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Ordnungstheorie and the Theory of Regulation Compared from the Standpoint of Complexity

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I. Introduction

Wirtschaftsordnungstheorie or simply *Ordnungstheorie* and the French Theory of Regulation are two theoretical constructions in which the connection between the historical character of the economy and the necessarily theoretical dimension of economics has been and is most investigated[1]. How to articulate these two aspects has been a permanent subject of debate since the Nineteenth Century. This question was already adressed in the *Methodenstreit* and by Thorstein Veblen (Veblen, 1919). However both *Ordnungstheorie* and the Theory of Regulation are uniquely articulated schemes in their attempts at providing theoretical alternatives to what they perceive to be an unsatisfactory state of scientific economics. This basic dissatisfaction arises from the lack of integration of history and theory, for short. The aim of this contribution is to identify a common salient feature related to this issue and developed independently in these theories. It is this feature and the argumentation deriving from it which contribute mostly to the design of these theories as alternative research programmes to what they perceive as an economics mainstream. Although they do not explicitly name

[1] In using the German for the Theory of Economic Order and the English for the *Théorie de la Régulation* I am following an apparent majority of the English language literature on this subject.

and conceive it as "complexity", its substance is what a noticeable part of present day complexity theory deals with. It even comes to such a high degree of complexity that it compels to a change of method of theorising. Such a kind of complexity may be called *essential* complexity.

The aim pursued here is not to assess the general merits and disadvantages of these theories. Nor is it to compare them systematically. It is to concentrate on one aspect whose detection and identification in these theories does not seem to have been exploited, to the author's knowledge. This aspect is essential complexity. In the analysis of these theories taken individually and in isolation from one another, I experienced personally how the observer's attention tends to be attracted by the specific interest he or she has in mind whereas the comparison between the theories leads to think of criteria, to sort out the most important ones, and can hardly avoid the irreducibility issue present in both of them. Essential complexity stems from it and from the kind of solutions the proponents of both theories strive for, although they never identify explicitly this notion as essential complexity.

I do not discuss whether these theories represent genuine scientific paradigms or research programmes. They are general theoretical settings or research programmes in a generic sense, and are thought of by their founders as alternatives to what they consider as the mainstream in economic theory.

My presentation of *Ordnungstheorie* relies entirely on Walter Eucken's book *The Foundations of Economics* which was first published in 1939 and whose edition in English, which I am using, came out in 1950. *The Foundations of Economics* is the undisputed core exposition of the economic theoretical framework of what is known as the Ordoliberal doctrine. Ordoliberalism is itself diversified (Wohlgemuth, in this book). It contains a normative part oriented towards economic policy making that I am leaving aside here. And the theoretical part pertains to law and economics. The *Foundations* address the economic side of it. The socalled French Theory of Regulation emerged in the 1970s independently, and even in the ignorance, of *Ordnungstheorie*, among a group of economists based in Paris.

These theoretical bodies have naturally no monopoly in treating institutions. And complexity was felt to be an important problem for economic theory much earlier, notably by Veblen, Marshall and Keynes. However it is the consequences drawn from complexity and the method elaborated to take them into account which single out these two theories, as we attempt to demonstrate in the following sections. I insist in the next section on the morphological analysis of the economy developed by these theories. It appears as the kind of solution devised in both of them in order to integrate essential complexity, a notion presented in section 3. This integration is

however not fully satisfactory. I suggest in conclusion that improving it may depend on the elaboration of a theory of essential complexity in its own right.

II. Two theories of morphological formations and processes

Ordnungstheorie in Eucken's Foundations of Economics

The *Foundations of Economics* is the most complete statement about *Ordnungstheorie* understood from its economic side. From our standpoint, the *Foundations* are divided in two parts. First is identified a problem for which available theories are considered unsatisfactory. It is the question of taking into account in an integrated way two opposite notions, the individuality attached to history and the generality necessary for theory, what Eucken calls the Great Antinomy. It is the source of complexity since they are irreducible to one another. The second part develops Eucken's answer and solution to this issue.

Eucken proposes to extend the analytical apparatus of economics and to include in it a morphological analysis of economic phenomena. In his repeated plea for basing the study on the actual, everyday economic life, he contends that this demands an understanding of the different forms in which economy activity takes place, "and therefore that a morphological analysis must precede a theoretical analysis" (p.11)[2] since "the morphological study of economic history reveals a limited number of pure forms out of which all actual economic systems past and present are made up. To work out these pure forms, and at the same time provide a basis for theoretical analysis which will explain the course of economic process, are our two tasks" (p.10). Eucken's ambitious goal is to construct "a morphological and theoretical system which is able to comprehend *all* (italics in original) economic life […] and which is able to catch, as in a net, the changing shape of economic reality" (p.10-11). At this stage it is necessary to expose briefly the strategy followed by Eucken since it determines the substance of *Ordnungstheorie*.

