autonomous factors. This shows to what extent effective demand is inherently unstable even at full employment. Even when time lags are abstracted, the "static multiplier" shows how an autonomous expansion or contraction of expenditures at home and abroad diffuses throughout the national economy in a

cumulative and self-reinforcing fashion. But the knowledge of the national system of transmission of fluctuations of effective demand, and of the nature of the disturbing forces, provided by the multiplier is not sufficient to determine the amplitude and duration of a particular cyclical movement, and the actual factors responsible for the turning points, especially their timing. For this, the multiplier must be interrelated with the "accelerator." In order to present this interrelation in outline we shall introduce time lags, first one, and then more than one, in equations (130), including in the final expression of the multiplier the time lagged formulations for housing and inventory investments. Moreover, as we shall speak of exports and imports, we must at this point abandon once for all the assumption of isolation of our model national economy.

B. A dynamic international economic system

1. National fluctuations in production and employment. The general expression (132) explains national output without a time reference. Making this reference explicit, expression (132) may be reformulated as follows:

$$Y_t = C_t + I_t + B_t + H_t + D_t + F_t \qquad (136)$$

where the money value of national income deflated by the price level of output is seen as a summation of real consumption expenditures of households, real gross investment expenditures of business firms for producers' durable equipment,

net real inventory expenditures, and expenditures on private construction, governmental net surplus or deficit as resulting from deducting the net algebraic sum of business taxes as well as net personal taxes or withdrawals from governmental expenditures on goods and services, and, finally, the net foreign balance of visible and invisible transactions, all these comprising current expenditures at time period t. So long as we deflate both investment and saving by the same price index of output in general, we shall have real investment equal to real savings.[78] In order to make the system (136) determinate as well as dynamic, we shall assume the following set of hypotheses:

$$C_t=cY_{t-1}+Ca;\quad I_t=iY_{t-1}+Ia;\quad B_t=bY_{t-1}+Ba;\quad H_t=hY_{t-1}+Ha;$$

$$D_t=G_t - R_t = Ga - R_t \text{ where } R_t=rY_{t-1}+Ra; \text{ and, finally,}$$

$$F_t=X_t - M_t \qquad (137)$$

or, in words: (a) real consumption expenditures, at any period of time t, depends, in a known way, upon the real net national product of the previous period, the marginal propensity to consume, and autonomous changes in consumption induced, for instance, by expected changes in prices; no account is taken of the effect of a possible reluctance to

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[78] J. R. Hicks, A Contribution ot the Theory of the Trade Cycle, Clarendon Press, Oxford, 1950, pp. 12-13.

revise consumption standards downward;[79] (b) gross investment, at time period t, depends, in a known way, upon the national income of the previous period; induced investment is assumed to be at least in the short run a rising function of disposable income; gross investment also depends upon the marginal propensity to invest at that period, and on autonomous changes in investment;[80] (c) the same linear relationships apply to housing and inventory expenditures; (d) it is assumed that government expenditure is an autonomous factor in the deficit; however, net business and personal tax collection is not considered a policy parameter, but it is assumed as depending, in a known way, on the national income of the previous period, and a constant, legislated, tax rate schedule; (e) the foreign balance consists of the difference between receipts from imports and expenditures for imports. In this last equation

$$X_t = x_t \frac{p_x}{p_m} = X_a \qquad (138)$$

where p_x is the export price index; p_m, the import price index; for simplicity, the volume of exports (x_t) at time t

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[79] F. Modigliani, "Fluctuations in the Saving-Income Ratio," in Studies in Income and Wealth, National Bureau of Economic Research, New York, 1946, vol. XI.

[80] Wolfgang Stolper, "The Volume of Foreign Trade and the Level of Income," Quarterly Journal of Economics, vol. 61, 1947, pp. 285-310.

times the terms of trade (p_x/p_m) comprises a foreign autonomous factor, Xa. This simplification is not strictly justifiable as far as some components of dividends payable to foreigners are concerned. There will also be reflex influences of income on exports via the effect of domestic imports on income and imports abroad. Moreover, it does not reflect any effect on national income resulting from a change in the volume of imports in response to a change in the relative cost of imports. It also assumes zero substitution elasticity between imports and domestic production. As for exports:

$$M_t = Mc_t + Mi_t + Mx_t = mY_{t-1} + Ma \qquad (139)$$

where

$$Mc_t = m_c C_{t-1}; \quad Mi_t = m_i C_{t-1}; \quad Mx_t = m_x X_{t-1}; \quad m = m_{c_t} + m_{i_t} + m_{x_t} \qquad (140)$$

i.e., imports at time t is a given function of income in the previous period, the marginal propensity to import, and autonomous imports, or imports not induced by a change in income; imports may be broken down into imports for the production of domestic consumption goods (M_c) imports for the production of producers' goods (M_i), and imports for the production of goods for exports (M_x), the m's being their marginal propensities to imports;[81] with a slight notation modification this corresponds to what has already been said about imports in the flow chart (127).

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[81] T. C. Chang, "International Comparison of the Demand for Exports," Review of Economic Statistics, vol. 3, n. 34, 1945-46, pp. 205-10.

2. Using now equations (137-9) in (136) we get

$$Y_t = cY_{t-1} + iY_{t-1} + bY_{t-1} + hY_{t-1} - rY_{t-1} - mY_{t-1} + Ca + Ia + Ba + Ha + Ga + Xa - Ra - Ma \qquad (141)$$

which, at the equilibrium level, where, by definition, $Y_t = Y_{t-1} = Y_{t-2} \ldots$ becomes:

$$Y_e = cY_e + iY_e + bY_e + hY_e - rY_e - mY_e + Ca + Ia + Ba + Ha + Ga + X_e - Ra - Ma \qquad (142)$$

where Y_e denotes the equilibrium level of national output, and X_e the equilibrium level of exports, and whence

$$Y_e = \frac{X_e}{1 - c - i - b - h + r + m} + \frac{Ca + Ia + Ba + Ha + Ga - Ra - Ma}{1 - c - i - b - h + r + m} \qquad (143)$$

an expression similar to (128) and from which the properties of the "static foreign trade multiplier" can be derived.[82] The notation may be simplified at this point:

$$Y_e = \frac{X_e}{d + m} + Ya; \quad \text{the multiplier being } K = \frac{1}{d + m}; \qquad (144)$$

may for convenience be divided into (a) a <u>foreign</u> part governing exports, and a <u>domestic</u> part. Subtracting (142) from (141) we get

$$Y_t - Y_e = c(Y_{t-1} - Y_e) + i(Y_{t-1} - Y_e) + b(Y_{t-1} - Y_e) + h(Y_{t-1} - Y_e) - r(Y_{t-1} - Y_e) - m(Y_{t-1} - Y_e) + Xa - X_e \qquad (145)$$

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[82] F. Machlup, <u>International Trade and the National Income Multiplier</u>, <u>op. cit.</u>, pp. 78-9; J. J. Polak and T. C. Chang, <u>An International Economic System</u>, International Monetary Fund, Washington, D. C., mimeographed copy, p. 10.

a difference equation which may be repeated for any value of t, as follows:[83]

$$Y_t - Y_e = c^1(Y_{t-1} - Y_e) + i^1(Y_{t-1} - Y_e) + b^1(Y_{t-1} - Y_e) +$$
$$+ h^1(Y_{t-1} - Y_e) - r^1(Y_{t-1} - Y_e) - m^1(Y_{t-1} - Y_e) + Xa - X_e =$$
$$= c^2(Y_{t-2} - Y_e) + i^2(Y_{t-2} - Y_e) + b^2(Y_{t-2} - Y_e) +$$
$$+ h^2(Y_{t-2} - Y_e) - r^2(Y_{t-2} - Y_e) - m^2(Y_{t-2} - Y_e) + Xa - X_e =$$
$$\ldots = c^t(Y_o - Y_e) + i^t(Y_o - Y_e) + b^t(Y_o - Y_e) +$$
$$+ h^t(Y_o - Y_e) - r^t(Y_o - Y_e) - m^t(Y_o - Y_e) + Xa - X_e \qquad (146)$$

which reformulates in terms of difference equations the differential expression (120), and which means that if a hypothetical national economy starts from an initially given configuration of goods and services, Y_o, its national income at any future time t is determined, provided that the level of exports stays invariant:

$$Y_t = Y_e + c^t(Y_o - Y_e) + i^t(Y_o - Y_e) + b^t(Y_o - Y_e) + h^t(Y_o - Y_e) -$$
$$- r^t(Y_o - Y_e) - m^t(Y_o - Y_e) + Xa - X_e \qquad (147)$$

Assuming that $Xa = X_e$, the following conclusions regarding the behavior of the system may be drawn: (a) if, also, $Y_o = Y_e$, then the national income remains at the equilibrium level indefinitely; (b) if $Y_o \gtrless Y_e$, and $d + m > 0$, then the national

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[83] J. R. Hicks, op. cit., p. 171; W. E. Milne, Numerical Calculus, Princeton University Press, Princeton, 1949, ch. XI.

income will damp down to equilibrium; (c) if $Y_o \gtrless Y_e$, and $d + m < 0$, then the system will be unstable and explosive. The condition that $d + m > 0$ is the general condition for the stability of equilibrium (IV,A,51).

3. So much for a system with a lag of one period. Let us now assume a uniform lag of more than one period.[84] Consumption now depends in part on the income of the preceding period, and this relationship recedes in time for the past t-v periods, thus

$$C_t = c_1 Y_{t-1} + c_2 Y_{t-2} + \ldots + c_v Y_{t-v} + Ca \qquad (148)$$

or, in a generalized form specified for national economy (K) = (1),..., (M), at any time period t-p, p=1,..., v:

$$C(K)_t = \sum_{p=1}^{v} c(K)_p Y(K)_{t-p} + Ca(K)_t \qquad (149)$$

where $c(K)_p$ is the marginal propensity to consume prevailing in national economy (K) at the t-p, p=1,..., v, period of time preceding the final time period t. As for investment we have:

$$I_t = i_1(Y_{t-1} - Y_{t-2}) + i_2(Y_{t-2} - Y_{t-3}) + \ldots + i_{p-1}(Y_{t-p+1} - Y_{t-p}) + Ia \qquad (150)$$

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[84] J. R. Hicks, op. cit., loc. cit.; J. S. Duesenberry, Income, Saving and the Theory of Consumer Behavior, Harvard University Press, Cambridge, Mass., chs. V and VI; L. A. Metzler, "Three Lags in the Current Flow of Income," in Income, Employment and Public Policy, Norton, New York, 1948, pp. 1-32; G. Katona, "Effect of Income Changes on the Rate of Saving," Review of Economics and Statistics, May 1949, pp. 95-103.

or, in a generalized form, specified for country (K) = (1),..., (M), at the pth time period before the final time period at t, p=1,..., v:

$$I(K)_t = \sum_{p=1}^{v-1} i(K)_p \left(Y(K)_{t-p} - Y(K)_{t-p-1} \right) + Ia(K)_t \qquad (151)$$

where the "acceleration coefficient," $i(K)_p$, is our former input coefficient when the productive factor is capital, and is here expressed in terms of the effect on investment of changes in output as a whole,[85] rather than, as it is more usual, in terms of the effects of changes in consumption only. Compare, for instance, equation (151) with any employment function above-mentioned. This autonomous investment, Ia(K), is here expressed also in real terms, i.e., deflated by the cost of living index, since this will be valid even if autonomous investment is "caused" by foreign investment. Note that autonomous investment, i.e., investment not caused by a change in output, is particularly important in certain institutional structures. In industrially developed countries, public investment as well as investment which occurs in response to innovations, and much of the so-called "long range" investment can be regarded as autonomous. But in

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[85] Bertil Ohlin, The Problem of Employment Stabilization, Columbia University Press, New York, 1949, pp. 117-8; Erik Lundberg, Studies in the Theory of Economic Expansion, P. S. King, London, 1937, p. 243 n.

countries with little domestic saving, or misdirected saving, and no capital market, such as is the case in industrially backward economies, autonomous investment acquires an international rôle. In such cases, willingness to lend in the lending country partly depends on economic conditions in the borrowing country, and to this extent foreign investment is an endogenous factor in the borrowing country's economic system. But generally, the conditions for lending in the lending country appear as predominant. In this thesis, therefore, foreign investment will always be considered as much of an exogenous factor in the receiving country's economy as is its exports. For simplicity we shall assume that the proceeds of foreign investment are used to finance imports, though not necessarily originating in the lending country, and that, as such, a foreign investment is not essentially or formally different from exports.[86]

4. Using equations (149) and (151) in the simplest expression for the national product, Y=C + I, we get

$$Y(K)_t = \sum_{p=1}^{v} c(K)_p Y(K)_{t-p} + Ca(K)_t + \sum_{p=1}^{v} i(K)_p \left(Y(K)_{t-p} - Y(K)_{t-p-1} \right) + Ia(K)_t \qquad (152)$$

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[86] J. J. Polak, "Balance of Payments Problems of Countries Reconstructing with the Help of Foreign Loans," Quarterly Journal of Economics, vol. LVIII, 1943, p. 214; J. R. Hicks, op. cit., p. 58, footnote 1, and appendix to ch. V, pp. 182-4; E. A. Radice, op. cit., pp. 47-56.

This is a rather basic equation for what follows. But we should not be entirely satisfied with this result, which is partial, as long as we are aiming at obtaining the "law" of behavior of the relative deviation between output at any point in time and output at the equilibrium level. The simplest situation is when $Ia(K)=0$ and all the Y's are equal so that $I(K)=0$, and if, moreover, $Ca(K)=0$, then $Y(K)_t=0$. If, however, $Ca(K) \neq 0$, then

$$Y(K)_e = \frac{Ca(K)}{1 - c(K)} \qquad (153)$$

as in the Keynesian "static multiplier." But when output is not stationary, two alternatives must be considered: (a) the scale expanding economy without autonomous investment, and (b) the scale expanding economy with autonomous investment. Because of the underlying assumption of a generalized constant returns to scale, which has not been relaxed, and assuming that there are no autonomous investment or autonomous consumption, i.e., that $Ia(K)=Ca(k)=0$, we obtain the economic situation already exemplified in the panels (96) and (97), except that now it is explicitly assumed that output grows at a constant rate, such that if

$$Y(K)_{t-1}=1, \text{ then } Y(K)_t = 1 + \lambda , \qquad (154)$$

where λ is the national economy's scale rate of growth. With reference to $Y(K)_e$, the national income at t may be expressed as

$$Y(K)_t = Y(K)_e(1 + \lambda)^t$$

hence

$$Y_{t-p} - Y_{t-p-1} = Y_e(1 + \lambda)^{t-p} - Y_e(1 + \lambda)^{t-p-1} = \lambda Y_e(1 + \lambda)^{t-p-1} \tag{155}$$

Substituting (155) into (152) we obtain:

$$Y(K)_e(1 + \lambda)^t = Y(K)_e \sum_{p=1}^{v} c(K)_p(1 + \lambda)^{t-p} + \lambda Y(K)_e \sum_{p=1}^{v} i(K)_p(1 + \lambda)^{t-p-1} \tag{156}$$

Rejecting, as economically inexpressive, the possible solution $Y(K)_e=0$, and dividing through by $Y_e(1 + \lambda)^{t-p}$ we get:[87]

$$(1 + \lambda)^v = \sum_{p=1}^{v} c(K)_p(1 + \lambda)^{v-p} + \sum_{p=1}^{v-1} i(K)_p(1 + \lambda)^{v-p-1} \tag{157}$$

showing that, if the equation has any real and positive roots,[88] the system remains in equilibrium at a progressive rate of growth when λ is equal to any of these roots. Assuming, now, that $Ia(K)=0$, that $Ca(K)=0$, and that $Ia(K) + Ca(K)$ is a multiple of $(1 + \lambda)^t$, and introducing the first two terms in (156), and dividing through by $Y_e(1 + \lambda)^{t-p}$ we get that

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[87] J. R. Hicks, op. cit., p. 182; R. F. Harrod, Towards a Dynamic Economics, Macmillan, London, 1948, pp. 77 ff.

[88] C. Jordan, Calculus of Finite Differences, Chelsea, New York, 1950, pp. 545-54; W. E. Milne, op. cit., pp. 324-8; L. M. Milne-Thompson, The Calculus of Finite Differences, Macmillan, London, 1933, pp. 234-7.

$$(1 + \lambda)^{v} = \sum_{p=1}^{v} c(K)_p (1 + \lambda)^{v-p} + \lambda \sum_{p=1}^{v-1} i(K)_p (1 + \lambda)^{v-p-1} +$$

$$+ \frac{Ia(K)_e + Ca(K)_e}{Y(K)_e} (1 + \lambda)^{v} \qquad (158)$$

or

$$Y(K)_e = \frac{Ia(K)_e + Ca(K)_e}{1 - \sum_{p=1}^{v} c(K)_p (1 + \lambda)^{-p} - \lambda \sum_{p=1}^{v-1} i(K)_p (1 + \lambda)^{-p-1}} \qquad (159)$$

where the "dynamic" multiplier may be expressed as follows:

$$K(K) = \frac{1}{1 - \sum_{p=1}^{v} c(K) (1 + \lambda)^{-p} - \lambda \sum_{p=1}^{v-1} i(K) (1 + \lambda)^{-p-1}} \qquad (160)$$

The equation (158) or (159) gives the moving equilibrium; the equation (152) together with the auxiliary equation (157) give the deviations from equilibrium; these equations may give the general solution, or its properties, of equation (152). We shall not attempt to present here the rigorous demonstration of this solution, but we shall attempt to outline its properties.

5. The multiplier (160) shows directly, as well as by implication, that domestic and foreign investment, either public or private, including investment in plant and equipment, business inventories and residential construction, as well as exports and granted loans are the primary factors responsible for cyclical fluctuations. These investment

fluctuations are both induced and autonomous. The induced investment, unless it results from an increase in output, which itself results from an autonomous investment adjusted to the trend of growth of the economy, would not tend to maintain itself in time, even when after the hump is over autonomous investment reverts to its equilibrium position.[89] The acceleration in the increase in the stock of capital equipment will then be greater than the rate of increase in investment opportunities. The decline in the rate of profit, and a consequent reduction in the rate of capital outlays, reduces total income and intensifies the reduction in the rate of investment. The configuration of this upward path of divergence from equilibrium may be oscillatory or that of a steady rise. It may or may not reach the ceiling at which the economy is producing an output which is the maximum obtainable with the available resources. Beyond this point the economy tends to engage itself into balance of payments difficulties, and, internally, into inflationary trends. But as far as the analysis is conducted in real terms, a cumulative downward spiral must, then, be initiated, since it is conceptually impossible for output to expand at a faster rate than the normal rate of expansion at which autono-

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[89] National and International Measures for Full Employment, United Nations, Lake Success, New York, December 1949, pp. 22-26.

mous investment fell after its burst, a normal expansion which is disguised by the continued expansion, even at a decreasing rate, of induced investment. Figuratively speaking, the economy is, then, like a rocket which rises in its trajectory as long as its initial momentum lasts, and in spite of the gravitational pull towards the earth which has never ceased to be effective.[90] In the case of a national economy this vertex of trajectory is the full employment of its available productive resources. Induced investment by itself is not sufficient to maintain the economy at this apex for more than perhaps two or three time periods.[91] Henceforth, the subsequent contraction may or may not be rapid, but in any case it will not proceed indefinitely but will come somewhere to a halt. After the upper turning point is passed induced investment will be zero, since output will be decreasing, and autonomous investment is reduced below its normal level. Then, the multiplier effect takes over, and the economy noses towards its equilibrium level, which it pierces, since, when reaching it, the cumulative effects of the rise is more than offset by the cumulative effects

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[90] Report on International Investment and Financing Facilities, Council of F.A.O., June 1949, p. 15.

[91] J. R. Hicks, loc. cit., and also G. Haberler, Prosperity and Depression, op. cit., pp. 368-9; R. F. Harrod, The Trade Cycle, Oxford University Press, Oxford, 1936, p. 165.

of the fall, and presumably, at the equilibrium level, investment will have not yet reached its minimum limit. Besides there are other breaks, such as disinvestment and dissaving, and, above all, there are the effect of long-planned public works, unemployment compensation payments, and a fall in imports relatively to exports, which together or separately may damp down the slump from its downward path, and bring the contraction to a halt. The rock bottom of slump equilibrium cannot be pierced through, it may perhaps not even be reached, except assymptotically after an infinite time. If the process of the multiplier is convergent (IV,A,51) there will be a moment at which the economy cannot dive any further and noses up, its horizontal stabilizer parallel to the normal trend of autonomous investment. Thus recovery is initiated. The duration of this cyclical process depends on the building up and the service life of capital goods. The former determines the moment at which investment overtakes investment opportunities, while the latter affects the rate at which an excess supply of equipment with reference to its possible minimum will liquidate itself. These fluctuations not only tend to become synchronized between industries of one individual country, but they also tend to spread internationally by means of trade and capital movements. To the consideration of these factors we must now turn.