The Great Antinomy

A cornerstone of the *Foundations* is what Eucken describes as the "Great Antinomy", introduced with capital letters. This notion runs throughout the book and commands Eucken's striving to overcome the difficulty it presents to scientific enquiry in social sciences, especially in political economy.

This is the central theme of the *Foundations*. Economic problems have a dual aspect, which has led to a dual approach to them, one historical, the other

[2] All references are to W. Eucken: *The Foundations of Economics*, 1950.

theoretical. This is not new. It culminated in the Methodenstreit. A separation established between individual-historical economics developed in Schmoller's pure empiricism and a general-theoretical economics illustrated by Menger's dualism of theoretical and historical economics.

In this debate "both parties were wrong, nor was the truth somewhere in the middle between the two. Neither Menger's dualism, of which Schmoller perceived the danger, nor Schmoller's pure empiricism, the failure of which Menger foresaw, does justice to economic reality. A new start is necessary" (p.324).

Yet the subject matter of economic reality has a dual aspect according to Eucken. "The economist has to see economic events as part of a particular individual-historical situation if he is to do justice to the real world. He must see them also as presenting general-theoretical problems if the relationships of the real world are not to escape him" (p.41). Then Eucken asks: "How can he [the economist] combine these two views ? If he does only the one or only the other, he is out of touch with the real world" (p.41). Here lies a deep tension, what Eucken calls the Great Antinomy. Eliminating or overcoming it can hardly be achieved by getting historians and theorists to work together (p.43). This antinomy is larger in recent decades than in the past. The structure "of our social economy [is] becoming more and more complex, thus making theoretical analysis more and more clearly indispensable" (p.44).

The uniformity of chemical reactions or of the movement of bodies or growth of plants "makes it possible to formulate theoretical questions and generally valid physical, chemical, or biological laws. No such uniformity exists in the economic world, which exhibits an immense variety of forms and historical processes" (p.42). How, then to integrate the individual-historical nature of economic life with the general-theoretical study without which "there can be no scientific experience in this field, just as there cannot be without individual-historical study" (p.42)?

According to Eucken, "economic reality compels the economist to formulate his first main problem as a historical one, but it also forces him in quite another direction". (p.37) He must understand the interrelations of which every activity is a part. And this cannot be achieved *"simply by looking directly at contemporary economic reality* (italics in original) or by "the simple direct contemplation of the facts of economic history" (p.38) even when the economist has experience of economic reality (p.39). The usual historical method fails. Quoting Lotze, the author of Logik, published in 1874, Eucken states that theorising enables man "to transform what is given to us as *happening* together into what is *connected* together" (p.40, italics in original).

Thus economic life presents the economist with a “complex phenomenon”: “There is only one way out of this situation. We must try to break down and analyse the complex phenomenon into its different components” (p.40). Understanding reality and its relationships requires to put the problem in a general form accessible to theoretical investigation if one wishes to achieve “scientific experience” in place of ““everyday” experience” and treat the problem as a general-theoretical issue.

Due to this fundamental duality, economic life appears as a complex phenomenon and cannot be reduced either to its individual-historical character or to a general theoretical problem. The historical method or direct observation provides a description of a phenomenon but without enabling to understand it since it lacks the theoretical concepts and does not contain the tools for establishing relationships. The theoretical method may enable to formulate abstract relationships but at the risk of loosing contact with the real world of historical variety and contextualisation of facts and events: “We would no longer see anything of the variety of actual historical phenomena and of individual facts” (p.42).

The Great Antinomy presents irreducibly two sides and, according to Eucken, has not been treated satisfactorily by economists, either because only one side is treated or because, when the antinomy is taken into account, it is theoretically flawed. In this last case, Eucken criticizes the theories of the stages of economic development (from List to Sombart) and of the styles of economic development (Spiethoff). In his view, these notions characterize moments of reality but cannot be applied to other contexts or to past phenomena.

The remainder of the *Foundations* is devoted to Eucken’s answer to this problem of integrating the two sides of the antinomy.

The answer to the Great Antinomy.

Eucken takes a radical position: “Because established doctrines fail before the Great Antinomy, we must make a completely new approach to the subject-matter itself. Simply to continue on existing lines, either “historical” or “theoretical”, is impossible. From now on we shall disregard for the time being all existing economic doctrines and hold quite radically to this point” (p.101).