6. Exports, imports, and national income fluctuations. We now consider imports and exports in relation to these fluctuations. Denote by $M(JK)_t$ the imports of country (K) from country (J), at period of time t, and by $M(K)_t$ the total volume of imports of country (K) during the same period of time. We must, then, have

$$M(K)_t = \sum_{(J=1)}^{(M)} M(JK)_t = s(J).u(JK). \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} m(JK)_p Y(K)_{t-p} +$$

$$+ Ma(JK)_t = X(J)_t = \sum_{(J=1)}^{(M)} X(JK)_t \qquad (161)$$

where $(J \neq K) = (1), \ldots, (M)$ denote the number of countries involved in international economic transactions, and $p=1, \ldots, v$, the number of time periods which we are considering t-p, a multi-period lag. The coefficient s(J) denote the marginal relative importance, or marginal share, of country (J) in world trade; this coefficient is assumed to be constant over the time period lag under study. The other coefficient, u(JK), denote the degree of economic, political, and cultural affinity, or geographic proximity or accessibility between country (K) and country (J). The symbol m(JK) signifies the marginal propensity of country (K) to import from any other country (J). According to equations (139) and (140) this marginal propensity to import may be broken down into a marginal propensity to import goods for consumption, a marginal propensity to import investment goods, and a

marginal propensity to import goods for the production of exports, in such way that

$$m(JK)=s(J).u(JK).\left(m(JK)_c + m(JK)_i + m(JK)_x\right) \qquad (162)$$

Allowance shall be made now for a possible competition between imported goods and home produced goods. This shall be considered as an explantion of "autonomous" imports, $Ma(JK)_t$, an expression designating a change in import not due to a change in income:

$$Ma(JK)_t=\left(e.m.\frac{p_d}{p_m}\right)_{(K)_t} + ma(JK)_t \qquad (JK)=(1),\ldots,(M) \qquad (163)$$

where autonomous imports are conceptually subdivided into two parts: (a) that which expresses the effect of price changes as manifested by the mean elasticity of substitution between domestic and foreign products, e, times the average value of imports, m, and the ratio of foreign to domestic prices; and (b) a properly speaking autonomous imports, ma, denoting the average propensity to import, or the level of the "import function" curve. This formula may not be satisfactory when quantitative or exchange restrictions are imposed on imports, since, then, fluctuations in income can no longer be reflected in changes in the quantities imported.[92]

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[92] J. J. Polak and T. C. Chang, op. cit., pp. 20 ff.; D. H. Robertson, "Mr. Clark and the Foreign Trade Multiplier," Economic Journal, vol. XLIX, June 1939, p. 354; G. Haberler, op. cit., pp. 461-73.

In other words, changes in the marginal propensity to import from a time period to another are to be considered unsystematic, and also changes in ma do not obey a "law" implicit in the national economic system, but must itself be a sort of policy parameter, a conceivable "autarky trend" or "tendency." Having these considerations in mind, we should facilitate statistical approximations, we shall adopt equation (161) as a sufficiently reliable explanation of the volume of imports of the national economy (K) in time period t, over a multi-period time lag t-p, and in absence of quantitative restrictions imposed during this time span.

7. A symmetrical expression to (161) may be obtained for the volume of exports of country (K). The imports of (K), as described in (161), are, of course, identical to the exports of any country (J) with which (K) has international economic contact, since what (K) imports from (J) is identical to what (J) exports to (K). But, now, the exports of (K) are assumed to constitute an exogenous factor from the point of view of economy (K). They must, therefore, be expressed as imports from (K) of any (J), $(J \neq K)=(1),\ldots,(M)$, as follows:

$$X(K)_t=\sum_{(J=1)}^{(M)} X(KJ)_t= s(K).u(KJ).\sum_{p=1}^{v}\sum_{(J=1)}^{(M)} m(KJ)_p Y(J)_{t-p} +$$

$$+ Ma(KJ)_t=M(J)_t=\sum_{(J=1)}^{(M)} M(KJ)_t \qquad (164)$$

where the same notation convention used in (161) applies, including that referring to the marginal propensities to import. But as far as any country (K) is considered, exports as well as foreign loans are to be considered a "foreign exogenous factor," thus:

$$X(K)_t = \left((x_t + x_a) \frac{p_x}{p_m} \right)_{(K)_t} = Xa(K)_t \qquad (165)$$

where $X(K)_t$ stands for the volume of exports of national economy (K) at time t, x_t denoting the volume of exports properly speaking, x_a denoting the volume of exports necessary to create a foreign balance equal to the amount of any possibly granted loan; p_x and p_m being, respectively, the price index number of exports, and that of imports referring to country (K) at time period t. This expression constitutes the <u>foreign factor</u> which, as far as economy (K) is concerned is to be understood as exogenous, $Xa(K)_t$.

8. We have, on purpose, delayed consideration of the three other items included in equation (136) along with current consumption, current investment, and the foreign balance, namely, new private construction, H_t, the governmental deficit or surplus, D_t, and business savings, B_t. We shall now give brief attention to these expenditures. Extended over a multi-period lag the deficit equation in (137) becomes, for the economy (K):

$$D(K)_t=\sum_{p=1}^{v} r(K)_p Y(K)_{t-p} + Ga(K)_t + Ra(K)_t \qquad (166)$$

The generalized equation for new private construction becomes:

$$H(K)_t=\sum_{p=1}^{v} h(K)_p Y(K)_{t-p} + Ha(K)_t \qquad (167)$$

and the generalized expression for business savings becomes:

$$B(K)_t=\sum_{p=1}^{v} b(K)_p \left(Y(K)_{t-p} - Y(K)_{t-p-1} \right) + Ba(K)_t \qquad (168)$$

These last three equations (166-8) were presented here only for the sake of completeness in the description of national expenditures for goods and services included in the national output at any period of time. They refer to real values and should be deflated by the cost of living index before statistical application. Moreover, they explain data that should be kept in mind when dealing with international trade relation of any national economy. The amount of national stocks is narrowly correlated to the problem of location of sources of supply, and with economic space as well as time. For simplicity, however, we shall keep out of account in what follows the governmental surplus or deficit, new private construction, and business savings.

9. Including into the basic equation (152) exports and imports, the net national product of country (K) at time period t may be written as follows:

$$Y(K)_t = \sum_{p=1}^{v} c(K)_p Y(K)_{t-p} + Ca(K)_t + \sum_{p=1}^{v} i(K)_p \Big(Y(K)_{t-p} - Y(K)_{t-p-1} \Big) + Ia(K)_t + s(K).u(KJ). \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} m(KJ)_p Y(J)_{t-p} + Ma(KJ)_t - s(J).u(JK). \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} m(JK)_p Y(K)_{t-p} - Ma(JK)_t \qquad (169)$$

which is obtained simply by inserting into equation (152) the equations (164) and (161) for exports from and imports into country (K). Equation (169) is a "final equation" where the national income variable, $Y(K)_t$, for any (K) at any t is explained by a set of constant coefficients and lags representing the structure of the national economy model, and a set of unsystematic terms denoting autonomous factors. There are (M) such equations, one for each country, in the international economic system we are at present considering, and a complete set for each period of time, and there are v such time periods in the lag t-p for p=1,..., v. These equations will be sufficient, given prices and exchange rates, to determine the level of income in each country for each time period. Omitting constant terms and all the exogenous variables, the endogenous variables of an international economic system may be written as follows:

$$X(T)_t = M(T)_t = \sum_{(J=1)}^{(M)} M(J)_t = \sum_{(K=1)}^{(M)} X(K)_t \qquad (J \neq K) = (1), \ldots, (M) \qquad (170)$$

which means that, at any time t, the volume of world trade $(T)_t$, in terms of imports, is identical to the volume of world trade, in terms of exports. This generalizes the system of transmission of national impulses internationally.

10. A model for an international economic system. National economies, typified in this description mesh into an international economic system[93] through the media of international trade, international capital movements and other international transactions. If countries are not obliged to participate in these transactions, and if the maximization principle is upheld in international trade as within a closed national economy, then we are obliged to conclude that some gains accrue to the various individual participants in an international economic action. We may say, more precisely, that if all the optimum conditions of production and exchange

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[93] Bertil, Ohlin, Interregional and International Trade, Harvard University Press, Cambridge, Mass., 1939, appendix A; L. A. Metzler, "A Multiple-Region Theory of Income and Trade," Econometrica, vol. 18, no. 4, October 1950, pp. 329-354; J. S. Chipman, "The Multi-Sector Multiplier," ibid, loc. cit., pp. 355-374; R. M. Goodwin, "The Multiplier as Matrix," Economic Journal, vol. 59, December 1949, pp. 537-555; J. J. Polak and T. C. Chang, op. cit., passim; and from a slight different angle see L. A. Metzler, "A Multiple-Country Theory of Income Transfers, Journal of Political Economy, vol. LIX, no. 1, February 1951, pp. 14-29, especially pp. 19-24; idem, "Underemployment Equilibrium in International Trade," Econometrica, vol. 10, April 1942, pp. 97-112; idem, "The Transfer Problem Reconsidered," Journal of Political Economy, vol. L, June 1942, pp. 397-414.

are satisfied in a certain country, then no other constellation of goods and services would suffice to make everyone as well off as they, in fact, are. The gainers by a movement away from the production aggregate would not be able to overcompensate the losers. But, in accordance with the maximization principle, trade and factor movements will take place whenever, after barriers being removed, the world prices are not identical with prices in the hitherto isolated country. And then, if we assume that all the optimum conditions are again satisfied, it once more follows that no other collection of goods which could be obtained by production or exchange would suffice to make everyone as well off as in the post-trade equilibrium position. If the distribution of real income is no worse after than before trade, and if among these collections of goods and services which can be obtained after trade is the configuration of commodities available in the pre-trade equilibrium, then we again must conclude that welfare can be said to have increased, i.e., that the post-trade national economic position is "better" than the pre-trade position.[94] All that is required to

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[94] Lloyd A. Metzler, "The Theory of International Trade," in Survey of Contemporary Economics, op. cit., pp. 233-6; Paul A. Samuelson, "The Gains from International Trade," Wolfgang F. Stolper and Paul A. Samuelson, "Protection and Real Wages," Tibor de Scitovszky, "A Reconsideration of the Theory of Tariffs," Readings in the Theory of International Trade, Blakiston, Philadelphia, 1949, pp. 239 ff., pp. 333 ff., pp. 358 ff.; I. M. D. Little, op. cit., pp. 229-31.

guarantee a gain from international trade is that (a) the distribution of real income be not deteriorated, and that (b) the comparative world prices be out of line with comparative real revenues and costs in the home country. This reasoning, however, is not complete, and may not be valid when more than one country is engaged in trade. Then, for all countries to gain from trade it is further required to assume that all the optimum conditions of production and exchange be satisfied in every participant country, so that transformation rates be equal to comparative real costs and revenues or, then, that after trade production be unaltered, so that the problem becomes merely one of exchange. If, now, we assume universal full-employment, and the absence of increasing returns to scale, then, and only then, free trade would maximize a world social action function, since it results in the fulfillment of all the optimum conditions of production and exchange throughout the world. But once this universally optimum position is reached, any individual country or group of countries, if economically strong enough to implement a nonconforming behavior without retaliation from other countries, would be able to gain more by a restrictive policy, just as an individual monopolist may so gain, than by simply conforming to the general ultra-nationally imposed norm. The undeterminacy of the whole problem is, once more, brought sharply to focus. As in the case of a

closed national economy it is not possible to derive, either statically or dynamically, a unique and stable optimum equilibrium position for an international economic system, unless a set of ethically conceived, politically determined, and juridically implemented ultimate ends is given, such that it is possible to say that the international economy tends to their fulfillment as the objectives of international economic action (IV,A,1).

11. In the absence of this universally agreed and observed set of norms of economic behavior, economic fluctuations occurring within each national economy will be internationally propagated through the network of the economic interrelations existing between individuals and groups across national boundaries. The objective of this section is theoretically to approach this international economic system, directly and as a whole. We aim at developing, briefly but exhaustively, the necessary as well as the sufficient conditions for international economic stability at an optimum position of equilibrium. Throughout this study we have tried to demonstrate its fundamental theme that no uniquely given, stable and optimum position of equilibrium is possible for an economic system unless there is a consensus among the participant economic agents about the ultimate ends of the economic action system. Since this consciously conducted, concerted, deliberate collective action aiming at a well defined objective

has never been attained internationally, we must in this section confine our attention to the description of displacement of equilibrium, or to the international economic action path of disequilibrium, leaving to the last part of this thesis the determination of the conditions of equilibrium in a dynamic international economy. Here we assume that an international economic order can be positively described by means of a world trade multiplier, whereas the description of the equilibrium conditions is essentially organizational and normative, and cannot prescind from considerations regarding an international consensus with respect to socio-ethical norms. For a positive description of the international economic order we need only to uphold the maximization principle as the universally accepted norm of economic action, i.e., by maintaining the assumption of constant returns to scale as applicable to the national production and employment functions of every country concerned, we shall assume that each participant country endeavors to maximize its gains from trade at the same time that it tries to minimize the expenditures necessitated by the acquisition of these gains. Moreover, we assume that countries possess the essential ingredients of national economic systems as previously described, such as an active population, a configuration of available commodities as an original endowment of goods and services, as well as political independence, i.e., in juristic

terms, national sovereignty. The international economic action, as formerly the national economic action at the technological and the exchange levels, will be visualized as flowing through time and an economic space, although problems of location will not be directly treated, all commodities being conceived as produced, and all costs of production as computed, after inclusion of the physical transportation of commodities to their users or consumers as well as transportation costs. The national sovereignty assumption simply means that nations will be assumed to be entitled to freedom of economic decisions, the political problem of the national allocation of coercive power being understood as satisfactorily solved, by imposition or consent within each national economy. It is, moreover, assumed that there exists a set of tacit norms of economic behavior prevailing internationally as an unwritten code or "law of nations," and referring to such matters as, for instance, the legitimacy of certain particular institutional structures of national economic organization. In other words, each country, besides being entitled to political sovereignty as regarding its capacity to make national economic decisions and policies, is also supposed to be entitled to particular ideological and cultural patterns, i.e., of specific national social action functions not strictly conforming to some universally valid ethical foundation. This is, for the moment, all that

we need as a general hypothetical framework for a positive theory of international economic order.

12. Our first step now is to divide the national output, of any country (K)=(1),..., (M), at any period of time t, $Y(K)_t$, into two parts: (a) a <u>domestic</u> part, which will enter as an aggregate in the international economic system, and comprises the sum of all expenditures on domestically produced goods and available services, to be denoted by the symbol $E(K)_t$, and given as a linear function of the national output of the previous time period; and (b) a <u>foreign</u> part, comprising the national economy's receipts from exports and expenditures on imports of goods and services, i.e., its foreign balance. Thus the general equation (169) may be reformulated as follows:

$$Y(K)_t=E(K)_t - M(K)_t + X(K)_t \tag{171}$$

where the domestic part is a function of output of the previous time period

$$E(K)_t= \sum_{p=1}^{v} E(K)_p\left(Y(K)_{t-p-1}\right) \tag{172}$$

and the foreign part is, in its turn, subdivided into: (a) the sum of all imports of country (K) from all other countries (J) given as a function of the national output of country (K) in the immediately previous time period, thus

$$M(K)_t= \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} M(JK)_p \left(Y(K)_{t-p-1}\right) \tag{173}$$

and (b) the sum of all exports from country (K) to all other countries (J) given as a function of the national output of each country (J) in the immediately preceding period of time, thus

$$X(K)_t = \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} M(KJ)_p \left(Y(J)_{t-p-1}\right) \qquad (174)$$

With these equations (171-4) it is possible to represent the international economy in terms of imports of all participant countries from all other participant countries, or as a flow of commodities, i.e., goods and services, in a fashion identical to the one we have used to formulate in (120) and (127) the flow of commodities in a national economic system. As in the flow chart (127), the flow chart representing a dynamic international economic system would also be open at both ends, that is, (a) at the initiation of the international economic action, where the world supply of goods and services is assumed to have been historically distributed among the various countries

$$Y(T)_o = Y(1)_o + Y(2)_o + \ldots + Y(M)_o \qquad (175)$$

and (b) at the ultimate end of the international economic action, where the national bill of goods and services available at the end of time period t faces a final world demand, $Y(T)_t$. By deflating all participant countries' money value

of their national income data into real value,[95] and by assuming that, however many variables the full system describing the world economy may possess, this system can always be represented by linear relations, we may write the final equation resulting from a general system of linear difference equations describing each national economy in the international economic system. After the elimination of all variables except one, the final equation representing a dynamic international economic action emerges as follows:

$$Y(T)_o + a(T)_v Y(T)_{t-v} + \ldots + a(T)_1 Y(T)_{t-1} = Y(T)_t \qquad (176)$$

which is a vectorial expression similar to (121), and where $Y(T)_o$ is an exogenous variable at time o; $Y(T)_{t-p}$, p=1,..., v, the world income in real terms at time period t-p; and any $a(T)_p$, including $a(T)_o$ which is assumed to be equal to unity, being a constant coefficient at the pth time period before the final time period at t. If these coefficients are such that there exists an equilibrium value of $Y(T)_t$, named $Y(T)_e$, for any value of $Y(T)_o$ except zero, this equilibrium value for the international economic action (176) could be

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[95] Using the Laspeyre price index to test increases, and the Paasche index to test decreases in real national incomes, as recommended in I. M. D. Little, A Critique of Welfare Economics, op. cit., p. 217; idem, "The Valuation of the Social Income," Economica, February 1949, pp. 11-26; Paul A. Samuelson, "Evaluation of Real National Income," Oxford Economic Papers, vol. 2, January 1950, pp. 1-21 and appendix, pp. 22 ff.

expressed as follows:

$$Y(T)_e = \frac{Y(T)_o}{1 - a(T)_1 - a(T)_2 - \ldots - a(T)_v} \qquad (177)$$

and the "multiplier" of the system, with respect to $Y(T)_e$, will be:[96]

$$K(T) = \frac{1}{1 - a(T)_1 - a(T)_2 - \ldots - a(T)_v} \qquad (178)$$

which is the most general expression of the dynamic "law" of the world income determination. If autonomuos factors are maintained constant leeway will be provided for the "hidden law" of the world income mechanism to reach equilibrium and to stay there without being disturbed. But this general formulation (178) could be written in terms of the national outputs of the various economically interrelated countries.

13. The international reflection ratio. Each term in both sides of (176), including the initial one, may be explained as a summation or aggregation of the outputs of all the participant national economies, thus

$$Y(T)_{t-p} = \sum_{p=o}^{t} \sum_{(K=1)}^{(M)} a(K)_p Y(K)_{t-p} \qquad (179)$$

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[96] J. J. Polak and T. C. Chang, op. cit., p. 12; Marshall K. Woods and George B. Dantzig, "Programming of Interdependent Activities - I. General Discussion," Econometrica, vol. 17, July-October 1949; George B. Dantzig, "Programming of Interdependent Activities - II. Mathematical Model," Econometrica, loc. cit.; Paul A. Samuelson, "Dynamic Process Analysis," in A Survey of Contemporary Economics, op. cit., pp. 377-81.

where $a(K)_o = 1$, and each

$$Y(K)_{t-p} = C(K)_{t-p} + I(K)_{t-p} - M(K)_{t-p} + X(K)_{t-p} \qquad (180)$$

or, using (171) as well as (172-4),

$$Y(K)_{t-p} = E(K)_{t-p} - M(K)_{t-p} + X(K)_{t-p} \qquad (181)$$

which is the same as

$$Y(K)_{t-p} = \sum_{p=1}^{v} E(K)_p \left(Y(K)_{t-p-1}\right) - \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} M(JK)_p \left(Y(K)_{t-p-1}\right) +$$

$$+ \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} M(KJ)_p \left(Y(J)_{t-p-1}\right) \qquad (182)$$

or, using (169) for consumption, investment and imports, and (165) for exports, we get

$$Y(K)_{t-p} = \sum_{p=1}^{v} c(K)_p Y(K)_{t-p} + \sum_{p=1}^{v} i(K)_p \left(Y(K)_{t-p} - Y(K)_{t-p-1}\right) +$$

$$+ Ca(K)_t + Ia(K)_t - s(K).u(JK) \sum_{p=1}^{v} \sum_{(J=1)}^{(M)} m(JK)_p Y(K)_{t-p} -$$

$$- Ma(JK)_t + Xa(K)_t \qquad (183)$$

an expression which, using the breakdowns in (162-3), could be further expanded to finer details, but which, as it is, fits our purposes. Recalling the basic assumption of constant returns to scale as prevailing throughout the national economy (K), and that, therefore, output increases at a constant rate in relation to inputs, λ, such that $\lambda(K)$ denotes the trend of growth of (K), it can be shown, by the same procedure

used to determine (159), that, when foreign transactions are included in the national output of any country (K), the equilibrium level of this national output may be expressed as follows:

$$Y(K)_e = \frac{Ia(K)_e + Ca(K)_e - Ma(JK)_e + }{1-\sum_{p=1}^{v} c(K)_p\left(1+\lambda(K)\right)^{-p} - \lambda\sum_{p=1}^{v-1} i(K)_p\left(1+\lambda(K)\right)^{-p-1} + \sum_{p=1}^{v}} \quad (184)$$

$$\frac{+ Ma(K)_e}{\sum_{(J=1)}^{(M)} m(JK)_p\left(1+\lambda(K)\right)^{-p}}$$

an expression which could be notationally compressed. Denoting the "marginal propensity not to spend" of (K) as

$$1 - \sum_{p=1}^{v} c(K)_p\left(1+\lambda(K)\right)^{-p} - \lambda\sum_{p=1}^{v-1} i(K)_p\left(1+\lambda(K)\right)^{-p-1} = \gamma(K) \quad (185)$$

and the "marginal propensity to import" of (K) as

$$\sum_{p=1}^{v} \sum_{(J=1)}^{(M)} m(JK)_p\left(1+\lambda(K)\right)^{-p} = \mu(K) \quad (186)$$

we get a conveniently simple expression for the "dynamic multiplier" out of (184):

$$K(K) = \frac{1}{\gamma(K) + \mu(K)} \quad (187)$$

In order now to obtain the relation between the foreign factor, $Xa(K)_e$, at the equilibrium level, and the equilibrium

level of imports, that is, the reaction path of the national economy (K) to impulses from abroad, we may reformulate the equation (75) as subdivisible into a domestic part $Y_d(K)_e$, and a foreign part, $Y_f(K)_e$, as follows:

$$Y(K)_e = \frac{Xa(K)_e}{\gamma(K) + \mu(K)} + \frac{Ia(K)_e + Ca(K)_e - Ma(JK)_e}{\gamma(K) + \mu(K)} \qquad (188)$$

$$Y(K)_e = \frac{Y_f(K)_e}{\gamma(K) + \mu(K)} + Y_d(K)_e \qquad (189)$$

According to (186) imports at the equilibrium level may be expressed as follows:

$$M(K)_e = \mu(K) . Y(K)_e \qquad (190)$$

Substituting (189) into (190); omitting $Y_d(K)_e$, and assuming that the national economy starts from the equilibrium level

$$Y(K)_e = \left(1 + \lambda(K)\right)^{-p} \qquad (191)$$

we get

$$M(K)_e = \frac{\mu(K)}{\gamma(K) + \mu(K)} . Y_f(K)_e \qquad (192)$$

and writing

$$\varphi(K) = \frac{\mu(K)}{\gamma(K) + \mu(K)} \qquad (193)$$

we obtain the international reflection ratio showing the intensity with which the national economy (K) reflects back

into the rest of the world impulses it receives from abroad. The ratio $\varphi \gtrless 1$, according to $\gamma \lesseqgtr 0$. The two values, $\varphi = 1$, and $\gamma = 0$, are both critical values for the stability of the national economy (K). If $\gamma = 0$, the multiplier would be infinite but for the fact that part of the domestic impulse is transmitted to foreign countries through imports: the national economy (K) is stable because other economies, with which it is connected, are stable. If $\varphi = 1$, the country sends back to the rest of the world, with equal intensity, any shock it receives from abroad: it contracts or expands imports with the same intensity that its exports have been contracted or expanded. It is, finally, because $\varphi < 1$ in a sufficient number of national economies that the international economic system is stable as a whole.

14. The world economy multiplier. We have now all the theoretical elements we need to combine the relationships concerning individual national economies into an expression denoting the world output multiplier. Assume that, for all (K) = (1),..., (M), the affinity coefficient s(JK) = 1. Then, according to (164), the volume of exports of economy (K) at the equilibrium level where $Y(K)_t = Y(K)_{t-2} = \ldots$ will be

$$X(K)_e = s(K) \sum_{(J=1)}^{(M)} M(KJ)_e \qquad (194)$$

where s(K) denotes, as we have already indicated, the importance or share of the national economy (K) in world trade (IV,B,6). Since, for the world as a whole, the total volume of imports is identical to the total volume of exports, the equation (194) may be reformulated as follows:

$$S(K)_e = s(K)\left(X(T)_e - M(K)_e\right) \qquad (195)$$

Using (192) and (193), and making $Y_f(K)_e = X(K)_e$ by assuming that there is no foreign lending at the equilibrium level, then (195) may be written

$$X(K)_e = \frac{s(K)}{1 + \varphi(K).s(K)}\ X(T)_e = \Psi(K).X(T)_e \qquad (196)$$

for

$$\Psi(K) = \frac{s(K)}{1 + \varphi(K).s(K)} \qquad (197)$$

where $\Psi(K)$ may be called "marginal propensity of the rest of the world to import from the national economy (K)." This is the first of three equations from which we intend to derive a multi-national multiplier. The second equation may easily be obtained from the foreign part of equation (188), by assuming again that $Y_f(K)_e = X(K)_e$. Accordingly, we write:

$$Y(K)_e = \frac{X(K)_e}{\gamma(K) + \mu(K)} \qquad (198)$$

The third and last equation is simply (190). With φ as defined in (193), and Ψ as defined in (197), equation (192)

may be reformulated as follows:

$$M(K)_e = \varphi(K).\ \psi(K).X(T)_e + A(K) \qquad (199)$$

where A(K) is the total effect upon imports of all exogenous variables which have been omitted from (196), (198), and (190). Finally, from (170), we obtain

$$M(T)_e = \frac{\sum_{(K=1)}^{(M)} A(K)}{1 - \sum_{(K=1)}^{(M)} \varphi(K).\ \psi(K)} = X(T)_e \qquad (200)$$

the systematic part of which is the <u>multi-national multiplier</u>:[97]

$$K(T) = \frac{1}{1 - \sum_{(K=1)}^{(M)} \varphi(K).\ \psi(K)} \qquad (201)$$

This multiplier will be damped since its denominator seems <u>a priori</u> to be less than unity. It synthetizes the propagation system. The impulses are summed up in A(K) of equation (200). They may be classified into two types of impulses or "shocks": (a) those that add to the importation of one country without simultaneously reducing the importation of

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[97] O. Lange, "The Theory of the Multiplier," <u>Econometrica</u>, vol. 2, July-October 1943, pp. 227-245; W. Leontief, "Output, Employment, Consumption, and Investment," and "Exports, Imports, Domestic Output, and Employment," respectively, in <u>Quarterly Journal of Economics</u>, vol. 58, February 1944, pp. 290-314, and vol. 60, February 1946, pp. 171-193.

another country; and (b) those which add to the imports of one country while reducing the importation of one or more other countries. The net effect of these two types of "shocks" need not be zero.

15. Properties of the international trade multiplier. Starting from an international economy in equilibrium, where the marginal real value of goods and services exported by any country at any period of time is exactly balanced by the marginal real value of goods and services imported, any one or both of two types of parametric shifts will cause this equilibrium to be displaced: (a) technological changes affecting the production level of the international economic action function; and (b) psychological changes affecting this function of international economic action at its exchange level. These parameters of shift have been called autonomous factors of displacement of equilibrium. The first type of shift, affecting production at its technological level is caused by changes in the various technical output, input, and flow coefficients, which are, for any country (K), the ρ (K), the π(K), the σ(K), and the ς (K). Since these coefficients should carry subscripts denoting not only specific productive factors but also lines of production as well as the time period of production, it will be easily imagined, even for a couple of countries, how ephemeral will be a state of equilibrium based upon their

permanence. The second type of shift is even more evasive for it affects the equilibrium of exchange through changes in the indifference-preference surfaces of individuals and integrated groups. These marginal utility indices are, for any national economy (K), the $\omega(K)$, and the $\upsilon(K)$, which carry superscripts indicating the particular individual or integrated group to whom they belong as well as subscripts denoting goods, services, and a time period of use or consumption. Furthermore, the marginal social utility coefficient, $\omega(K)$, refers to changes in the real national income, which is of extremely doubtful detection, if we wish to maintain that individual utilities are not comparable. All we can hope to do in these circumstances is, by aggregation and linear approximation, to predict, on the basis of statistical observation, what will be the sign of certain variables when subject to well-defined conditions. Thus, for instance, if the assumption of maximizing behavior is upheld, the equilibrium values of the variables can be regarded as solutions of an extremum problem, and then, regardless of the number of variables, it is often possible, by determining the sign of special determinantal forms, to define the qualitative behavior of the solution values in respect to changes of parameters.[98] An alternative method is to narrow the problem

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[98]Paul A. Samuelson, Foundations of Economic Analysis, op. cit., p. 21; J. L. Mosak, General-Equilibrium Theory in (continued)

by considering parameters which supposedly cause only one of the various equilibrium equations to shift. These are autonomous factors such as Ia(K), Ca(K), Ga(K), Ra(K), Ma(K), Xa(K), Ba(K), Ha(K), s(K), and u(K), as well as changes in the terms of trade and other price ratios. Whenever exchange and quantitative restrictions are introduced we should also consider the shifts in the average and marginal propensities to import due to these restrictions. But this is still too broad a problem for one to consider who does not aim at purely formal answers, and who has in mind exclusively international economic situations. If we, nevertheless, insist upon the usefulness of such investigations, we must still commit ourselves to the simplifying assumption that the international repercussions of all such disturbances have many common features, and that it would be needlessly repetitious to consider each of them separately. Maintaining, therefore, our assumption of constant returns to scale, and the overall linearity of production and employment functions, we shall restrict our attention to the short-run and to the domestic investment aspects of the problem.

16. We shall assume that the most important autonomous factor in the short run is either a change in private

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International Trade, op. cit., pp. 49-51; L. A. Metzler, "Stability of Multiple Markets: the Hicks Conditions," Econometrica, vol. 13, October 1945, pp. 277-92. A. C. Aitken, Determinants and Matrices, op. cit., pp. 74-75.

investment not induced by a change in output, or a change in the magnitude of governmental investment expenditures. These factors, which are supposed immediately to affect the level of imports, may have been primarily caused by a great variety of motives, such as changes in business expectations, as a result, for instance, of changed political conditions, new discoveries and inventions, expenditures for military preparedness, changes in the structure of interest rates, governmental policies affecting credit, labor, prices in general, tariffs, etc., as well as by every type of foreign influence affecting exports. Changes in the level of domestic investment, whether public or private, caused by domestic as well as foreign factors, domestically affect the level of production and employment, and, through a consequent displacement of equilibrium in the balance of payments, exert a direct influence on the balance of international transactions. The intensity of this reflection is given by means of equation (193). Generally the reaction path is that, whenever country (K) experiences a reduction in its exports, the incomes of its export industries will fall, and this, bringing about a reduction in demand for the products of its other industries, will cause a fall in production, and a fall in its demand for imports. Depending on (K)'s reflection ratio the national economy will poise again in equilibrium at a lower level of economic activity, or its imports will not be

reduced by the full extent of the fall in exports leaving a residual disequilibrium in its balance of payments on current account.[99] We have already noted (IV,B,13) that the stability of the international economic system rests upon the empirical fact that the reflection ratio is less than unity in a sufficient number of countries, since, then, the marginal propensity not to spend will be greater than zero in the national income multipliers of these same countries. If this were not so, there would be no floor for effective demand to fall as well as no ceiling for it to rise, the whole system being explosive upwards and downwards. As this is evidently not the case what frequently happens is that whenever country (K) let its effective demand fall this creates a favorable balance in its foreign transactions, since the other countries will not reciprocate (K)'s cut in its imports from them with an offsetting cut in their imports from (K). Contrariwise, if (K) increases its level of employment, by means of private or public investments, this creates an import surplus for (K), since, then, other countries will not normally raise their imports from (K) at the same rate that (K) increased its imports from these countries. This, however, is the general case, for, whenever it is applied

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[99] H. C. Wallich, "United Nations Report on Full Employment," American Economic Review, vol. 11, December 1950, pp. 876-83; The Problem of Economic Instability, a Committee Report, American Economic Review, vol. 11, September 1950, pp. 532-4.

to specific instances, the problem loses much of its sharpness. We see, in (200), that much depends upon the marginal propensity of the rest of the world to import from (K), given in (197), which, of course, depends upon the importance or share of (K) in world trade. Unimportant countries, for instance, may permit their effective demand and employment to fall, or pursue deflationist policies without exerting a perceptible influence in the rest of the world, and, at the same time they will, by so doing, augment their own international financial strength. Conversely, unimportant countries would not affect the level of activity in the rest of the world in a ponderable way by running into balance of payments difficulties for the sake of fidelity to pledges with other members of an international society which do not care for them. On the other hand rich and large countries, tending as they do to export a smaller proportion of their total production than less well developed countries, will be less exposed than less important countries by fluctuations in effective demand from abroad, but their decisions to lead policies of external strength and internal economic weakness, or vice versa, will affect many. This is the reason why small countries tend politically to favor restriction and bilateralism while large and important countries tend to favor free trade and multilateralism; the first have much to gain through a restrictionism which does not provoke

retaliation, whereas the latter have at least nothing to lose by favoring multilateral schemes.

17. The international trade multiplier expressed in equation (201) yieldsother suggestions. We see, for instance, that an international consensus on the pursuit of policies aiming at economic prosperity and stability is consistent with an equally international consensus on the desirability of effective competition and free trade only if there is a tacit understanding to violate the freedom of trade whenever the effort of some countries to pursue full employment policies are being frustrated by the failure of other countries in this policy or in that of avoiding inflationary tendencies. This is a world <u>trade</u> multiplier and not a world <u>output</u> multiplier. By itself, and in a negative way, the expression (200) suggests that there may be a fall in world trade not followed or caused by a proportional fall in world income, and only by going through the reflection ratio down to its real roots into the national income of each participant country, it is possible to see in a theoretical light the intuitive limits to restriction imposed by the uneven distribution of resources and the obvious advantages of international division of labor. This exploration of the hidden implications of the multiplier (201) suggests, moreover, that bilateral systems can only succeed if they include all the major trading nations, whose position in the

coalition must then be one of leadership while, for less important nations the political rôle will simply be one of adaptation. This distribution of rôles, in accordance with the reflection ratio, should be made in accordance with (a) the particular country relative share in the world trade; and (b) its income elasticity of demand for imports from other countries.

18. Import restrictions are the next important category of autonomous shocks, all in the downward direction, in the volume of world trade. Here, however, the effects are less clear cut as long as only individual countries are concerned, since an import restriction which is not followed by retaliation may in fact increase a country's national income at a given level of imports, than actually to restrict the volume of imports itself. We may say that the net effect of such restrictions would bear a ratio of $1 - \varphi$ to the original restriction. Finally, changes in export and import prices constitute autonomous influences for the particular country that is affected by the change in demand resulting from them. Thus, as far as any one specific national economy is concerned they constitute important influences in the level of national demand. The net result seems to depend rather closely on the precise values of the φ's for the countries concerned. Given, therefore, the multiplier transmission system, and these various autonomous impulses, the primary

cause for fluctuations in effective demand may be most generally imputed to the uneven distribution of economic resources throughout the world. According to any country (K)'s reflection ratio, (K)'s degree of exposure and transmissibility of fluctuations in effective demand, the φ (K), depends upon its marginal propensity not to spend income, the γ (K), and upon its marginal propensity to import, the ρ (K), which, in their turn, depend upon the c(K), the i(K), and the m(K). That is, specifically, (K)'s international reflection ratio depends: (a) upon the particular phase of the cycle during which the national output computation takes place, i.e., upon the relative deviation of net national product from its equilibrium level; (b) on the types of goods to be imported and exported, i.e., on the m_c, the m_i, and the m_x; (c) on the elasticity of substitution of imports for domestic goods, i.e., on the Ma(K) which includes foreign investment; (d) on the income elasticity of demand for imports, and, finally, (e) on the income elasticity of demand for (K)'s exports of other countries.

19. The effect of transport costs is to localize and delay the speed of transmission of fluctuations, and tariffs, in this case, will tend not so much to localize but also to orient fluctuations, since they confine demand to particular sources of supply not necessarily near. To the extent that tariffs tend to reflect in the price ratio in (163) they

are susceptible of explanation as for their influence upon imports by formulation (163). Assuming no retaliation, a reduction of imports due to a tariff may, if exports are unaffected, influence favorably foreign and domestic reserves for investment in the protected industry. As tariffs differ from transport costs in that they can be altered by legislation it is conceivable a countercyclical tariff policy.[100] A country threatened by deflation abroad or at home should then raise its tariffs in order to avoid a depression, and pursue the opposite policy in case of inflation. Attention, however, should be directed on the consequences of such a policy, which are not so clear cut as they appear at first sight, since much depends upon the other countries reflection ratio. If this policy is advisable for a single unimportant country, or unimportant group of countries, retaliation and the simultaneous pursuance by all nations of such a policy should render it unadvisable for an important country or group of important countries, since, then, specialization and international division of labor will cause that the demand for domestic products not to raise to the same extent as the demand for imports falls. Conversely, in the upswing, a simultaneous, tariff reduction will increase the expansionary impulse to each country.

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[100] G. Haberler, op. cit., ch. 12; Hans Neisser, Some International Aspects of Business Cycles, Blakiston, Philadelphia, 1936, ch. 5.

20. The effects of quantitative import restrictions, however, may not reflect in the price ratio in (163). These restrictions affect both the level and the slope of the import functions.

21. The influence of foreign investment, that is, of the uneven distribution of capital among nations, and its imperfect mobility across national boundaries, is by far the most important autonomous influence in the propagation or circumscription of business fluctuations.[101] Perfect mobility of capital, and complete immobility of goods would apparently cause the international economic system to be completely unstable. As far as the rate of interest has an effect upon business cycles, and to the extent that the imposition or removal of restrictions on capital movements will tend to reduce or raise the rate of interest in the capital exporting country, and to raise or reduce it in the capital importing country, a certain immobility of capital will tend to damp down local booms and depressions, since with perfect mobility a local inflation would feed on credit drawn from all over the world, and the rate of interest will then raise much less quickly than it would were only local funds available, and

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[101] Shan-Kwei-Fong, Business Cycles and the International Balance of Payments: An Application of Period Analysis to the International Money Mechanism, unpublished Ph.D. thesis filed at Harvard University, 1941; Svend Laursen, International Propagation of Business Cycles, unpublished Ph.D. thesis filed at Harvard University, 1941.

a local depression would be aggravated, since funds cannot leave the country and this would tend to depress the rate of interest and retard the chances and speed of revival. However, when goods move also, an active foreign balance in current transactions may furnish the fuel that is denied by capital immobility. Moreover, some of the inflationary fuel may come out of hoards, or, in case of a depression, go into hoards, thereby aggravating the inflation although capital be immobile.[102]

22. We may summarize the properties of the reflection ratio and the international trade multiplier. Starting from equilibrium the balance of international transactions is primarily affected by changes in the levels of production and employment. Seeing these changes exclusively from an international point of view, we may say that fluctuations in the levels of production and employment are caused by autonomous deviations of domestic as well as foreign investment from their equilibrium level. These deviations, in their turn, may be caused by various national and international impulses and "shocks," which, once exerted, tend to propagate throughout the system in a systematic way. If all countries had the

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[102] Albert Aftalion, "Les Variations Cycliques Irregulières dans les Relations Internationales," Revue d'Économie Politique, vol. 47, 1933, pp. 273-91; A. H. Hansen, International Capital Movements and the Stabilization of Employment, Principia Press, Bloomington, Indiana, 1933 pp. 192-205.

same relative importance in international trade; if tastes and cultural differences were non-existent or at least comparable; if resources as well as initial real incomes in goods and services were evenly if not equally distributed among all participant countries; and if their reflection ratios and their marginal propensities not to spend income were such that any country's reduction (increase) in its effective demand for imports of all other countries would be sufficient to reduce (increase) its exports by the same rate as its imports, simultaneously, equilibrium would be stable, and its path perfectly stationary, no deviations from it being possible. In reality, any country's reduction (increase) in its effective demand for imports will not be sufficient to reduce (increase) its exports by the same rate, and this means that, from the point of view now of a single country, the pursuance of full employment policies spells balance of payments difficulties, whereas a policy of equilibrium in the balance of payments attract domestic unemployment and a fall in effective demand. From the viewpoint of any single country, the policy leading to internal economic weakness may lead to external financial strength, and vice versa, whereas, for the world as a whole, equilibrium may be compromised not only by the failure of some countries to pursue full employment policies, but also by the failure of others to avoid inflationary tendencies domestically.[103] If the alternative

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[103] National and International Measures for Full Employment, op. cit., pp. 26-33.

is rejected, by assumption, that nations should, en désespoir de cause, tend to isolate themselves from each other, since a world of autarkies would only be possible with a very great fall in world output, then, there is no other alternative for a universally valid economic policy than full employment and international economic collaboration. To the discussion of the validity of full employment policy as a universal, politically determined and juridically implemented norm of international economic behavior we must now turn, but before doing so, we would like to retrace the thread of argument of this thesis to this stage of its development, as well as briefly to summarize the gains we hope to have so far been able to acquire.

23. Summary of argument and partial conclusions. The objective of this thesis, upon which we have insisted often enough, and the formulation of which we have again and again restated from many different angles of inquiry, is rigorously to demonstrate that an economic system, whether regional, national, or international, cannot prescind, for meaningful and determinate solutions, from the theoretical constraints imposed upon its working by socio-ethical value judgments. This does not seem to us a useless or idle investigation. If certain economic theorists feel emancipated enough from all that is irreparably human in them to persist in pursuing, under any circumstances whatever, the strange exercise of

abstracting everything that is significant in a system of economic organization by assimilating it to a pure mechanism, good luck to them. Those who can only conceive their professional life to be not merely a means of gaining a living but also of experiencing more deeply and of establishing more fully a mode of existence which they want to be human, such people no longer have the right to pretend to say anything meaningful, or to achieve any real penetration into an economic reality out of which they have excluded those conceptions which the participants have of it, how they experience their tensions therein, and how they react to tensions so conceived. As we include ourselves among the latter and not among the former we definitely consider the central theme of this dissertation, however unsuccessfully its validity may have been demonstrated thus far, to be a timely, real, and important subject for theoretical and practical consideration. But as the humanistic approach to economic problems that it necessitates is, as far as we can remember, thoroughly unfamiliar to the intellectual climate of classes in economics we have been able to frequent in this country, we felt obliged to start this study from its remotest metaphysical roots by placing its conceptual structure entirely upon the idealistic foundation which axiomatically affirms the intentionality of human consciousness. With the orientation provided by this methodological decision we have attempted to develop a

theoretical analysis of social action at political, economic, and technological levels of activity, by expressing these relationships as a function of an initially given configuration of goods and services, and the rational choices of individuals and groups. It was mathematically verified, for a closed national economy, that on the basis of purely economic considerations alone it is impossible to derive, either statically or dynamically, an optimum, uniquely given position or path of equilibrium of production and exchange, and that only after a specific assumption is made about a politically determined and juridically implemented social ordering of individual preferences it becomes formally possible to derive extreme values for the social action function. The demonstration was extended to an international economic system, where, by means of the theory of the multiplier, it was possible to trace a reaction path or an international economic contract locus of positions ranging from a situation, defined in space and in time, where all the gains from trade are enjoyed by one country, through some sort of compromise position, to one in which another country has all the advantage. In the forthcoming and last part of this thesis we propose to state in a precise form the normative assumptions required for the derivation of the conditions of maximum international economic welfare. In order not to be tediously repetitious we shall strongly rely upon the mathematical techniques and formal conclusions derived in this section in reference to a closed national economy.

V. THE NORMATIVE THEORY OF INTERNATIONAL ECONOMIC ORGANIZATION

A. Basic norms for an international economic organization.

1. National planning and international economic relations.

We have already seen that, either in the structure of social action or in a national economy, a norm of behavior is an essential element of the system. In a national economy the norm of economic behavior is called an ideology. A certain national economic ideology may be defined as a description of social state of affairs, which, in their turn, are supposed to be a complete description of the amount of each type of commodity in the hands of each individual, the amount of productive service to be supplied by each individual, the amount of each productive resource invested in each type of productive activity, as well as the initial endowment of goods and services existing in the community at the beginning of the national economic action, or national planning period, under observation. We have already studied, in detail, how such an action system works in a closed economy, and how it is defined, statically and dynamically, by a political and juridical superstructure acting as a constraint or boundary of the national economic action. We have called this relationship a social action function. We have, moreover, assumed that this social action function describes some sort

of well-being of the different individuals in the system, i.e., the social action function is such that the social ordering of individual preferences responds positively to alterations in individual values, or at least not negatively. A national economic ideology is such social ordering, and it is, along with the national legal, political, and ethical ideologies, the necessary product of the prevailing, and accepted as legitimate, national normative social philosophy itself a product of the cultural and historical environment. Theoretically, the social situation of a national unit is that of general equilibrium, at each period of time, and of dialectical circulation through time. Its description has already been attempted in various ways,[1] and it consists, in nuce, as we have already seen, in a circular determination and interpenetration of physical and cultural, environmental elements. The social order, resulting as a solution or set of imputations, from the social action, is then accepted by those living under it. This acceptance is brought up by social integration, habit, custom, reasonable conduct, legal coercion, religious devotion, etc., as determined by historical, cultural, and physical circumstances. These circumstances, however, being different between different countries, fashion national social philosophies from compatibility to incompatibility, in a way that

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[1] F.S.C. Northrop, The Logic of the Sciences and the Humanities, op. cit., p. 339; Talcott Parsons, The Structure of Social Action, op. cit., pp. 278-88

national economic ideologies must also differ between themselves, from country to country, making national economic policies seldom complementary within an international economic order. These differences and incompatibilities tend to be preserved by the institution of national sovereignty, which, internally, is the supreme coercive authority preserving the individuality of a national economic, social, historical, and cultural organization, and which, internationally, is not subject to an effective and adequate coercive legal norm.[2]

2. In the modern world national economic policies take the form of national planning. Nations resort to planning precisely because they are more interdependent, and more vulnerable to the foreign effects of political conflicts and economic maladjustments abroad. But in order to be effectively enforceable by a national authority, economic planning must conform with the national economic system of norms of behavior, i.e., the prevailing national economic ideology, which is, as we have pointed above, a necessary product of local conditions molding the adopted and accepted national normative social philosophy. Because these conditions are not identical in each country the various national economic plans, though agreeing with the national ideological sentiment, may not coincide or agree internationally.

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[2] A general reference, Hans Kelsen, op. cit., pp 328 ff.

In fact, as we have already seen, they may even be contradictory, and since each country tends to identify its own actual facts of economic organization with a criterion of truth and goodness in international economic affairs, conflicts may arise between countries pursuing, in all sincerity, what each one, as a collectivity, judges to be the goal of sound international economic action. Because they are dissimilar nations disagree as to the appropriate norms for the selection of means to attain what each individual country understands the international economic objective should be. Because they are inter-dependent, nations are brought together, and they clash because they are sovereign. In these circumstances, a conceivable international economic action function admits, at best, a dual locus of equilibrium points of efficiency and contract, but it is impossible, as long as national ideological preferences are not ordered in accordance with some internationally accepted criteria, to maximize that function and decide which of its points of equilibrium is the optimum equilibrium point of production and exchange in the international economic system. The modern world lacks universally accepted international institutions such as the balance-of-power system, the international gold standard, the self-regulating market, and the liberal state,[3]

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[3] Karl Polanyi, The Great Transformation, op. cit., ch.1, and sources therein mentioned, pp. 259-94.

which tended mechanistically to erase the underlying human deliberateness in international affairs, and to make the international system determinate. The international effort towards peace has tried to replace these mechanical norms of behavior, such as the self-regulating market or the balance-of-power system, typically used throughout the nineteenth century to make international economic and political decisions, by voting systems consisting of single individuals, or small representative groups gathered in international political and economic agencies destined to reestablish order, peace, and stability in international diplomatic relations, as well as trade and finance. These agencies and leagues, in trying to replace instinctive decisions of a multitude of individuals acting anonymously in perfect markets, by the rational and deliberate decisions of a small number of cartelized agents or governmentally appointed officers, have fallen into paradoxical situations,[4] and have been prevented by their own particular social organizations, which they are supposed to represent, from enforcing and implementing,

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[4]The familiar "paradox of voting" has already been mentioned: let A, B, and C be three alternatives, and 1, 2, and 3, the three individuals; 1 prefers A to B and B to C, and therefore A to C; 2 prefers B to C and C to A, and therefore B to A; and 3 prefers C to A and A to B, and therefore C to B; a majority prefers A to B, and a majority prefers B to C; if the community is to be regarded as behaving rationally, A must be preferred to C, but in fact a majority also prefers C to A; see Kenneth J. Arrow, Social Choice and Individual Values, op. cit., p. 3, and footnote 3, for a pertinent example; and another instance is provided by the so-called "majority question" referring to the recent election of Pres. Getulio Vargas in Brazil.

internally as well as internationally, crucial recommendations of these agencies, either because they are, or they seem to be, antagonistic to national economic ideologies, or because they are not supported by an international legitimate authority disposing of coercive power and legal sanctions over non-conforming member governments.

3. The work and the failure of these agencies have evidenced the validity of a notion which has been intuitively clear since at least Plato's Gorgias, and this is that no order, in mathematics and in the nervous system as well as in human societies, is ever possible without an ordering of its terms, i.e., without a tacit or explicit organization.[5] Hobbes had already demonstrated, and Locke had for a century obscured the logic of his demonstration, that no social order can possibly emerge from the competitive and utilitarian exertions of atomistically isolated individuals, and, moreover, that this is not an empirically valid description of existent human societies. Since chaos and disequilibrium are not a permanent social experience, the peace and tranquility prevailing in the liberal state could not possibly result from an order without organization. Much to the contrary. The liberal state was nothing else than a capitalistic institution subject to such an organization in which

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[5] Alfred Korzybski, Science and Sanity, Institute of General Semantics, Lakeville, Conn., 1948, part IV, ch. XII.

the great majority of the people had no political expression at all, and so could conveniently be placed under ad hoc ceteris paribus assumptions without perceptible influence over theoretical results.[6] Owing to well known historical polarizations, in the description of which we shall not enter here, these people became politically dangerous, and conservative governments were obliged, when not actually subverted by social revolutions, to help them effectively and permanently, and since their privations were due, in the economic sphere, to defects in income distribution, to replan national economies. It is, for instance, a conclusion of very recent date[7] that the stabilization of a self-regulating market economy requires something more than merely structural adjustments: it requires a deliberate and positive anti-cyclical program. The trouble, however, is that economic planning undertaken by a national government, as its inherent right of sovereignty, for the benefit of its own people or of special groups within it, inevitably results in disturbing the self-adjusting, mechanistic, almost celestially perfect, competitive international economic harmony which economic theorists, with the possible exception of Wicksell and Launhardt, have advocated without

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[6] W. Stark, The Ideal Foundations of Economic Thought, Routledge, London, 1948, pp. 149-209.

[7] A. H. Hansen, Business Cycles and National Income, Norton, New York, 1951, p. 4.

rigorous proof as being the optimal result of atomistic competition, specialization, and international division of labor.[8] Hobbes reasoning regarding the determinateness of social equilibrium in a national state has only during the last ten years being explicitly applied to the determination of an optimum position of equilibrium of production and exchange in an international economy.[9] In the complete destitution of an internationally accepted, unified body of economic theory establishing and applying criteria of propriety to international economic policies,[10] the existing international economic agencies frequently relapse into mere academicism when trying to conciliate the necessity of national governments to implement policies of full employment which depend either on the help of other governments, or may oppose with their actions the achievement of full employment by other governments, increasing thereby the probability of international economic frictions which these agencies were created to prevent. Meanwhile, uncoordinated by international economic agencies, liberal economic policies lead to instability, economic vulnerability, and avoidance to face unescapable social, national, and international,

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[8] Paul A. Samuelson, Foundations of Economic Analysis, op. cit., pp. 203-5.

[9] Without probably knowing it Prof. Samuelson has been pioneering in this field since his "Welfare Economics and International Trade", American Economic Review, vol. 28, 1938, pp.261-6, but nothing similar is available for international law.

[10] The failure of the ITO to provide such a general theory is at least symptomatic.

problems of the modern world, whereas controlled economic policies, recognizing the unescapable federal organization and action which it involves, invites economic isolationism, a fall in the national standard of living, or a fall in the living standards abroad, bureaucracy and contralization, economic nationalism, and increased possibility of organized retaliation and international economic war.

4. The dilemma above sketched will admit no possible solution, if we do not assume that nations prefer stability of demand at full employment to stability at less than adequate levels of demand, or even to instability. But an international cycle policy by itself would not be sufficient, since this would be at its best a simple structural adjustment between national economies which cannot function together in a unified and smooth way. But this would be, of course, a tremendous stride ahead from the state of affairs presently existing, which, in its turn, is already a progress towards coordination over the state of affairs prevailing in the interwar period. If the assumption is maintained that an international full employment policy is internationally acceptable and implementable by member governments, along with the counterpart of this assumption that member governments are by now convinced that a national full employment objective cannot be properly achieved within an uncoordinated international economic

order, then, there seems to be a theoretical possibility for the development of an international economic policy to be pursued within a deliberate international economic organization of national objectives. Then, it thus appears to exist a way of scientifically verifying, independently of the peculiarities of national economic ideologies, the correctness and applicability of national and international measures leading to the common goal. This assumption closes the international social system, and makes it determinate. The normative international economic theory which would serve as a theoretical basis for the verification of the correctness of these measures, and in reference to which nations pursuing separate national economic policies would agree to adapt their national economic behavior, would have to conform with the following basic requirements:

a) Such a normative international economic theory shall not be based exclusively upon the assumptions of a particular national economic ideology of a group or even of the majority of the participant nations. This will avoid the domination of one type of ideology within the organization, and its consequent transformation into a league of some nations against opponent member nations, or outsiders.

b) It should be broad enough to be internally applicable by major, but conflicting, institutions and social doctrines sponsored by nations as characteristic of their cultural and historical individuality, as well as by nations at different stages of economic development along similar ideological lines. It seems possible theoretically to provide such a common doctrine provided that it is constructed upon all-inclusive, fundamental assumptions.

c) Finally, this normative international economic model should be verifiable by epistemological correlation with the international economic reality, i.e., its correctness should be ascertainable by test against measurable economic data, in order to provide a functional policy depending on forecasting and anticipation rather than in remedial action. It seems that there is some evidence pointing toward the existence of such a deductively formulated, experimentally verifiable economic theory.

5. National and international policies for full employment. We have already tried compactly to express in

a world trade multiplier the way fluctuations in effective demand tend internationally to spread. In industrially advanced countries the autonomous impulse seems to be domestic investment, both private as well as governmental, whereas in industrially underdeveloped countries the dynamic factor is usually a fall in foreign demand for the exportable production of these countries, manifesting itself in a fall of export prices, or a reduction in the volume of exports, or both.[11] The mechanism of propagation is rather simple. Investment expansion in industrial countries raises domestic income, and the volume of imports in these countries. As a result the exports of the raw material and luxury goods exporting countries start to rise, and this has a magnified effect upon the national income of these countries, raising their imports of manufactured goods, and sending back to its source the impulse leading to the initial expansion. Similarly, contracting impulses spread out from advanced industrial countries return to reinforce the original decline.[12] We have also tried to express in a reflection ratio the influence that a country economically exerts upon other countries. These tools of analysis are drastic simplifications of the way

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[11] Economic Stability in the Post-War World, Delegation on Economic Depressions, League of Nations, Part II, 1945, pp. 89 ff.

[12] A. H. Hansen, op. cit., pp. 596-7.

an international economic system really works. Their major drawback resides in that they are purely formal. Far from being the core of the analysis itself these expressions are aggregative statements of a variety of analyzable facts. Nevertheless, these were concepts about the meaning of which there is substantial amount of agreement, so that they were ripe for application to policy recommendations designed (a) to maintain high and stable levels of employment in large industrial countries; (b) to stabilize the prices of primary products in order to portect the export values of the primary producing countries; (c) to promote a high and stable level of international investment destined to raise the productivity of underdeveloped areas; and, finally, (d) to help countries meet their balance of payments difficulties without precluding the conduct of full employment policies by other countries. These international measures were coupled with at least one recommendation regarding the avoidance of inflationary or deflationary developments by way of a continuous adjustment of factor prices, especially wages, to changes in factor productivities.[13] It seemed that, provided there is coordination in timing and direction, and not necessarily uniformity in pattern,

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[13]As in the Chapultepec conference which was preparatory to the San Francisco assembly.

between national economic policies it would be possible effectively and adequately (a) to direct the flow of international investment to raise the productivity of countries in need of reconstruction and development; (b) to promote exchange stability by means of short-term lending facilities designed to strengthen the position of countries in need of international monetary reserves; (c) to improve the diet of people everywhere and increase the volume of food production, while at the same time avoiding surpluses in certain areas; and, finally, (d) to promote the optimum international division of labor based upon the maximum development of resources throughout the world. It is well known which international economic agencies were created or proposed on the basis of these terms of reference.

6. Adequate domestic stabilization of investment and consumption. These agencies have issued recommendations to member governments concerning the appropriate national as well as international measures for full employment. We shall briefly review the recommendations concerning national full employment policies. Two norms were repeadedly suggested for member governments to follow in their efforts to achieve and maintain a sufficient effective demand. Firstly, domestic investment should be stabilized, private investment should be stabilized through fiscal and monetary measures, and public investment should

counterbalance private investment. Secondly, consumer demand should be stimulated and stabilized through fiscal policy measures, and sometimes by means of private controls aiming at a more even income distribution. The production controlling norm was based on the income multiplier theory, and the consumption controlling norm on the acceleration principle. That these norms would be necessary to conduct the economy to a target effective demand no one questioned, the real problem being whether they would be adequate and applicable to the various types of national economic systems composing the international economy. Under socialism, for instance, investment irregularities may result from the intricate process of project dovetailing. In mixed, private enterprise economies subject to governmental controls, on the other hand, directly imposed allocations tend to be of practical effectiveness only when investment demand is excessive in relation to supply. Moreover, in orthodox private enterprise economies under a free price mechanism the stablization of private investment is only possible by placing upper limits to interest rates and credit expansion, no such indirect control being available in a downward movement. To attempt, in these economies, to influence the timing and direction of private investment by means of penalties and rewards would require a very complex tax-subsidy

legislation and administration even if it were possible for that government to obtain complete information regarding the investment plans of individual firms. Furthermore, it would be necessary for the government socially to evaluate each private investment project on the basis of some politically determined criteria, and this course of action would eventually be contradictory to the private enterprise orthodoxy prevailing in that national economic system. The stabilization of consumer demand is achieved by rationing, price manipulation, and other devices of central consumption planning and economic control in socialist economies, whereas in private enterprise economies this is usually attempted by means of governmental expenditure programs and by changes in the level and structure of taxation affecting the purchasing power of consumers. In industrially developed countries possessing the necessary statistical means, and progressive tax structures as well as flexible tax legislation this would be moderately feasible, as a preventive measure, since, even in these countries, the knowledge of economic forecasting is still primitive, whereas in industrially underdeveloped countries the implementation of such consumption controlling norm would simply be impossible. Both these norms for achieving a stable and adequate level of effective demand depend heavily upon member governments

satisfactorily solving the tremendous political problem of determining a target or objective for full employment, and then of implementing such a decision by means of counter-cyclical measures appropriate to come into effect in anticipation of the events they are designed to prevent. Inflation or inflationary pressures generally appearing at the threshold of full employment, can only be avoided by a precise timing in the cessation of the stimulation of effective demand as well as by a close understanding between government, labor unions, farming groups, trade associations, monopolies and cartels. Moreover, this planned prevention of anticipated turning points in effective demand, which is so difficult to achieve domestically, would be impossible, in the absence of narrow international cooperation, for countries whose economic stability depends on the volume or value of exports. Such countries, which in general are politically, economically, and technically incapable of defending themselves from the effects of depressions generated elsewhere, have been urged to maintain employment in the export industries in spite of a fall in foreign demand, or to provide alternative opportunities for factors released by the slump in these industries, and, moreover, that these opportunities be not far from the place where these slumped industries are located, so that productive factors be moved to their former occupations as soon as foreign demand revives. Since these recommendations are as unimplementable in

underdeveloped countries as, for instance, in industrially advanced countries, an automatic device must be employed for starting or stopping the compensatory mechanism regulating the governmental investment expenditures countervailing private investment. The current theory of public investment has furnished an economic rationalization for the manipulation of a strictly political weapon which is so adequate to the circumstances of modern industrial countries that no government will relinquish its use for the sake of an automatic device based on an employment signal which, after all, may turn out to be as false as that provided by the gold reserve ratio in the interwar period. Thus, both on theoretical and practical grounds, the conclusion emerges that national full employment policies depend much more on the qualitative characteristics of national economic systems than a quantitative analysis based on the aggregates of investment, saving, and consumption, instead of upon the determinants of such aggregates, such as the price-cost structure, competitive conditions, etc., would lead one to believe. Towards such a qualitative, microscopic analysis this thesis has been directed since its initial statement. But before turning our attention to this final task of theoretically characterizing a model for an international economic welfare system, we must briefly survey the measures that

have been recommended for conducting an international full employment policy.[14]

7. Recommendations concerning an international counter-cyclical policy. These recommendations rest on three main theoretical conceptions: a multilateral trade structure, an assured international flow of long-term capital, and provision for meeting trade deficits of countries whose exports are hurt by depressions abroad. The maintenance of over-all international equilibrium without which no multilateral trade structure is possible will require an international declaration of intention as to the general policies of countries with respect to the ways in which they intend to reestablish balance in their international transactions. Countries should make known to one another their "maps of indifference and preference," or their "strategies" relative to the international economic policies they intend to pursue, so that it be possible, through consultation, to harmonize such policies. This recommendation is almost revolutionary in its replacement of the free market mechanism making international economic decisions by the general system of voting that has been used to make political decisions. It is symptomatic of the modern ascendence of democratic methods over the

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[14]For the content in the last and in the following paragraph see National and International Measures for Full Employment, op. cit., pp. 33-69.

political methods of historical conservatism which prevailed throughout the nineteenth and in the first decade of the twentieth century, namely, the primacy of the intellectualistic methods attempting solely through thought, discussion, and organization to master the irrational realm in politics which cannot be managed by administration.[15] Thus, the multilateral trade structure is to arise from the cooperative projection and reconciliation of the anticipated trade structures of individual countries. Here, again, reconciliation is only possible when common grounds are found for solution by agreement and not by necessity, pressure, or domination, and this is only possible if there is a body of theory capable of containing stable solutions of antagonistic tensions. The second major requirement for the establishment of a sound basis for international economic relations is the creation of conditions under which the flow of international investment could be stabilized over substantial periods of time, and this is to be achieved on announcements by potential lender countries of the expected level of their intended capital export availabilities over a period of a few years, any short-falls below these targets being met by public

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[15]Karl Mannheim, Ideology and Utopia, op. cit., pp. 104-30; F. H. Knight, "Human Nature and World Democracy," in Freedom and Reform, Harper, New York, 1947, pp. 308-10.

funds. This recommendation, granted the obvious advantages of a reasonably steady international flow of capital, faces very great political, purely economic, and technical obstacles from the part of the lending as well as the borrowing countries. The chief obstacle in the lending country is that it must have enormous foreign exchange reserves and a very strong balance of payments. Moreover, the loan would have to be granted almost by an act of faith very difficult to achieve collectively through governmental action. This will make for the intermediary international economic agency all the more difficult to employ and divide up the accruing resources so as to ensure economically sound investment. For the side of the receiving country the chief obstacle is its probable lack of ability to use investment, and to plead for loans on the basis of projects which are only feasible if it shifts over to total or partial forms of control, requiring for success at least a substantial knowledge and experience in overall economic planning.[16] The third major requirement for an international full employment policy concerns measures to assure stability in international trade, and this could presumably be obtained by a scheme requiring a country whose imports fall because of failure to maintain full

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[16]Report on International Investment and Financing Facilities, Council of FAO, Sixth Session, 13-25 June 1949, Paris, France, pp. 28-32.

employment at home to make available to the affected exporting countries an amount of its currency equal to the drop of their exports. This requirement is strongly reminiscent of the so-called compensation principle in welfare economics, the international economic aspects of which we shall discuss later in this thesis. Similarly one may ask whether this scheme, despite its safeguards, would not interfere with the export incentives of deficit countries, if we assume as solved the administrative difficulties that it will entail, and as bearable the heavy burden it will place upon the paying country. Finally, we may question the advisability of promoting full employment to the role of international norm of economic behavior, and inquire just how much is unemployment an actual danger in an economic world boosted to its inflation point by universal military preparations. Even if we do not push the question to its limbo of irrelevancy, it seems that an effort should be made to appraise full employment in face of other equally respectable objectives such as high output, fair distribution of income, personal freedom, economic growth, etc., of which full employment is complementary only to a certain point. It is to the appraisal of more broad and more inclusive policy framework that we shall turn our attention now.

B. A model for an international economic welfare system

1. Characterization of fundamental assumptions. In what follows we shall explicitly assume that nations, unanimously, and whatever may be their particular national ideology, are willing to strive to attain and maintain full employment of world resources,[17] and we assume, furthermore, and perhaps unrealistically, that national states are willing, at this stage of social evolution, not only to maximize world wealth, but also to maximize national welfare by a more adequate distribution of income. We are convinced that by so doing we are not taking leave of the economic level of social action and entering into the ethical level of adequacy of value judgments. It seems that there is no scientifically grounded ethics, but we are not going so far. We are simply saying that the problem of ensuring stability of demand by full employment measures inevitably merges into the higher problem of ensuring an adequate level of demand at full employment. In formal terms we assume, again perhaps too unrealistically, that national governments know with a fairly high degree of precision the objectives of the national economies they are running, as a future state of affairs consisting not

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[17] There are two possible sets of findings when welfare problems of international trade are discussed, one from the world's point of view, and one from that of the individual nation; see T. deScitovszky, "A Reconsideration of the Theory of Tariffs," Review of Economic Studies, vol. IX, Summer 1942, pp. 89-110.

only of a certain prescribed bill of goods and services, but also of a certain prescribed configuration of distribution of these commodities. As it is a political problem to determine how this pattern of distribution is accepted as legitimate by the different economic classes integrating a national society, so that its prescription by the established public authority does not involve inevitable subversion, so long as we do not leave the economic level of social action we must assume that this problem of allocation of coercive power has been domestically solved. In other words, by full employment of resources we mean, broadly, a state of affairs in which there is free choice of employment, and general public agreement as to the particular constellation of goods and services to be supplied in the future, which is manifested by its meeting its most adequate and effective demand at that future date, and also that this promotion and maintenance of full employment are to be pursued through measures appropriate to each country's political and social institutions. In other words, again, each citizen's preferences are to count provided these preferences are sanctioned by the society in which they are intended to be satisfied. Again, we are not concerned here with the way by which this social integration was achieved, whether it was brought up to existence by tradition, imitation, coercion, persuasion,

social conditioning or fashion. All that we must assume is that national governments, to the extent that they represent integrated national communities, accept as internationally valid the pursuance of economic development and social progress, and of higher standards of living at stable price levels as specific expressions of the general objective of full employment. Finally, we assume that national governments do their best to avoid conflict with the full employment policies of other countries, and, in so doing, they are willing to subordinate their national sovereign autonomy to the general desire for economic peace and stability, in order that all countries may obtain the benefits of a stable and expanding world economy. Thus, if governments are assumed to be willing to strive as well as capable to promote and maintain full employment within the national economies for the smooth working of which they are supposed to be politically responsible; and if it is also assumed that governments are aware that the success or failure of their national full employment policies depend upon the mutual interdependence of their economic decisions, it is not contradictory, or inconsistent, to assume that nations, by acting collectively, as an integrated international society, may achieve a stable, peaceful, and expanding world economy of which they may benefit. In summary, once the

objectives of an international economic system are given, and once a set of norms of behavior is agreed upon as basic and internationally applicable, and once it is known the conditions or the environment of the proposed international action, as well as the available means conducive to the prescribed end, the underdetermined, open and dynamic international economic system may be driven by maximization of a characteristic function in a direction that meets the objectives of a stable and adequate international demand at full employment of world resources. Thus, when these assumptions are properly stated they define a relationship not essentially dissimilar from a social action function in a closed national economy.

2. Definition of an international economic action function. We shall maintain here the identification of rationality with maximization, and then the central problem in this section is to derive a social maximum for an international economy from the social action functions describing national desires.[18] And here, as before, the viewpoint is taken that the measurability of

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[18]Here, as before, we shall borrow heavily from Paul A. Samuelson, Foundations of Economic Analysis, op. cit., ch. 8; Abram (Burk) Bergson, "A Reformulation...," op. cit.; M. W. Reder, Studies in the Theory of Welfare Economics, op. cit., ch. I; I. M. D. Little, A Critique of Welfare Economics, op. cit., ch. 13; Kenneth J. Arrow, Social Choice and Individual Values, op. cit., chs. 1, 2, and 3.

individual utility, and of national satisfaction derived from pursuing nationally adequate norms of behavior, as well as interpersonal or international comparison of utilities have no meaning.[19] We have already seen that it is possible to establish an ordering of social states which is based on the ordinal indifference maps of individuals, and now we propose to extend this analysis to a functional relationship involving an ordering of the policy preferences of national states based upon the ordering of social states prevailing in these economies.[20] The analogy need not be elaborated nor the well-known controversy around measurability and interpersonal comparability of utility be recited here. But again we must confine this study to well-behaved participants, and abstract the strategical aspect of the international economic game, i.e., the interpretation of the postulate that the international action function must be maximized is simply that national governments must behave in the way in which its representatives declared it would behave: maximizing utility internationally means telling the truth diplomatically. No consideration shall be given to the enjoyment

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[19] N. Kaldor, "Welfare Propositions...," op. cit., pp. 549-52.

[20] H. Zassenhaus, "Uber die ökonomische Theorie der Planwirschaft," Zeitschrift für Nationalökonomie, vol. 5, 1934, pp. 507-32.

of playing and winning the economic and political game, nor to possibly profitable rational misrepresentations of tastes and values by action. Moreover, we shall take as data the national values which must not be altered by the process of policy making itself. Finally, we assume that national societies are rational, meaning, precisely, that the national society is integrated in such a way that policies are ordered in a consistent way, i.e., transitively: if policy A is preferred to B, and B to C, then A is preferred to C,[20] and that any two alternative policies, either nationally or internationally, are comparable on the basis of some agreed criterion, and that, on the basis of this adopted criterion, they may be evaluated. This criterion is, in the national economy, the politically determined and juridically implemented set of norms of economic behavior, and, internationally, this criterion shall be by assumption the general norm of full employment. The set of indifference curves denoting the ordering of social states, in a national economy, as well as that set of indifference curves denoting the rational ordering of national policies in an international economic action function, must conform with the familiar conditions ordinarily defining indifference maps, namely, conditions

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[21] A. Tarsky, Introduction to Logic, Oxford University Press, New York, 1941, p. 94.

regarding transitivity, integrability, convexity in relation to an origin, mutual non-intersection among curves, and diminishing marginal rates of substitution. These properties of indifference curves are self-evident from the interpretations placed upon definitions, and we shall not attempt here to review the various infinitesimal as well as topological proofs that have been advanced in their theoretical support.[22]

3. An international economic action function as above described is susceptible of mathematical formulation. Let the following implicit expression represent such a function:

$$P(T_1, \ldots, T_h; T_o) = 0 \qquad (202)$$

which is a possibility function denoting a set of mutually exclusive alternatives, $1, \ldots, h$, for international economic integration bounded by a set of conditions T_o. Among these various alternatively possible international economic policies, one is found to be feasible, since its validity has met with a substantial amount of international

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[22] See for proof of these various properties, J. Ville, "Sur les Conditions d'Existence d'une Ophélimité Totale et d'un Indice du Niveau des Prix," Annales de l'Université de Lyon, section A, vol. 3, no. 9, 1946, pp. 32-9; Vilfredo Pareto, Manuel d'Économie Politique, op. cit., pp. 546-69; N. Georgescu-Roegen, "The Pure Theory of Consumer's Behavior," Quarterly Journal of Economics, vol. 50, August 1936, pp. 545-93; K. W. Rotschild, "The Meaning of Rationality, a Note on Prof. Lange's Article," Review of Economic Studies, vol. 14, no. 1, 1946-47.

agreement. This feasible international economic action function may be expressed as follows:

$$T^g(W_1, \ldots, W_k; W_o) = T_g \qquad (203)$$

which is the static formulation of the feasible alternative for international economic integration, T_g, as an explicit function of the 1,..., K social states of affairs denoting the structure of the social action in the K national economies participating in the international economic action T_g, also bounded by uncontrollable conditions prevailing nationally, W_o. This expression (203) may be reformulated in dynamic terms as follows:

$$T^g(W_{1_{t-r}}, \ldots, W_{K_{t-r}}, \ldots\ldots, W_{1_t}, \ldots, W_{K_t}; W_{K_o}, \ldots, W_{K_o}) = T_g \qquad (204)$$

where each social state of affairs in any of the K participant national economies is conceived as computed or "photographed" at the end of each of r lags in the time period t. These various social states of affairs, either statically or dynamically visualized, may be defined by social action functions of the form

$$W^H(U_1, \ldots, U_s; U_o) = W_H \qquad (205)$$

which explicitly describes the social action function for national economy H = 1,..., K in terms of the levels of well being of the s individuals U participating in the national economic action W_H, bounded by uncontrollable

conditions, U_o, referring to the national endowment of goods and services. This again may be dynamically reformulated

$$W^{H_{t-q}}(U_{l_{t-v}}, \ldots, U_{s_{t-v}}, \ldots\ldots, U_{l_t}, \ldots, U_{s_t};$$

$$U_{l_o}, \ldots, U_{s_o}) = W_{H_{t-q}} \qquad q = 1, \ldots, r \qquad (206)$$

where v may be greater, less, or equal to r, the simpler alternative being that it is equal, so that the period of time for the national economic action has as many lags as the planned international economic action. The definition of these various U's within each national economy, the various operations that may be performed upon them, as well as the optimum conditions of production and allocation that either statically or dynamically may be deduced from these operations, have been the subject of the previous section of this thesis, and we shall not repeat them here. Inserting in (203) or (204) these various W's, and their U's with their X's, V's, S's, and δ's, an expression would be attained, not necessarily simple, which, in functional or in vectorial terms, would synthetize a system of equilibrium equations upon which the mathematical operations described in (Iv,A,8) could be performed resulting in by now familiar expressions defining the marginal properties of the optimum position of equilibrium of production and exchange in an international economic welfare system. Although these operations have been performed to test the correctness

of the forthcoming conclusions, we shall not transcribe them here *in extenso*, since they would uselessly duplicate the exact form of the conditions derived in the previous section.

4. However, before stating in literary form these marginal conditions[23] of optimum equilibrium of production and allocation in an international economy, we would like to redefine, precisely, the concept of international economic action function, as well as to reformulate, unambiguously, the various conditions we wish to impose upon this function. By an *international economic action function* we mean a process, rule, or system of choice which, for each set of national ideological orderings $W_1, \ldots, W_K$ for individual utility orderings $U_1, \ldots, U_s$ for alternative social states concerning ownership or control over $X_1, \ldots, X_n$ goods and $V_1, \ldots, V_m$ services, determines a corresponding international organization of national economic imputations, T. The conditions we wish to impose upon this function are as follows: (a) it is a monotonic increasing function of the national social action W's, i.e., it responds positively to alterations in national values, or at least not negatively: only if all countries

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[23] As in J. R. Hicks, "The Foundations of Welfare Economics," *Economic Journal*, vol. 49, December 1939, pp. 692-712; O. Lange, "The Determinateness of the Utility Function," *Review of Economic Studies*, vol. 1, June 1934, pp. 218-25.

are made better (worse) off can we definitely state that a given international proposal is good (bad); (b) it is independent of alternatives not included in the initial conditions W_o, which, by the definition of the concept of situation will be considered as irrelevant to the proper conduct of the proposed international economic action named as T_g: this places everything else outside the general equilibrium system denoted by the international economic action function under ceteris paribus for the duration of the action; (c) it is not to be imposed upon the national sovereignty of the participant countries, i.e., by force or coercion exerted by the international organization, its public validity being derived from the logical consistency of its theoretical structure after epistemological correlation with empirical data: the social action, internationally conducted, must not be dictatorial. These conditions restate the basic conditions for an international economic organization mentioned above (V,B,4,a,b,c) and at the introductory section of this thesis, and they apply to international trade the customary conditions constraining social welfare functions.

5. Static conditions for optimum international production and consumption. The most general way of stating the static first order necessary conditions for the characterization of an optimum position of production and

consumption in an international economic system is as follows: if it is maintained that national welfare increases (decreases) whenever one or more individual participants in that national economic action become more (less) satisfied, i.e., is put onto a higher (lower) indifference surface, without any other individual or individuals becoming less (more) satisfied, i.e., being put onto a lower (higher) indifference surface, then, the optimum position of production and consumption is internationally attained whenever (a) the marginal national welfare increase due to each import of a good or a service and the marginal national welfare decrease due to an export of a good or a service is the same with respect to each national economy in the international community; and (b) the marginal national welfare increase due to the importation of goods or services acquired with a marginal increment of exports of goods and services is equal to the marginal national welfare decrease due to that increment of exports within each national economy in the international community; finally, (c) the marginal national welfare increase due to the shift of a marginal unit of a good or a productive factor away from exports into domestic consumption or use is equal to the marginal national welfare decrease caused by this adjustment upon the level of imports of goods or services within each national economy in the international community.

6. Reversing our customary procedure we may reformulate these general conditions for a position of optimum international production and exchange in mathematical terms as follows: if T_g in (203) varies continuously with the W's, and if W_H in (205) varies continuously with the U's, and if the U's are in any national economy implicit functions of social states consisting of a bill of goods and services under the ownership or control of an individual, thus

$$U^k(X_1, \ldots, X_n; V_1, \ldots, V_m) = 0 \qquad (207)$$

then, we may write as a general condition for a maximum that, subject to physical and psychological constraints,

$$dT_g = 0 \qquad (208)$$

Using (203), (205), (207) and (208), the conditions above (V,A,5) take the forms:

$$\frac{\partial T^g}{\partial X(H)^k_i} = \omega^H{}_k \cdot p_i \qquad (209)$$

where $X(H)^k_i$ refers to the quantity of commodity X_i owned or controlled by the kth individual in the Hth national economy, ω being the utility index to deflate the price p_i to real terms of marginal costs;

$$\frac{\partial T^g}{\partial V(H)^k_j} = \omega^H{}_k \cdot w_j \qquad (210)$$

where $V(H)^k_j$ refers to the quantity of the jth productive

factor V owned or controlled by the kth individual in the Hth national economy, the coefficient being the utility index to deflate the price w_j to real terms of marginal value productivities; moreover, as we have already seen when studying the general equilibrium conditions in a closed economy,

$$p_i \frac{\partial X^{k_i}}{\partial V(H)^k_{ij}} = w_j \qquad (211)$$

where to the previous designation of a technical output coefficient π was now added the notation of the specific national economy H; and, finally,

$$w_j \frac{\partial V^{k_j}}{\partial X(H)^k_{ji}} = p_i \qquad (212)$$

the coefficient ω, which was present in all terms in (211-2), having been divided out. The cost of the shift may, then, be easily calculated in terms of displaced real marginal value productivities.

7. These general conditions may be restated and developed in a number of ways. They may, for instance, be reformulated in words as follows: consumption goods and productive factors will be correctly allocated internationally whenever (a) the marginal social rate of substitution between any two imports is the same for every country which imports them both; (b) the marginal social rate of transformation between any two exports is the same within any two countries

exporting them both; (c) the marginal social rate of transformation between any factor and any product for export is the same for any two countries having the factor and exporting the product; (d) the marginal social rate of substitution between any two factors must be the same for any two countries using both to produce the same product for export; (e) the marginal social rate of substitution between any two imports for any country importing them both must be equal to the marginal social rate of transformation between them.

8. These conditions, which, upon inspection, could be easily reduced to a simple equality between marginal cost and marginal revenue, in the same way that similar conditions were reduced to this equality when the general equilibrium conditions were discussed in the previous section, may be reduced again to a simple rule applicable to international trade. This is as follows: in any national economy goods and services should be imported from abroad up to the point where (a) the marginal cost of production abroad, plus the marginal cost of transport and other marginal costs of importing is equal to the marginal cost of production at home, i.e., the price of the factor equals the value of the marginal product, provided we count as a factor the foreign currency that pays for the goods acquired abroad, or, again, the domestic money worth of foreign currency purchases an amount of foreign goods that can be sold at home

for their price abroad plus transport costs and other transport charges; and where (b) the marginal efficiency of investment expenditures in the factor importing country is equal to the marginal efficiency of investment expenditures for the same factor in the factor exporting country, i.e., the marginal value product and the value of the marginal product are equal in both countries, this being applicable to whatever type of factor may move across international barriers, specific problems of international trade arising because a complete freedom of movement of goods or services do not exist in the real world due to physical as well as more artificial impediments to the international movement of commodities. An appropriate restriction of imports and exports below these optimum points can benefit a country while imposing a loss on the foreigner whose extent cannot be computed. If this invites retaliation, however, the common loss seems to be unambiguously determinable.[24]

9. Stationary conditions of moving equilibrium. These various conditions of international equilibrium refer to a given moment of time. But as we have already seen national economies may plan inter-temporally their national income and expenditure, either by predetermining a stream of output targets with various time patterns of factor inputs, or,

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[24] A. P. Lerner, Economics of Control, op. cit., ch. 26.

conversely, working along a dual planning by having various time patterns of outputs with a given input stream of factor services. As both goods and services may be imported as well as exported, a national economy may try to organize its foreign trade upon these norms of national economic behavior. Treating imports or exports of a product or factor at different moments of time as the imports or exports of different products or factors,[25] the problem of the optimum allocation of international production and consumption through stationary time trends become a special case of static allocation of imports and exports where the formerly derived first order conditions of optimum equilibrium apply without modification. However, one qualification must be made, and this is that, since the various configurations of goods and services are planned configurations, or future projections of present anticipations regarding prices and physical productivities, the inter-temporal resource allocation must include a complete discounting to present values of all future expected real or money values. To the previous five static conditions mentioned in (V,B,7) we must add two more stationary conditions as the following: when there is no risk or uncertainty regarding future situations, the optimum position of resource control by

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[25] J. L. Mosak, General Equilibrium Theory in International Trade, op. cit., ch. 9.

borrowing and lending is reached whenever (a) the marginal rate of substitution between two planned international commodity control transfers at any two dates is equal, for every two countries, to the ratio of their discounted expected prices expressed in terms of marginal costs for products and marginal productivities for productive factors; and (b) the marginal rate of transformation of a planned export of any date into a planned import of any date is equal, for every country in the international community, to the ratio of their discounted expected prices expressed in terms of marginal costs for products and marginal productivities for productive factors. These two stationary conditions are expressed on the assumption of an international token money the exchange rates of which between countries reflect the technological conditions of production and the psychological conditions of exchange prevailing within these various national economies.[26]

10. Again we must stress that these seven conditions for an optimum position of international production and allocation are <u>necessary</u> on first order partial derivatives:

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[26]The adaptation of these conditions to an international economy subdivided into sovereign currency regions and interconnected by flexible exchanges would be easy. All that is necessary is to introduce these various kinds of money as commodity specie subject to the constraint of budget equations. The analysis in real terms is inclusive enough for our purposes here.

they are not sufficient conditions for an extreme value of the international economic action function. Only by accident would these conditions coincide with the values of the unknowns at a true extreme of (203) or (204): only by accident would the national economic action function be at a maximum instead of at a minimum or rather at an inflexion point. If the correct secondary maximum conditions were written out in full, it would be seen that they would simply require that all indifference surfaces, in the neighborhood of the position where the first order conditions are verified, be less concave to the origin than the possibility-transformation surfaces between the same products and for all countries engaged in trade.[27] But even if the second order maximum conditions are also verified, this will again not be both necessary and sufficient to guarantee a true maximum of the international economic action function. The total conditions require that it be impossible to increase one output, other outputs and all inputs being constant, or decrease one input, other inputs and all outputs being constant, provided the international and the various national income distributions do not change during this process of adjustment to a more desirable situation. These total

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[27]For a diagrammatical presentation see Wolfgang F. Stolper and Paul A. Samuelson "Protection and Real Wages," op. cit., p. 348, and in a slightly different approach, Wassily W. Leontief, "The Use of Indifference Curves in the Analysis of Foreign Trade."

conditions which require that the second order differential expressions stating the sufficient conditions be negative definite quadratic forms in the various differentials of the unknown variables, could be restated as follows: if the international economic action function is at a maximum, then it must be impossible to increase it further by increasing one output, not necessarily for export, in any participant country, or by producing an output not otherwise produced; or by decreasing one input, not necessarily imported, in any participant country, or by not employing an input not otherwise employed, assuming that in both cases all other variables are maintained constant, and the distribution of the goods and services available throughout the world and fully controlled by the residents of all countries be maintained invariable. Only when the world economy is assumed to be static or stationary, and when the distribution of the world income is supposed to be constant as well as when the marginal, second order and total conditions are satisfied, it is rigorously proper to state that perfect competition in international trade achieves a position of optimum equilibrium of production and consumption in the international economic system.

11. Perfect competition as an ideal of international economic organization. In spite of its evident epistemological inadequacy when referred to empirical economic

reality, perfect competition has been advocated by economic theorists as the national and international ideal-type economic order. Impressed by important advances in scientific thought in the natural sciences, economic theorists of Walrasian stature tried to prove that perfect competition provides not only a situation of structural equilibrium in the economic system but also that it represents an optimum position of production and exchange. Their deterministic and positive philosophical bias prevented them to perceive the absolute necessity of normative, organizational assumptions to make possible the determination of the sense or direction according to which the working of the economic system should be socially evaluated. Wicksell seems to have been the first economic theorist who successfully although implicitly demonstrated that perfect competition is optimal only when the distribution of income is appropriate.[28] It was Pareto, however, who, starting from sociological considerations, qualified the appropriateness of perfect competition, regardless of income distribution and of interpersonal comparison of individual utility, as applicable only to define the optimum equilibrium position for the community as a whole, provided there should be no possible movement away from

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[28]Knut Wicksell, Lectures on Political Economy, op. cit., vol. I, pp. 72-83.

this point which would make everybody better off.[29] But Pareto failed to show that such an optimum position is not necessarily a unique point, and it was left for Barone to point out that, once perfect competition is assumed, with prices being taken as fixed parameters, a point of maximum efficiency is derivable from production conditions alone.[30] Barone, however, did not go into the fact that a change in production will necessarily modify the initially given exchange situation. The definition of the optimum allocation involves the formulation of a scale of values, on the basis of which the alternative uses of resources are to be evaluated, and all this various writers left in doubt the question of the number and nature of the decisions on ends required to formulate this needed scale of values. It was only thirty years later[31] that the question was squarely faced of knowing the value judgments involved in the definition of the criteria of optimum allocation, and it was verified, precisely, that there are ethical values implicit even in the choice of the different mathematical forms of the social utility function in terms of the individual utilities. The gist of these various

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[29]Vilfredo Pareto, Manuel d'Économie Politique, op. cit., ch. VI.

[30]E. Barone, "The Ministry of Production...," op. cit., passim.

[31]Abram (Burk) Bergson, "A Reformulation...," op. cit., passim.

investigations was to conclude that under perfect competition the marginal and the second order conditions of optimum allocation will be satisfied, but that the concept of perfect competition is, in its essence, an ethical concept. This is even more so, since, when the production functions in the economy are not all of the constant returns to scale variety, the competitive order must, if at all, be realized by means of deliberate political and juridical organization of the decreasing cost as well as the increasing cost industries.

12. As soon as it is carefully defined, it becomes evident that strictu senso perfect competition is unattainable, for it requires not only that any one buyer (seller) buys (sells) only an infinitesimal part of the total amount of any one commodity bought (sold) during any given period, but also that every commodity is infinitesimally divisible and infinitely mobile, and that every participant in the economic action is granted complete information about the outcome of all anterior economic acts having a bearing upon his intended act. As the marginal first order conditions for an optimum position of production and allocation do not involve all the properties of perfect competition, it has been suggested[32] that, either nationally or internationally, it

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[32] J. R. Hicks, "Foundations of Welfare Economics," Economic Journal, December 1939, vol. XLIX, pp. 696-712.

is only sufficient that the less stringent conditions of pure competition be realized in order that the optimum position be attainable. It needs only that every individual and firm buy or sell such a small part of the total amount of any commodity that the effect of purchases or sales on the price is negligible and is hence ignored, and that the price of any commodity be the same to all buyers and sellers, in order that the optimum equilibrium position be realizable exclusively on principles that are in some sense positive or scientific and needing no normative or ethical decisions on the objectives of the economic action for its full and unambiguous derivation. We have already demonstrated[33] that this is not true. Either the social action function referring to a national economy or the international economic action function depend for their value on the technological variables concerning production as well as on the psychological variables concerning exchange, but their shape is only determined when specific decisions regarding the ordering of the various U's in the social action function and the various W's in the international economic action function are explicitly introduced into the analysis. Given these

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[33]Mathematically and fully with respect to the social action function, and in a summarized way with respect to the international economic action function, but the latter demonstration could be amplified to a desired extent simply by following the steps of the former demonstration.

decisions both functions are transformed into scales of values for the evaluation of alternative uses of national or world resources. If perfect competition is unattainable, and if pure competition is insufficient per se to determine maximum international economic welfare, what minimum set of ethical norms should be agreed upon before nations attempt to derive the optimum conditions for an adequate and effective international economic organization?

13. Minimum universal ethics for maximum international welfare. We have already seen, in the methodological part of this thesis, that natural science consists of research into sense experience, motivated and guided by a working hypothesis, leading, through logical inference to the formulation of an explanatory theory, and resulting in appropriate technological action. No working hypothesis means no intention, no motive for research, no reason for making one experiment rather than another, no way of bringing sense or order into the observed facts. Contrariwise, too much working hypothesis means finding only what you already know to be there and ignoring the rest, it means going about forcing things to become the signs of one's word patterns, when one ought to be adapting one's word pattern to become the signs of things. In trying to determine the minimum set of universally acceptable ethical norms for maximum international

economic welfare how much of a working hypothesis do we need? From Marshall and Pigou we gather that the only value judgment involved in welfare maximization is the ethical decision to maximize welfare. But once this decision is assumed as taken, other perspectives unfold themselves, and if it is not the task of the economic theorist to deduce or verify these implications, it is a legitimate exercise of economic analysis to examine the consequences of assigning rationality or equal sensitivity to consumers, or perfect discriminatory power to monopolists, and so on.[34] Feeling, in the type of economic analysis we have been taught, the absolute necessity of making explicit the rôle of value judgments we sensed as tacitly and implicitly theorized into the very texture of arguments presented as scientific, we found it useful to introduce from the very beginning the concept of a social action function for the complete definition of which we were obliged to go as far afield as to deal directly with unfamiliar metaphysical concepts. In defining this function we found that it has three distinct domains, perfectly identifiable in a national economy: at the technological level this social action function depends

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[34] Abram (Burk) Bergson, "Socialist Economics," op. cit., pp. 416-7; Paul A. Samuelson, Foundations of Economic Analysis, op. cit., pp. 219-20; M. Dobb, "Economic Theory and the Problems of a Socialist Economy," Economic Journal, December 1933, vol. XLIII, pp. 588-98; R. F. Kahn, "Some Notes on Ideal Output," Economic Journal, March 1935, vol. XLV, pp. 1-35.

upon a certain endowment of goods and services; at the exchange level, upon individual preferences and indifferences; and, finally, it is given a form, at the ethical level, by means of politically determined and juridically implemented decisions on ends. In trying to extend this concept to an international economic system we found that, although in the past there had been an international conformity to certain rules of the game as developed, it is true, in the City of London, there had been in the present nothing like universal agreement on any one of the various codes of economic behavior proposed by the various international economic agencies since those created under the patronage and care of the League of Nations.[35] It is true that all these modern proposals were, without exception, based exclusively upon purely economic considerations, in this residing, in our view, their fundamental weakness. In extending the concept of social action function to an international economy, we found it essential to assume that there actually exists universal consensus regarding a set of restraints we wished to impose upon a feasible international economic action function, in order to specialize its form as well as the nature of its variables and boundaries. These constraints, which we have already outlined above (V,B,4), will now be formally

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[35] Lionel Robbins, Economic Planning and International Order, Macmillan, London, 1938, ch. XI.

developed, not merely as the essential foundation for an ideal model of perfect competition in international trade, but as a social and ethical basis for a politically determinable and juridically implementable legal norm defining a possibly both effective and adequate international economic organization.[36] These constraints are concerned with the problem of choice of an internationally valid economic ideology, the necessity of positive correlation between international and national economic values, the independence of irrelevant alternatives for international economic organization, the maintenance of national economic sovereignty in relation to the realization of national preferences, and the avoidance of economic hegemony, domination, vassalage and servitude. These conditions will be stated as follows:

a) The choice of an international economic ideology. As a function of all the economic magnitudes of an international economic system, the international economic action function (203-4) is supposed to characterize some ethical belief concerning a functional hierarchy of

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[36]Although it may appear contrariwise, we are not trying to innovate anything in a path so well beaten by phenomenological philosophy, Austrian jurisprudence, and the so-called "new welfare economics." We are only restating Prof. Bergson in terms of Prof. Samuelson and Prof. Arrow, when Prof. Bergson himself avowedly descends from Pareto and Barone, and unavowedly, perhaps, from Prof. Parsons and Prof. Friedrich, and, through them, from Kant and Hegel.

proposed national economic policies or possible social action functions of the participant national economies. We only require that this belief exhibit the properties of a stable solution,[37] i.e., that no national economic policy contained in the international economic action function is dominated by a national economic policy contained in the international economic action function, and that every national economic policy not contained in the international economic action function is dominated by some national economic policy contained in the international economic action function. The national economic policy W_F is said to dominate national economic policy W_G, $F \neq G = 1, \ldots K$, if a participant country or a group of participant countries have separately greater gains in W_F than in W_G and can, by acting together enforce W_F, i.e., get for themselves a combined gain at least equal to that provided in W_F. This definition of a stable solution is more general than the familiar one

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[37] John von Neumann and Oskar Morgenstern, Theory of Games and Economic Behavior, op. cit., p. 40; J. Marschak, "Neumann's and Morgenstern's..." op. cit., pp. 97-115; L. Hurwicz, "The Theory of Economic Behavior," American Economic Review, vol. 35, 1945, pp. 909-25.

based exclusively on transitivity for it not only covers cases already mentioned (V,A,2) as "voting paradoxes" but also provides an excellent theoretical springboard for considerations of cyclical social evolution within a plausible dynamic politics. Note that this basic requirement for a stable international economic ideology will take care even of those international economic policies of a Platonic, suranné kind as that proposed by Prof. Maritain and his Neo-Thomists as well as that of strict hedonic flavor justifying more liberal, laissez-faire leanings, as well as government by élite, secular or religious. This broadness, however, does not mean that the international economic ideology is an heterogeneous mixture of eclectic doctrines, for the stability requirement places a real restriction upon the condition to which the international economic action function is subjected. This is to be understood that there are some national ideological preferences which are not admissible into a stable international ordering of national ideological preferences. Thus, for instance, political anarchism, national or international, the doctrine of absolute national or individual

sovereignty, the myth of a perfectly atomistic and competitive market, in national or international economic systems, are incompatible with collective rationality.[38]

b) Positive association of international and national values. The international economic action function (203-4) is supposed to be such that its ordering of national ideological preferences responds positively to alterations in national ideological values, or at least not negatively. Expressed mathematically, and perhaps now somewhat misleadingly, this condition requires that the international economic action function be a monotonic increasing function of the national ideological preferences: if an economic measure leads a country to fulfil its economic policy objectives more fully than before, without this resulting in hampering any other country from attaining their own economic aims,

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[38]This is another way of formulating the central theme of this thesis, which is, once more, that purely atomistic, mechanistic, individualistic assumptions cannot lead to a well-defined social welfare function. This has been often referred to as the "utilitarian paradox." For the implications of utilitarian economics see I. M. D. Little, A Critique of Welfare Economics, op. cit., chs. 1 and 2.

then the international economic action function must increase in value; there will be a decrease in its value whenever one or more countries become less ideologically satisfied without any other countries becoming more ideologically satisfied, i.e., being placed in a higher indifference surface referring to a set of alternative policy measures. This is a generalization of what has been said above (V,B,1) concerning possible conflict between national and international measures for full employment. This condition, together with those that will follow, are already implicitly contained in the condition concerning a stable solution to the problem of choice of an international economic ideology.

c) Independence from irrelevant alternatives for organization. The chosen international economic action function (203-4) must be independent from the existence of possible alternatives for international economic organization outside the initially given set of possible alternatives, because, if all possible alternatives were considered, the final choice of an international economic action function could very well be based upon fortuitous but probable circumstances which,

nevertheless, could never manifest themselves in reality, such as wars, revolutions, administration landslides, etc. This condition is simply a development of the second requirement for a stable solution mentioned above (V,B,13,a): the international economic policy which is chosen as a solution for the problem of international economic organization must establish an order of preference among the initially given set of national economic policies such that none of these national forms of economic organization are discredited or upset by standards of behavior not included within the limits of the accepted standards.

d) National sovereignty in relation to accepted preferences. The international economic action function (203-4) must not be such as to prevent any participant country from implementing a national economic policy which does not dominate or upset any other national economic policy, and is not dominated by any other national policy. In other words, an international economic ideology must not be chosen such as to prevent any participant country from conducting an accepted norm of economic behavior, the criterion of acceptance being exclusively that of not

compromising the stability of the international economic system, as defined in (V,B,13,a). This condition, once more, is a development of a condition logically implicit in the basic requirement for a stable international economic ideology, and expressing in nuce that the national economic policies comprised by the stable international ideological solution are precisely those policies which are undominated by other policies contained in the stable solution.[39] This rigorously expresses the axiom in international law that a treaty making power which does not possess sovereign authority has no capacity to negotiate and conclude international compacts, but at the same time that this capacity limits the exercise of sovereign power by a politically independent nation. It expresses, moreover, the circularity contained in the so-called "doctrine of the original agreement," according to which a state, by an original agreement, may consent to the future operation upon itself by majority vote of international authority, and even coercion, and

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[39] John von Neumann and Oskar Morgenstern, op. cit., pp. 38–41; Oskar Morgenstern, Limits of Economics, Hodge, London, 1937, chs. V, VI, and VII.

going so far as voluntarily to surrender its entire sovereignty without violating the doctrine of sovereignty.[40]

e) Exclusion of solution by domination and servitude. The international economic action function (203-4) must not be dictatorial or imperative in any other way except that it requires that the stability of its proposed ideological solution must be fulfilled. This condition expresses the requirement that the international economic organization must have sovereign authority over other alternative forms of international economic organization existing outside the limits of its original ethical decision concerning the objectives of the proposed international economic action. It is the aspect of the international normative economic system seen as if from outside in the totality of its unified action. It means that international organization is broader than international government in relation to the member nations, and includes immediate and completely voluntary cooperation among nations, just

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[40] Hans Kelsen, General Theory of Law and State, op. cit., part II, ch. VI; R. G. Hawtrey, Economic Aspects of Sovereignty, Longmans, Green, London, 1930, chs. 1 and 5.

> as socialization in the individual state proceeds not only by state control and legal coercion but also by strictly voluntary cooperation among individuals.[41]

14. We have now imposed, formally and explicitly, five apparently reasonable conditions upon the shape of an international economic action function. These conditions are, of course, value judgments. They reflect preoccupations which are themselves a result of a specific historical environment. Being, therefore, subjective in this sense, they can be questioned by whoever does not accept the fundamental ethical assumption upon which these value judgments are based, i.e., that nations prefer, at the present stage of their international economic and historical unfolding, to achieve stability of demand at full employment to stability at less than adequate levels of demand, or even to instability (V,A,4). A full employment program is here explicitly assumed to be the chosen international economic ideology. In fact, there has been no other normative proposal to meet such an unanimity of consensus as to its validity, and the difficulty of its implementation has resulted exclusively from the fact that this implementation has been attempted on the fragile basis of economic considerations alone. These

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[41] Pitman B. Potter, "International Organization," in Encyclopaedia of Social Sciences, op. cit., vol. 8, pp. 177-85.

considerations stem either from a marginalist tradition or from Keynesian analysis. Marginalist considerations impose on individual tastes only those restrictions that are implied by individualistic assumptions, and, in this case, if there is more than one commodity, no unique point of optimum equilibrium is derivable as long as further restrictions of a social kind are not imposed upon the individualistic ones. Keynesian analysis is manageable and elegant but even more formal than infinitesimal marginalism, since it does not commit its users precisely to state their fundamental beliefs concerning the nature of the forces underlying summary concepts, and causes them to become satisfied with a symbolical aggregation that completely clouds price-cost relations, special situations in particular industries or geographic areas, monopolistic practices, and the like.[42]

15. Real national income distribution and international economic welfare. Thus, problems of real income distribution, which are at once political and social more than simply economic, because, if measurability of individual utility is

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[42] J. M. Clark, "Separate Concurring Statement," in National and International Measures for Full Employment, op.cit., pp. 100-4; William Fellner, Competition Among the Few, Knopf, New York, 1949, pp. 1-15; D. G. Johnson, "High Cost of Food, a Suggested Solution," Journal of Political Economy, vol. LVI, 1948, pp. 54-7; E. Ronald Walker, From Economic Theory to Policy, op. cit., ch. V; R. F. Harrod, "Scope and Method in Economics," Economic Journal, September 1938, pp. 383-412.

avoided as meaningless, they will nationally involve further decisions on ends, and which, internationally, tend to manifest themselves as a polyglot confusion of national price-wage structures, competition, incentives, liquidity, technology, etc., are doubly avoided firstly by the macroanalysts under allegation of convenience, and secondly by the purely theoretical marginalists by lack of agreement upon what really happens in the economic realm transcending aggregates. This exclusion has been in fact a matter of more than mere convenience, for it springs, indeed, from a very deep stream of individualistic thought pervading the whole body of classical economics. The passing away of an entire social system erected upon more or less subconscious checks and counter-checks left economic theorists and social scientists with a vain hope that an effective, or pure, if not perfect, competitive market behavior would be sufficient to achieve the realization of those social and ethical norms which form so inherently a part of the value system of individual human beings. This view, which may be found at the core of all the currently accepted types of economic analysis, except orthodox socialism, simply abstracts what we have called in this thesis the political level of economic action, and by so doing theoretically implies that all individual participants in an economic system have the same value schema, although not perhaps identical or similar taste patterns.

This is the only way of attaching any sensible meaning to a collectively accepted ordering of different possible configurations of real income distributions in any given situation. Granting that collective indifference curves based on communal or national taste patterns do not have much scientific support, economists have almost unanimously[43] assumed that individuals do have identical value systems at any given instant of time. This assumption which is anthropologically maintainable for a culturally integrated group, and which is perhaps still grantable, although on much softer grounds, for a national state which is not passing through a period of overt social revolution, becomes almost positively false when the question is internationally to compare national orderings of different possible welfare distributions. Here, again, an international decision on ends is absolutely necessary to make the problem yield to a unique solution. Only in a closely integrated community of nations it is possible to speak about the distribution of the real income of the world as consistent with the various national income distributions. Only if it is assumed that all ethical

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[43] An exception: Paul A. Samuelson, Foundations of Economic Analysis, op. cit., p. 225; idem, "Evaluation..." op. cit., pp. 1-21; W. J. Baumol "Community Indifference," Review of Economic Studies, vol. XIV, 1947- pp. 44-48; F. H. Knight, "The Planful Act: The Possibilities and Limitations of Collective Rationality," in Freedom and Reform, Harper, New York, 1947, pp. 346-65; A. Ammon, Grundzüge der theoretischen Nationalökonomie, Francke, Bern, 1948, ch. 4.

philosophies that exist throughout the world at a certain period of time conform with the maximization principle involved in the utilitarian philosophy of Jeremy Bentham, it is possible rigorously to affirm that international trade involves a potential, if not an actual, economic gain to all participating countries: if trade is opened between countries and due to the doctrine of comparative advantage, each country, if it chooses to do so, can obtain more of every commodity while performing less of every productive service, and this represents an improvement in welfare. So, the traditional question of the determination of the gains from international trade depends, from the point of view of each participating country, on the nationally accepted ethical value schema, and, from the point of view of the world, on the degree of compatibility existing between the Weltanschauungen of the various countries involved in international economic action.

16. Closure of the conceptual system of thesis. This conception of international economic action closes the theoretical system expounded in this thesis. Starting from a description of mental action as developing through various distinct levels of consciousness, which may be classified roughly as transcendental, rational, and intuitional, we have described the structure of social action, at its rational level, as consisting of three domains of a social

action function, namely, ethical, economic and technological. Then, national economic action was described as conforming with this structure of social action, and these national economic systems were combined into an international economic action function. A positive-normative method was adopted, and all main premises, postulates, and theoretical conclusions were discussed and demonstrated as far as the scope of this thesis permitted us to go in our investigation. Individual values were interpreted as transcendentally given, at the ethical level, and there as politically determined and juridically implemented, whereas tastes were interpreted as rationally ordered at the level of pure economic exchange. A series of coefficients of production were seen as constraining the national or international social action function at its technological level, acting in the system as the parametric variables. Constrained between the limits imposed by the political decisions on ends, at the ethical level, and by technological conditions, at the level of production, the outcome of the social action undertaken in a national economy is imputed or distributed as real national income to the participants, varying, whenever these individuals "count," according to their individual tastes. Thus, for a given set of individual economic agents as defined by their taste preferences and indifferences, and a given social, political, and cultural

environment, there is a given distribution of purchasing power as defined by an exogenously given set of decisions on the ends of the proposed economic action; then exchange under perfectly competitive conditions proceeds until an optimum and uniquely given position of equilibrium is reached. We have seen in detail how this final outcome is determined. When this national economic action is conceived as developing throught time, various conclusions may be reached regarding displacement and restablishment of equilibrium, stationary, and cyclical behavior, etc. If these national economies are then conceived as meshing into an international economy, we have seen that no unique optimum point of exchange equilibrium is determinable as long as an international economic ideology is not assumed as a rule selecting national economic policies, and ordering then in accordance with a certain scale of ethical values, as the nationally stated choices for certain configurations of real national income distribution from a given collection of alternative allocations of goods and services as a function of the tastes of the participating economic agents.

17. Axiomatic summary of thesis. The equilibrium equations describing the international economic organization system proposed in this thesis may be brought together under axiomatic form. Two sets of such equations have been considered, according to whether we have or have not included

a time variable. And there are two ways for mathematically including into the analysis the dimensionality of time: the functional method of the calculus of variations, and the numerical method of the calculus of finite differences. We have adopted throughout the second of these two methods. The dynamic system, when describing economic action by means of a sequence of finite periods, is simply a stream of discrete static visualizations of cross sections. In the summary here attempted, we shall firstly present the general, static aspect of a cross section, and then we shall visualize the system as flowing through a multi-lag sequence of time periods. The static system is as follows:

a) There is, without a time reference, a finite set (P) of 1,...,h ideological possibilities for international economic integration (T). The finite set (P) is circumscribed by unspecified ethical, economic, and technological boundaries (T_o). Among the various T_k, k=1,...,h, one is found, by unanimity, to be a doctrinal function without specific content (T_g) but establishing definite logical relations between 1,...,K, finite subsets (W) in (P), and also bounded by specific ethical, economic, and technological restraints (W_o), where the various W_H, H=1,...,K, are national statements of economic policy

preferences. The functional translation of this axiomatic formulation has already been given above in (202) and (203).

b) The chosen international economic ideology, T_g, is defined by the following definite relation it establishes among the subsets W_H, H=1,....,K, in (P): no W_J contained in T_g is dominated by a W_H in T_g; every W_Z not contained in T_g is dominated by some W_J contained in T_g; therefore, the subsets in T_g are precisely those subsets which are undominated by subsets in T_g. This expresses the stability requirement for the internationally adopted ideology of full employment as explained at length in (V,B,13), and exhausts the axiomatic content of an international economic organization as we propose to define in this thesis.

c) There is, without a time reference, and for each participating national economy, a finite set (W^e_H), H=1,....,K, e=1,....,z, of ideological possibilities for national economic integration, circumscribed by ethical, economic, and technological boundaries, one of which is found, by voting in democratic countries, and by imposition in dictatorships, to be a feasible social action function, which is also a doctrinal function, without specific content. This chosen social

action function e in national economy H, i.e., W^e_H, establishes, by one way or another, an ordering of social preference unambiguously defining of s subsets in W^e_H of individual preferences U. This has been expressed in (205).

d) As the proper conduct of an international full employment policy necessitates that there be stability within each participating national economy, the W^e_H is defined for such a requirement where its elements are the U_h, h=1,...,s, and comprising physical as juridical persons, such as individuals, business firms, households, the government with its various branches, and the rest of the world. These have been called the individual and collective economic agents of the national economic action W^e_H, which is a complex of activities or economic acts one for each period of time, like moves in a game.

e) There is, without a time reference, within each participating national economy, and for each participating economic agent, a finite set (U_h), h=1,...,s, of taste patterns referring to the consumption of n goods X, and the provision of m services V. A certain configuration of goods and services owned or controlled by a certain

individual is circumscribed by political and jurical constraints at the ethical level; by psychological and budget constraint at the exchange level; and by physical constraints at the technological level of production, such that each X^h_i and each V^h_j is the outcome, respectively, of a production relation between services V^h_{ij}, and of an employment relation between the various goods X^h_{ji}, where h=1,...,s; i=1,...,n; j=1,...,m. These relations have been thoroughly described previously in this thesis and there is no need of repeating them in this summary.

18. Generalizing the behavior of this static system along a time dimension, a dynamic system is deducible, as follows:

a) There is, as holding during a multi-lag period of time, a finite set (P) of 1,...,h ideological possibilities for international economic integration (T), and bounded by initially given ethical, economic, and technological conditions (T_o). Among the various T_g, g=1,...,h, one is chosen as an international economic norm for action, defining relationships to be observed with respect to the various W_H, H=1,...,K, during the course of the intended action carrying the system

from an initially given state of affairs towards an anticipated state of affairs at a certain point in the future. If the system is stationary, the stability requirement based upon an intransitive domination must hold along the course of the intended action. If the system is cyclical, the domination relationships between the various national economic ideologies, $W_1, \ldots, W_H$, correspond to the various ways in which these can unstabilize, or upset, each other. The functional translation of this axiomatic formulation is expressed in (204).

b) There is, as holding during a period of time of r lags, and for each participating national economy, a finite set $(W^e{}_{H_{t-q}})$, $H=1,\ldots,K$, $e=1,\ldots,z$, $q=1,\ldots,r$, of ideological possibilities for national economic policy integration, one of which is found as feasible, a realizable planning of national economic action during the prescribed period of time. It expresses a norm for carrying the national economy from an initial situation to a final end, target, or objective. If the adopted norm is a certain national economic policy for full employment, this social action function presumably describes a series of measures

leading to full employment. It may or may not fulfil the requirement for stability: if it fulfils such requirement the national economy will be maintained in a stationary state; if not, there will be cyclical fluctuations within the individual inputations contained in $W^{e}_{H_{t-q}}$.

c) There is, as holding during the period of time of v lags, for $v \gtrless r$, and for each individual or collective participant U_h, h=1,...,s, a finite set $(U_{h_{t-p}})$, p=1,...,v, of taste patterns referring to the consumption of n goods X, and of m services V, at the end of each time period p=1, ...,v. A certain configuration of goods and services owned or controlled by a certain individual is determined at the time period preceding the period of time t-v. Given taste patterns and parametric coefficients of production a final outcome is uniquely determined as a target bill of goods and services expressing a social state of affairs for the hth individual. At each period of time there will be $X^{h}_{i_{t-p}}$ production functions, and $V^{h}_{j_{t-p}}$ employment functions involving relationships between, respectively, $V^{h}_{ij_{t-p}}$, and $X^{h}_{ji_{t-p}}$ as thoroughly described in

the preceding section of this work. All these relationships, however, are seen from the initial period of time and always refer to an anticipated relationship in the future, causing the appearance in the system of coefficients of retentions of flow, under form of stocks, inventories, and savings or hoards.

19. This summary, in axiomatic form, completes the description of an international economic organization as a normative system. This system could have been expressed in determinantal, matric, or vectorial form. By making the time variable change continuously the system could have been expressed in integral form. Or, by means of tree-diagrams and flow charts, a tableau économique could have been devised to expound an international economic system. By specifying certain commodities as consumption goods, investment goods, savings, stocks, imports and exports, etc., a Keynesian visualization could have been obtained on the basis of aggregates. By deducing families of interregional and international multipliers, the whole system could have been expressed as a network of impulse and propagation adaptable to electro-analog representations,[44] and permitting the inclusion of space in a more conspicuous manner.

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[44] Stephen Enke, "Equilibrium among Spatially Separated Markets: Solution by Electric Analogue," Econometrica, vol. 19, no. 1, January 1951.

Finally, by relaxing the assumption of linearity non-linear cycle models could have been developed. For the sake of uniformity, however, we chose to repeat the form, but, of course, not the content, of our social system model when dealing with a closed national economic system, and also when describing the model for a positive as well as a normative international economic systems. Our last task is to appraise this theoretical model as an instrument for policy.

C. Foundations for an international economic welfare policy

1. International economic optima in practice. It might seem that a section on policy is out of place in a theoretical work. This would be the case if the theory of international economic organization were pure theory, and, if we have succeeded in conveying to the mind of the reader the central proposition of this thesis, it should by now be clear that this it never exclusively is, for we have argued that it is a calculus with an ethical interpretation. Policy recommendations when referring to a normative theory always requires political changes. We shall not discuss these changes here, but limit ourselves, given the scale of values we have proposed in (V,B,13), to the definition in these terms of the conditions for optimum allocation, and to the description of the main obstacles that we perceive to the attainment of such an equilibrium position. The following analysis will be in its most part static, although we shall

attempt at dynamizing it for we believe that a consideration of dynamic factors will serve to make one cautious concerning the application of static criteria to a dynamic world. We shall, then, for the moment assume that the national value schemas, and the individual taste patterns as well as the technical coefficients are constant all over the world. In the general equilibrium system thus resulting the conditions derived from the given ends will be the equations sufficient in number to determine the unknowns which are the amounts of each and every good and service allocated to each and every use. It has been already mathematically shown how, in these circumstances, the characteristics of an optimum position of production and allocation can be derived, and when are they necessary, sufficient, or both. From the conditions previously derived the more interesting optimum requirements may be formulated as follows: for maximum international economic welfare,

a) <u>optimum position of exchange equilibrium</u> will be internationally reached whenever the marginal rate of substitution between any two goods, or any two services, or between a good and a service, as well as vice-versa, is the same for every individual who consumes both goods, or provides both services, or consumes the good and provides the service, as well as vice-versa; and

b) optimum position of production equilibrium will be internationally reached whenever the marginal rate of substitution (transformation) between any two products, or any two factors, or between any factor and any product, as well as vice-versa, is equal to the ratio of their marginal costs in case of products, or their marginal productivities in case of factors, or of the marginal productivity of any factor in terms of the marginal cost of its product, as well as vice-versa.

2. This is the most compressed way a general equilibrium system may be described. By replacing such general denominations as goods, services, factors, products, marginal costs, marginal value productivities, individuals, etc., by narrower qualificatives such as imports, exports, consumption goods, investment goods, prices, wages, households, industries, government, foreign countries, etc., this brief description could be developed ad infinitum et nauseam. One can, if one chooses, set up a logical system, using only symbols, and without giving them any real meaning. But, the moment this purely logical construction is expressed in words, the system is ipso facto interpreted or restricted by the resultant propositions. An international economic welfare system is one such interpretation, and we have

described this system both as an order as well as an organization, both as a positive as well as a normative system. So long as its welfare character is maintained, and the analysis is restricted to its positive aspect, we have demonstrated that an optimum unique position is indeterminate. We must introduce assumptions concerning decisions on ends to make the system determinate from a welfare point of view. This is only as intuitively it should be. An optimum must be defined in which way it is optimum to be recognized as such, and, identically, welfare cannot be defined directly in terms of content for it is a concept by postulation in need of hypotheses to be understandable. Given the necessary norms, or the ethical decisions on ends, welfare is that which varies with its indicator: if the objective of the economic action is to maximize individual satisfaction (minimize individual dissatisfaction), welfare is that which increases (decreases) whenever one or more individuals become more (less) satisfied without any other individuals becoming less (more) satisfied; similarly, if the objective of the economic action is to maximize output (minimize input), welfare increases (decreases) whenever one output increases (decreases) other outputs and inputs being constant, or when less (more) of any input is spent for the same amounts of all other inputs and outputs.[45] These norms

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[45] M. W. Reder, Studies in the Theory of Welfare Economics, op. cit., pp. 14-17; Paul A. Samuelson, Foundations of Economic Analysis, op. cit., p. 230.

define what is sometimes called the justice of a specific economic system.[46] Given these norms, the determination of the policies to be undertaken in accordance with them is a strictly scientific enterprise. When, for instance, the empirical economic system to be normatively regulated admits technologically and psychologically, the existence of economies and diseconomies of scale in production as well as in consumption, the social justice of a general equilibrium system can only be redressed by periodical and deliberate redistributions of real income, conducted in accordance with the ethical criteria which happens to be politically determined and juridically implemented in the economy in question. Given these criteria, whatever they may be, according to which incomes are to be redistributed, the marginal social utility per unit of purchasing power for different participating individuals is necessarily the same in the light of these criteria after the redistribution is realized.[47] This is as logically valid for a national economy as for an international economy.

3. International application of the compensation principle. Defining a successful national economic policy as a

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[46] E. Antonelli, L'Economie Pure du Capitalisme, op. cit., p. 77.

[47] Abram Bergson, "Socialist Economics," in A Survey of Contemporary Economics, op. cit., p. 418.

series of economic measures leading to a national increase in welfare, as above stated, we may apply this concept to an international economy. We may say that international economic welfare increases whenever a country is able successfully to conduct a national economic policy without preventing any other country at least from maintaining invariant its level of national economic welfare. In an interdependent economic world, however, there are very few national economic policy measures that will not involve injury to some individual located abroad, and, strictu senso, this will be sufficient for welfare to decrease abroad as a result of a policy measure implemented at home. This would reduce to sterility the national (international) applicability of economic welfare policies if it were totally impossible for national states (international economic agencies) to achieve the socially (internationally) agreed ethical desiderata by means of a system of lump-sum taxes and bounties.[48] In the event of a displacement from the optimum equilibrium position, i.e., whenever the amount of any product (factor) produced (spent) deviates from its equilibrium amount, a compensating tax (bounty) would be that amount of abstract purchasing power or real income in form of commodities which, when taken from (paid to) a given

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[48] M. W. Reder, op. cit., ch. I, especially pp. 14-17.

individual, leaves him on the (same) indifference surface he would have been on had the displacement from the optimum equilibrium not occurred. This theorem, called compensation principle,[49] is greatly important for social policy in a planned or free enterprise national or international economy. With the aid of this concept, which is certainly not debatable except perhaps on a philosophy of systematically denying people whatever they want, we can now ascertain how any given real income variation will affect the economic welfare of a national or international community. Thus, precisely, a national income variation will increase, decrease or leave welfare unaffected according to whether the algebraic sum of the compensating taxes and bounties, levied on all affected persons, is positive, negative or zero. As applied to an international economic organization, this principle could be stated as follows: if an international economic agency could collect enough revenue from those countries whose economic welfare increased due to real national income variation, without making any of them worse off than they

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[49] As formulated by Vilfredo Pareto, Manuel d'Économie Politique, op. cit., pp. 354-65, 617-57; E. Barone, "The Ministry of Production... " op. cit., pp. 245-90; A. P. Lerner, "The Concept of Monopoly... " op. cit., pp. 162-5; H. Hotelling, "The General Welfare in Relation... " op. cit., pp. 248-56; O. Lange, "The Foundations... " op. cit., pp. 215-18; for a different formulation see N. Kaldor, "Welfare Propositions... " op. cit., pp. 549-52.

would have been had the welfare increase not occurred, in order to compensate fully those countries harmed by the variation abroad, leaving them as well off as they would have been in the absence of such variation, and retain a surplus, it could by distributing this surplus, increase world welfare.

4. This principle is as general as the concept of welfare itself. All that it requires for application is, in the case of a national economy, that individual taste patterns be ordered in accordance with collectively accepted value schemas, and, in the case of an international economy, that national policy preferences be ordered in accordance with internationally agreed economic ideologies. The principle acquires specificity whenever a particular national or international value schema is ethically given. Thus, for instance, it must be qualified in various ways if the adopted international economic ideology is based upon a postulate of structural stability as that described in (V,B,13) above. In this case, the compensation principle could be reformulated as follows:[50] economic welfare will be increased, decreased or left unchanged by a given real income variation depending upon (a) whether the algebraic sum of all compensating taxes and bounties is positive, negative or zero, and (b) the potential losers could not profitably bribe the potential gainers to prevent economic welfare from changing. Real income should

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[50] I. M. D. Little, op. cit., appendix, pp. 273-5.

be redistributed in such a way as to conform to the imputation of a stable solution as defined in (V,B,13a) above. Internationally, the compensation principle should be applied in accordance with the five requisites enumerated in (V,B,a,b,c,d,e) above. But these are requisites that the compensation principle must observe at the ethical level of the international doctrinal function or of the social action function. Many other obstacles must be overcome in order that compensatory payments be correctly made at the exchange and at the technological levels of national or international economic action. The remainder of this thesis will be dedicated to a brief discussion of these various obstacles, from a static as well as from a dynamic point of view.

5. Variable, asymetrical returns to scale. The optimum conditions of international production and exchange, summarized in (V,C,1,a,b), may be restated in terms of costs and value productivities as follows: price of product must equal marginal cost, and price of factor must equal marginal value productivity. This is the marginal litany of textbooks. Both conditions will be necessary as well as sufficient only when the economy is one of constant returns to scale. This very special case may not prevail in economic reality, due to fixed factors, and indivisibilities of factors and products, causing average total cost curve to decline for a wide range of output variations, with marginal

cost below average cost. However, for the attainment of the optimum position, the rule is that price must equal marginal cost; it must not be merely proportional to marginal cost: it must be equal to it.[51] Identically, in an international economy, assuming that the adopted decisions on ends are those mentioned in (V,B,a,b,c,d,e), from which analysis establishes the optimum conditions (V,C,1,a,b), the same rule must apply, and we have already seen in (V,B,7) how it does apply whenever international trade is assumed to be perfectly competitive. This it never is, and, as we have already seen (V,B,12), it never can be. In the hypothesis that an international economic agency succeeds in persuading all member governments to compel each firm in all industries situated within the limits of their political authority to produce that output which makes price equal to marginal cost, at least theoretically two results will emerge: (a) socially important increasing cost industries might have to be subsidized in order to survive; and (b) socially important decreasing cost industries might lose the stimulus to large scale research which only they can afford.[52] And assuming that national governments are persuaded effectively and adequately to enforce equalization of factor prices to

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[51] E. F. M. Durbin, "Economic Calculus... ", op. cit., pp. 676-690; R. H. Coase, "The Marginal Cost Controversy," op. cit., pp. 169-182.

[52] O. Lange, "On the Economic Theory... ", op. cit., pp. 65-72.

marginal value productivities, or to keep factor price differentials in correspondence with differences in marginal value productivities this would cause two effects: (a) the breakdown of the ethical assumption of freedom of choice as allowed to households in respect of both the work they do and the goods they consume; and (b) strict governmental control with respect to the time preference of households in relation to the rate of investment.[53] If, then, at the initiation of the international action prices and wages are arbitrary, it can be shown, on the basis of well known theoretical arguments, that the resulting equilibrium prices, wages and interest rates will determine the aggregate demand for and supply of each and every sort of goods and services on the part of all households and production units within all national economies participating in the international economic action.[54] The evident national as well as international obstacles to this kind of concerted action are at the present time very great and even unsurmountable. However, it is not utopian, or visionary, in the sense that this would be impossible of achievement under any circumstance whatever, the realization in the empirical economic world of the

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[53] Ibid. loc. cit.

[54] Ibid., pp. 72-98; F. M. Taylor, "The Guidance of Production... ", op. cit., pp. 39-55; H. D. Dickinson, "Price Formation in a Socialist Economy," Economic Journal, December 1933, vol. XLIII, pp. 237-50.

organizational features outlined above. None of the results already pointed of an international implementation of a competitive solution for conditions relating to income distribution, the rate of investment, and variable costs, especially decreasing costs, are absolutely unavoidable. Its possibility resides, ultimately, in the possibility of making social choices between alternatively possible ethical decisions on ends. It is true that any national or international economic plan must be feasible, in order to be both effective and adequate, and any one slightly acquainted with the primitive status of economic observations, even in statistically minded countries, will readily agree that such a program of coordinated competition for an international economic organization is impossible under present circumstances.[55] And if we add to these technical obstacles in obtaining accurate economic information relating to production and consumption in a national as well as in an international economy the difficulties already pointed of translating individual values into social choices, and these into international agreement, we shall see that the objective of increasing world welfare by deliberate action is, indeed, utopian and visionary.

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[55] O. Morgenstern, On the Accuracy of Economic Observations, op. cit., ch. V.

6. Further obstacles to maximum international economic welfare. In economies in which production and consumption are not expressible by means of linear and homogeneous equations, the administrative implementation of the compensation principle would require perfect discriminatory powers from the controlling authority. The national government or the international agency should be able, in order correctly to apply a system of lump-sum taxes and subsidies, at the same time that it observes the current distributive notions derivable from the ideal model of perfect competition, to set its allowances according to individual or national situations which are partially the result of individual or national actions and decisions.[56] Ideally, the international or national managers would have to know the potentialities of every member country or citizen, or then to be able to change nationally accepted ethical value schemas or individual taste patterns, in order not to violate the conventional nations of social justice when making compensatory payments or levying compensatory withdrawals, nationally as well as internationally. Curiously enough the conduct of such a compensation program seems to be more feasible in an international than in a national economy, for, while in a national economy this would at least require that everybody manifest

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[56]Paul A. Samuelson, op. cit., pp. 247-8.

his truthful and accurate economic intentions, in an international economic organization this would require honest declaration of policy from member governments, i.e., international exposure of their intended national economic planning. Nevertheless, the empirical fact of economies and diseconomies of production,[57] and similar phenomena regarding consumption[58] will be a very serious obstacle to the sensible application of the compensation principle, either nationally or internationally.

7. Another obstacle to the national or international attainment of a maximum and stable welfare position is lack of complete information regarding all data of importance and influence upon the outcome of an intended national or individual action. Economic agents, individual or collective, do not have complete information about the configuration of the system of action in which they participate. The success of advertising is partly due to this absence of complete information, since, if information must be provided as to the location of business, the commodities offered, and the prices charged, selling activities in general only succeed in increasing the demand for a product because buyers do not know with precision the true qualities

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[57] M. W. Reder, op. cit., ch. V.

[58] G. Tintner, "A Note on Welfare Economics," Econometrica, January 1946, pp. 69-78.

of the product. If advertising does not change tastes accordingly, then, there will be a decrease in welfare, or at least an impediment to the attainment of a maximum position. Another instance in which maximum welfare may not be reached due to the existence of incomplete information regarding all relevant past data is provided by the uncertainty of the individual or collective economic agent about to take an economic decision. The various problems arising in international trade under flexible exchange rates belong very much to this category. In policy-making at the national level this is evident in the uncertainty of the authorities about the effects of a certain measure the results of which would only be determinate under laboratory conditions where there exists a narrow correlation between the probability of occurrence and the actual effect that supervenes in reality. In the consumption planning of households as in the production planning of business firms[59] uncertainty and risk play a well-known rôle. As the proper conduct of a national or international compensation policy depends upon the probability of potentiality realization of production and consumption, rather than upon performance, the necessity of complete information is evident when the issue is that of maximizing welfare.

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[59] J. R. Hicks, Value and Capital, op. cit., part IV, ch. SV; J. L. Mosak, General Equilibrium Theory in International Trade, part II, chs. VI and VII.

8. Still further obstacles may be pointed out even if it is assumed that every member government, as well as the international agency itself, possesses the best economic talent, that there is a certain theoretical if not ethical consensus between outstanding economists, and that governments are willing and able to follow their advice. One of these obstacles is accurately to test, from an international point of view, the success of the various national economic policies. The obvious test would be to measure the real gains that each country is able to obtain from international trade.[60] Assuming that the index-number problem that is involved in such evaluations has been satisfactorily solved,[61] it remains to be decided how is it possible to maintain the exports and imports of goods and services which, although not economically profitable, are socially desirable. This conspicuously refers to international long-term capital movements. International friction may result from attempts at governmental control in such cases, even if we wish to abstract the full-fledged international study of price and

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[60] L. A. Metzler, "The Theory of International Trade," in A Survey of Contemporary Economics, op. cit., pp. 233-6.

[61] "In a democratic community, with universal suffrage, income distribution will tend to move in a favorable direction in the eyes of most people. The use of the Laspeyre index is then indicated. Those who believe that, in a capitalist community, income distribution must always be changing unfavorably, however it changes, should always use the Paasche price index," in I. M. D. Little, op. cit., p. 217.

wage structures, leading to the ideal equalization of product price to marginal cost, and factor price to marginal value productivity over the entire economic world. Another obstacle stemming from ignorance is that due to errors in forecasts of national governments regarding estimates of future market conditions in deciding upon the optimum rate of domestic investment, and imports. These errors presumably would be the greater the more dynamic the national economy about the conditions in which the forecast was originally made. The avoidance of such errors could perhaps be achieved by the international economic agency carrying a comprehensive information service for the benefit of every member government. Curious questions of international law may be involved in the creation of such a purely informative agency.[62] Moreover, rigidities of prices and wages in response to changes in supply and demand, and prices and wages standardization for broad categories of goods and services entering into international relationship may constitute permanent obstacles to the proper functioning of an international economic organization.[63] Last but not least there are the obstacles emerging from transition problems

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[62] S. J. Rubin, "The Judicial Review Problem in the International Trade Organization," Harvard Law Review, vol. 63, no. 1, November 1949, pp. 97-8, and footnote 28.

[63] M. W. Reder, op. cit., ch. XIII; I. M. D. Little, op. cit., p. 2, footnote 1; Paul A. Samuelson, op. cit., p. 253.

appearing during the passage from a market economy to a controlled economy in international trade.

9. International economic welfare in a dynamic world. So far, this study of international welfare economics has proceeded within the limits of a static analysis of the properties of equilibrium positions. We now propose briefly but exhaustively to generalize, in words, the applications of the dynamic theory sketched in the previous section of this thesis to problems of welfare and real income distribution in an international economy. Specifically, our task now is to trace the time path of the optimum equilibrium position of production and allocation when welfare increases (V,C,2). The conclusions will be applicable to a closed national economy as well as to an integrated international economic system.[64] Dynamically speaking, welfare will be at a maximum along a time path of a multi-lag period whenever the present value of a stream of compensating taxes (and bounties) that could be derived from changing the course of the system would be negative, no matter what other course was adopted. Of course, a corollary of this definition is that at each moment along the time path all the marginal first and second order, and total conditions must be satisfied.

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[64] J. Marschak, "Identity and Stability in Economics: A Survey," Econometrica, January 1942, pp. 61-74; J. Ulmo, "Recherches sur l'Equilibre Economique," Annales de l'Institut Henri Poincare, vol. VIII, pp. 1-62.

However, this is not to be understood as referring exclusively to a stationary time path. Stationariness is only a special case, which, incidentally, is covered by this definition. Another case that we have in mind is typically dynamic, and this is the case when, if only for technological reasons, the economic system cannot instantaneously eliminate all excess demands and excess prices. The functional expression of all this has been already written in (204), where the international economic action function is expressed in terms of the social action functions of the participating countries, which, in their turn are expressed in (206) in terms of the utility functions of the participating individual or collective economic agents. These, in their turn, are functions of the goods and services owned or controlled by each of these economic agents, so that, ultima analysi, goods and services at each moment of time are treated as commodity configurations which producers and consumers combine and anticipate so as to satisfy, in a perfect competition model, the optimum conditions of equilibrium. But in order to do this successfully firms and households must make perfectly accurate forecasts of all relevant data on the basis of complete information regarding the past behavior of the system. In order to make the model more realistic it will be recalled that we introduced some retention coefficients denoting unplanned savings or dissavings, stocks,

inventories, disinvestments, surpluses, scarcities, etc. Introducing these coefficients in the welfare system we may be able to generalize the definition of a dynamic welfare path simply by qualifying that, although the equilibrium position towards which the system may tend is welfare maximizing, the time path of the system, leading to that position of equilibrium, may not be so. A number of interesting implications concerning full employment as an international economic policy may be derived from this suggestion.

10. We shall now briefly examine this conclusion in one simple model, which, however, synthetizes most other more complicated dynamic patterns.[65] Let us assume, for simplicity, that there is a possibility of computing the real income of the world. Since this computation would require the explicit statement of a set of universally valid ethical decisions on the ends of international economic action, which results at a certain point in the future in a certain configuration of goods and services called the real income of the world at that date, let us suppose that there is such an international agreement. The objective of that proposed international economic action is to hit, at a predetermined future moment, a given world real income target located at

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[65] R. M. Goodwin, "The Nonlinear Accelerator and the Persistence of Business Cycles," Econometrica, vol. 19, no. 1, January 1951, pp. 1-17; J. R. Hicks, A Contribution to the Theory of the Trade Cycle, op. cit., pp. 147-151; N. S. Buchanan, "A Reconsideration of the Cobweb Theorem," Journal of Political Economy, February 1939, pp. 67-81.

the intersection of a supply schedule and a demand schedule which defines the optimum point of world welfare maximization. We must now suppose that the international economy is starting from a point which does not coincide with this point of long-run equilibrium, and, in order to make a long story short, let us suppose that a conceivable world income multiplier is set in such a way that the change in the rate of supply per unit of time is an increasing function of the difference between the initially given world real income and real income at the target. As supply increases, this discrepancy of course will be reduced, and this will cause supply to increase at a decreasing rate, the difference between world real income in the short-run moving equilibrium and real income at the prescribed long-run target approaching zero, assymptotically. Figuratively speaking, this is a problem in external ballistics, the world real income taking the place of the projected missile.[66] So far, the argument presupposes that the participating countries can correctly forecast the increased world output that will result from the discrepancy between actual and long-run world real income equilibrium. It presupposes, as we have indicated above, that there is a fixed multiplier coefficient, a linear

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[66]Or in servo systems as in The Theory of Servomechanisms, ed. H. M. James, N. B. Nichols, R. S. Phillips, McGraw-Hill, New York, 1947, I. M. Getting, "Servo Systems."

structural relation, which is supposed to be non-explosive, leading eventually to the disappearance of the initial impulse.

11. We shall relax this restrictive assumption of linearity by introducing the more realistic assumption that there exists a general tendency among the controlling authorities of the participating national economies to underestimate (overestimate) the increase (decrease) in world output, and that there is a tendency for each country to produce an output greater (smaller) than that which maximizes national welfare in the short-run, as defined above (V,C,9). Whereas formerly world investment was maintained at a desired relation with world output, now during the course of the contemplated international economic action there is either too much or too little capital stock, so that the world real income fluctuates about its long-run equilibrium level. Thus, the question is restricted to the determination of the general ways by which these fluctuations could be made convergent to the real income target hitting it at the prescribed moment. Precisely, under the assumption of non-linearity, it is now supposed that the objective of the international economic action is to maximize welfare by perfectly adjusting capital to output throughout the world, thereby maintaining international full employment. On the basis of this objective, the international economic agency

issues the following recommendations: (a) national governments must adopt, in accordance with their specific national ideologies, compensation rules based on systems of taxes and bounties most adequate to meet the political, economic, and technological situation in each country; (b) this will serve as a welfare indicator, since, dynamically speaking, national welfare will be at a maximum whenever the present value of a stream of compensating tax-bounty payments is negative for every alternative redistribution of real national income; (c) whenever welfare is maximized in each and every participating country, world welfare will, a fortiori, be at a maximum, and then the international system of penalties and rewards that, also as a system of taxes and bounties, the international economic agency imposes upon each member government as a scale of policy behavior, would indicate a negative value for any other alternative international economic organization; (d) world welfare will be increased, decreased or left unchanged by a given international economic reorganization whenever the algebraic sum of all compensating taxes and bounties collected or paid to member countries in accordance with the universally adopted scale of national economic policies is positive, negative or zero. If the adopted international economic policy is that of achieving optimum distribution of income at full employment in each participating country, the international economic agency

will issue the following basic rule for national anti-cyclical policy: national governments must calculate the necessary domestic investment stream for maintaining full employment at a maximum level of welfare: if at any moment during the course of the planned national economic action actual capital equals planned capital, no adjustment is necessary and capital is simply maintained with zero net investment; if the stock of capital is insufficient, the rate of investment proceeds at capacity, and if it is in excess, it is retired by scrapping at a given rate.

12. This international economic policy model, although extremely oversimplified, does illustrate the international economy we had in mind when, in the previous section, we attempted at deducing a world trade multiplier. Once provoked by an output deficiency modern industrial economies start up and continue until the capital scarcity is removed, and then go down until they remove the excess capacity with which they started downward. In terms of demand for and supply of output, this scheme could be easily adapted to agricultural fluctuations of the cobweb variety[67] and be made to fit the conditions in underdeveloped

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[67] M. Ezekiel, "The Cobweb Theorem", Quarterly Journal of Economics, vol. LII, 1938, p. 272; W. Leontief, "Verzogerte Angebotsanpassung und partielles Gleichgewicht", Zeitschrift fur Nationalokonomie, vol. V, part 5, December 1934, pp. 670-76; Paul A. Samuelson, "Dynamic Process Analysis", in A Survey of Contemporary Economics, op. cit., pp. 368-74; R. M. Goodwin, op. cit., pp. 4-7; R. W. Reder, op. cit., p. 169

countries. As such, the model is completely general, since the final result is independent of the initial conditions, oscillations maintain themselves as long as uncertainty of policy from the part of the national governments or the national economic agency is assumed to exist, and, finally, no lags are introduced, the mechanism operating by its own inherent dynamic contradiction as long as it remains unorganized. Its mathematics are extremely simple, for, if the Keynesian equations are given:

$$I = kY \tag{213}$$

$$C = aY + b \tag{214}$$

$$Y = C + \dot{K} \qquad \dot{K} = dK/dT \tag{215}$$

and the recommendation of the international economic agency concerning domestic investment are symbolically expressed as

$$\dot{K} = \begin{cases} \dot{K}' & I > K \\ 0 & I = K \\ \dot{K}'' & I < K \end{cases} \tag{216}$$

where K is the stock of capital existing in the national economy; I is the planned investment, proportional to real national income or output; C is consumption; Y is national income or output; and a, b, and k are constants. Now, if $\dot{K}$ is net investment, $\dot{K}'$ is net investment at capacity and $\dot{K}''$ is the rate of investment scrapping, and if we combine (213-6), the "multiplier" of the system will be

obtained as follows:

$$I = \frac{k}{1-a}\dot{K} + \frac{k}{1-a}\,b \qquad (217)$$

By assuming a steady rate of growth in the desired amount of capital, a crude allowance for technological progress and research could be made. Other asperities could be softened by developing the multiplier or by introducing investment lags. As these developments have already been undertaken in the previous section of this thesis, such considerations here would be either repetitive here of static welfare criteria as applied to a dynamic world. Concluding these remarks we may say that policies that statically promise increase in welfare are probably sound on a dynamic setting, whereas transition policies should perhaps not be judged by welfare criteria.

13. Two economic ideologies: full employment, and optimum distribution. In very general terms it may be said that free enterprise national economies tend to emphasize in their economic policies the attainment and maintenance of full employment of resources, whereas socialist national economies tend to concentrate their economic policy upon the problem of optimum allocation of resources. By method and intention what goes under the name of Keynesian economics is only incidentally connected with welfare economics, although, paradoxically, that which is

known as "welfare state" is much more readily associated with the theory of employment than with the theory of distribution. It is our intention to end this study with some observations concerning the necessity of welding the interstices between these two pieces of economic analysis in order eventually to develop an inclusive value theory to serve as a foundation for both specific changes as well as for aggregate magnitudes. This lack of common doctrine is, in our view, the chief obstacle for world-wide multilateral agreement on the appropriate policies to attain and maintain full employment. A pertinent example of this lack of theoretical ligaments is the vagueness surrounding the very concept of full employment, which necessitates to be reinterpreted according to whether the country in question is economically backward or industrially developed. As underdeveloped areas are rich areas in the eyes of some, whereas industrially plethoric nations are inhabited by relatively poor individuals on the standards of others, confusions and misunderstandings may result when the issue is simply to impose an import control over a luxury, or to increase impossible flows of private investment internationally. Even in the hypothesis that comprehensive and multilateral agreement on unified policies for full employment is impossible of achievement at present, the lack of a coherent body of economic theory may cause trouble when

schemes must be introduced which would permit single countries to maintain full employment in spite of fluctuations in effective demand elsewhere. Many a national policy for full employment may be precluded by ineffective anti-trust legislation, lack of coordination between unions and management, or between the industrial sector and the agricultural sector of the economy. The sad state of affairs prevailing over the economics of fewness, in spite of the towering mountain of books, monographs, etc., dealing with this subject, is truly symptomatic of a will to ignore through meticulous application. How is it possible, under these circumstances to safeguard the planning of the exchange of goods between countries as well as the internal policy of each of these constituent units of an international economy? Minimum cooperation in this field would require at least that no country should use foreign trade policy in order to provide internal employment, but what countries and just how many have the necessary political foundation to enforce this agreement when a major depression is threatening? And how many have the necessary economic knowledge to evaluate beforehand the repercussions of a change in their foreign economic policy to achieve export surpluses or a mitigation of adverse balances?

14. It is more than doubtful that the five requirements set out in this essay (V,B,13) will ever be fulfilled an economic world constituted by politically sovereign nations. In the first place these are rational requirements, and the behavior of sovereignty is far from being always consistently rational. For instance, if cyclical fluctuations give rise to international economic isolationism, surplus countries, whose probable depression is likely to be mitigated, will adhere to a conscious policy of regionalism, although, rationally, no greater disadvantage would accrue to them from an opposite policy. On the other hand, a socialist country will refrain, on rational grounds, to strengthen a capitalist economy for fear of subsequent reaction, and in so doing the socialist government is acting exactly as it supposes that the capitalist government will act in the same emergency. Free enterprise economies will reject, also on rational grounds, any attempts at economic reform, in order not to lose thus the "charismatic" force of their immaculate example. Free enterprise economies, moreover, being in general politically democratic, will only adopt an effective full employment policy under protest that this will strengthen the role of the central government in detriment of those who are economically strongest.

15. Failing satisfactory world-wide agreement between countries pursuing full employment policies and countries pursuing optimum distributional schemes, and since unplanned multilateralism is unlikely to compensate with gains the losses arising from the recurrence of fluctuations, countries will tend either to isolationism with greater mutilations of international division of labor or to a conscious policy of block regionalism. A rule, then, may be formulated: the larger is the block the smaller will be the loss from foregoing the potential increase in welfare to be derived from international specialization of economic effort. Small and poor countries will very likely be the most vocal opponents of unplanned multilateralism, and they will tend to form coalitions to face the highly imperfect character of international markets for manufactures. The absorption of these blocks into the theory of international economic organization here developed is not intrinsically difficult, since all that is necessary, if these blocks are integrated and stable, will be to take them as national economies, and if they are not integrated to treat them in accordance with the methods of partial equilibrium. By comparing a large block with a large and rich country, the same conclusions regarding the spread of adjustment to any adverse balance, or the degree of protection against economic aggressions or probability of

retaliation could be theoretically worked out always in accordance with our basic norm for stable solutions (V,B,13,a). The relationships between blocks is not also a problem that could not be dealt with the aid of a structure of action similar to or identical with that which has been the object of this study. In this sense, the theory that has been presented here is an attempt at developing a general theory of action on the basis of which the consolidation of the social sciences may, perhaps, through hopeful eyes, be dimly perceived.

SELECTED BIBLIOGRAPHY

Aitken, A.C. Determinants and Matrices, Oliver and Boyd, Edinburgh, 6th edition, 1949, pp. 141.

Allen, R.G.D., Mathematical Analysis for Economists, MacMillan and Co., Ltd., London, 3rd. impression, 1947, pp. 547.

Arrow, Kenneth J., Social Choice and Individual Values, Cowles Commission Monograph 12, John Wiley and Sons, Inc., New York, 1st edition, 1951, pp. 99.

Barone, Enrico, "The Ministry of Production in the Collectivist State," in Collectivist Economic Planning, F.A. von Hayek, ed., George Routledge and Sons, Ltd., London, 3rd impression, 1947, pp. 245-90.

Bergson, Abram (Burk), "A Reformulation of Certain Aspects of Welfare Economics," Quarterly Journal of Economics, vol. 52, February, 1938, pp. 310-34, reprinted in Readings in Economic Analysis, R.V. Clemence, ed., Addison-Wesley Press Inc., Cambridge, Mass., 1950, pp. 61-85.

Bergson, Abram, "Socialist Economics," in A Survey of Contemporary Economics, H.S. Ellis, ed., The Blakiston Company, Philadelphia, Pa., 1948, ch. XII, pp. 413-48.

Dantzig, George B., and Woods, Marshall K., "Programming of Interdependent Activities - I General Discussion," and Dantzig, George B., "Programming of Interdependent Activities - II Mathematical Model," Econometrica, vol. 17, July-October, 1949, pp. 396-81.

De La Vallée Poussin, Ch. -J., Cours d'Analyse Infinitésimale, Dover Publications, N.Y., 1946, vol. I, pp. 460, and vol. II, pp. 542.

De Scitovszky, Tibor, "A Reconsideration of the Theory of Tariffs," Review of Economic Studies, vol. 9, Summer, 1942, pp. 99-110, reprinted in Readings in the Theory of International Trade, H.S. Ellis and L.A. Metzler, ed., The Blakiston Company, Philadelphia, Pa., 1949, pp. 358-89.

De Scitovszky, Tibor, "A Note on Welfare Propositions in Economics," Review of Economic Studies, vol. 9, November, 1941, pp. 77-88.

Edgeworth, Francis Ysidro, Mathematical Psychics, C. Kegan Paul and Co., London, 1st edition, 1881, pp. 150.

Edgeworth, Francis Ysidro, "The Pure Theory of International Values," in Papers Relating to Political Economy, vol II, Macmillan and Co., Ltd., London, 1st. edition, 1925, pp. 1-60.

Farber, Marvin, The Foundation of Phenomenology, Harvard University Press, Cambridge, Mass, 1943, pp. 585.

Frazer, R.A., Duncan, W.J., and Collar, A.R., Elementary Matrices, Cambridge University Press, Cambridge, 2nd impression, 1950, pp. 416.

Haberler, Gottfried, Prosperity and Depression, United Nations, Lake Success, N.Y., 1946, pp. 532.

Hicks, J.R., Value and Capital, Clarendon Press, Oxford, 4th impression, 1946, pp. 340.

Hicks, J.R. "Founuations of Welfare Economics," Economic Journal, vol. 49, 1939, pp. 696-712.

Hicks, J.R., A Contribution to the Theory of the Trade Cycle, Clarendon Press, Oxford, 1st. edition, 1950, pp. 201.

Hotelling, Harold, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," Econometrica, vol. 6, July, 1938, pp. 242-69.

Hurwicz, Leonid, "The Theory of Economic Behavior," American Economic Review, vol. 35, 1945, pp. 909-25.

Kaldor, Nicholas, "Welfare Propositions in Economics," Economic Journal, vol. 49, 1939, pp. 549-52.

Kelsen, Hans, General Theory of Law and State, Harvard University Press, Cambridge, Mass., 1949, pp. 516.

Klein, Lawrence R., Economic Fluctuations in the United States, 1921-1941, Cowles Commission Monograph 11, John Wiley and Sons, Inc., 1950, pp. 174.

Lange, Oskar, "The Foundations of Welfare Economics," Econometrica, vol. 10, July-October, 1942, pp. 215-28.

Lange, Oskar, "On the Economic Theory of Socialism," in On the Economic Theory of Socialism, Benjamin E. Lippincott, ed., The University of Minnesota Press, Minneapolis, Minn., 2nd edition, 1948, pp. 57-143.

Lerner, Abba P., The Economics of Control, Macmillan Co., N.Y., 4th impression, 1947, pp. 428.

Little, I.M.D., A Critique of Welfare Economics, Clarendon Press, Oxford, 1950, pp. 276.

Marschak, Jacob, "Neumann's and Morgenstern's New Approach to Static Economics," Journal of Political Economy, vol. 54, 1946, pp. 97-115.

Milne, William Edmund, Numerical Calculus, Princeton University Press, Princeton, N.J., 1949, pp. 383.

Mosak, Jacob Louis, General-Equilibrium Theory in International Trade, Cowles Commission Monograph 7, The Principia Press, Inc., Bloomington, Ind., 1944, pp. 183.

National and International Measures for Full Employment, United Nations, Lake Success, N.Y., December 1949, pp. 104.

Northrop, F.S.C., The Logic of Sciences and the Humanities, Macmillan Co., N.Y., 1948, pp. 402.

Pareto, Vilfredo, Cours d'Économie Politique Professé a l'Université de Lausanne, R. Pichon, Paris, 1896-97, pp. 563.

Pareto, Vilfredo, Manuel d'Économie Politique, Marcel Giard, Paris, 1927, pp. 695.

Pareto, Vilfredo, Traité de Sociologie Générale, Payot et Cie., Paris, 1917-19, vol. I, pp. 590, and vol. II, pp. 630.

Parsons, Talcott, The Structure of Social Action, The Free Press, Glencoe, Ill., 2nd edition, 1949, pp. 817.

Pigou, A.C., The Economics of Welfare, Macmillan and Co., Ltd., London, 4th edition, 3rd impression, 1946, pp. 837.

Reder, Melvin Warren, Studies in the Theory of Welfare Economics, Columbia University Press, N.Y., 3rd impression, 1949, pp. 208.

Robbins, Lionel, An Essay on the Nature and Significance of Economic Science, Macmillan and Co., Ltd., London, 2nd edition, 4th impression, 1946, pp. 160.

Robbins, Lionel, Economic Planning and International Order, Macmillan and Co., Ltd., London, 1938, pp. 330.

Samuelson, Paul Anthony, Foundations of Economic Analysis, Harvard University Press, Cambridge, Mass., 1st. edition, 2nd impression, 1948, pp. 447.

Samuelson, Paul Anthony, "The Gains from International Trade," Canadian Journal of Economics and Political Science, vol. 5, May, 1939, pp. 195-205, reprinted in Readings in the Theory of International Trade, H.S. Ellis and L.A. Metzler, ed., The Blakiston Company, Philadelphia, Pa., 1949, pp. 239-53.

Samuelson, Paul Anthony, "Evaluation of Real National Income," Oxford Economic Papers, vol. 2, no. 1, January, 1950, pp. 1-21, appendix.

Stolper, Wolfgang F., and Samuelson, Paul A., "Protection and Real Wages," Review of Economic Studies, vol. 9, November, 1941, pp. 58-73, reprinted in Readings in the Theory of International Trade, H.S. Ellis and L.A. Metzler, ed., The Blakiston Company, Philadelphia, Pa., 1949, pp. 33-57.

Von Neumann, John, and Morgenstern, Oskar, Theory of Games and Economic Behavior, Princeton University Press, Princeton, N.J., 2nd edition, 1947, pp. 641.

Walras, Léon, Abrégé des Éléments d'Économie Politique Pure, R. Pichon et R. Durand-Auzias, Paris, 1938, pp. 395.

Weber, Max, The Theory of Social and Economic Organization, trans. by A. R. Henderson and Talcott Parsons, William Hodge and Co., Ltd., London, 1948, pp. 404.

Weyl, Herman, Philosophy of Mathematics and Natural Science, Princeton University Press, Princeton, N.J., 1949, pp. 311.

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