However, this does not mean rejecting theorising. The solution he proposes is to start by looking at “everyday economic life and asking questions about it” (p.101), notably how the economic process, of which each individual economic fact is a part, hangs together as a whole (p.63). The *Foundations*

proposes nothing less than a reconstruction of economics based on a redefinition of its object and its method. The object of economics is stated by going back to the classical economists: how does a multitude of autonomous decisions and actions hang together in a more or less unified whole ? The method is confronted to the problem well described by the subtitle of the *Foundations*: "History and Theory in the Analysis of Economic Reality". It is the integration of history and theory which leads to the issue of the Great Antinomy. Eucken proposes to solve it primarily by a morphological analysis. Morphological analysis is conceived of as preparing to the next step of theoretical analysis.

Form and process appear as two central notions in this argumentation. The differing structure of the problem of the forms in which economic life unfolds and of the course of the daily process within these forms, determines the character of economics (p.298). Identifying the basic forms through the observation of everyday life of say, the household, the farm, the firm in a given place and at a given time is the only way to remain grounded in what Eucken calls "economic reality". The immense variety of everyday economic life can be rendered tractable thanks to abstraction. But here it is a specific kind of abstraction. Eucken develops a method of "isolating abstraction" which starts with the observation of a historical fact or phenomenon whose individual features are extracted, and ends with building ideal types out of these individual features. Isolating abstraction is the abstraction of "specially significant characteristics" (p.326), of the "distinguishing or significant characteristics" (p.107), of "significant salient characteristics" (p.332).

Isolating abstraction is contrasted with the "generalising" abstraction "which seeks to fasten on to what is common to *many* (italics in original) phenomena, and with which the constructors of "stages" and "styles" of development work". (p.107) Eucken insists repeatedly on this distinction. He seeks to identify recurrent elementary forms of economic life from which ideal types are built. It can thus be said that the phenomenological unity of a fact is maintained in isolating abstraction whereas generalising abstraction involves a "withdrawal from actual economic phenomena" since it leads to identify common traits of different phenomena. Generalising abstraction "must take second place" in the definition of economic systems (p.299). The influence of Husserl's principle of phenomenological reduction is manifest in this reduction to the salient features of an individual phenomenon.

Everyday economic life "everywhere and at all times" shows that men "act on the basis of economic plans for overcoming their shortages of goods". Economic plans and the data which influence planning are "the point of entry into the real economic world". This is where the study "of either the structure of any actual economic system" or "of everyday economic processes" has to begin, "and this beginning decides the rest of the path" (p.303).

The notion of plan occupies a central place in Eucken's construction. He tackles it through the unique criterion of individual freedom and is thus led to differentiate between the two ideal-types of a centrally directed economy, controlled by a single authority, and the exchange economy composed of many independent agents, each with her/his own plans which have therefore to be coordinated. This coordination will itself depend on the forms of the market and of the monetary system.

By starting from the degree of freedom of planning in the exchange economy, one discovers a multitude of cases. But it results from the different ways in which the elements are combined. Indeed the number of pure formative elements or basic forms is limited. A morphological scheme is analogous to the individual letters of an alphabet out of which a huge variety of words can be formed.

Different economic systems can be identified through applying this morphological apparatus. Indeed an economic system or order "comprises the totality of forms through which the everyday economic process at any particular time or place, past or present, is actually controlled" (p.227).

The understanding of the different economic systems is a first moment of the scientific understanding of economic reality, to paraphrase Eucken. We can interpret it as a kind of bottom-up move from the observation of facts of everyday economic life to abstracting pure forms and their particular combination in an economic order. At this "top level" the economic order (or system) is an ideal type. It remains to understand the actual course of economic events in a kind of top-down move back to the interrelationships of everyday economic activity, by applying theoretical analysis. Here Eucken seems to rely on the tools provided mainly by microeconomic and business cycle theory. He advises to apply the "relevant theory" (p.237) but also seems not to pay much attention to how we discover it or make sure that it is the relevant theory. Then comes the question of power. Eucken sees economic power as a question "of the greatest importance". (p.263) Power is the opposite of freedom and may be characterised by applying morphology and theory to situations grasped with an historical perspective. On the first account, the more the form of the market approaches that of a monopoly or a monopsony, the larger is the power of the economic unit. With respect to theory, the larger the elasticity of demand, the less powerful is the position of the supplier. The less elastic supply is, the smaller is the power of the supplier. Beyond these particular instances complete competition is the form of market in which power is minimised, which explains the central place given to competition in Eucken's writings on economic policy.

Finally Eucken's book offers an instance of an approximate systemic theory before systems theory developed after the 1950s. "Thinking in orders" (or systems) is the motto of *Ordnungstheorie*. From the start Eucken quotes approvingly a statement saying that economic life is an organic whole. He claims that for this reason the attempt to formulate independent theories of production, exchange, distribution, and consumption must be abandoned (p.320) and that problems must be unified and complete if justice is to be done to economic reality (p.28). The modern theory of complex systems contains the central proposition that a complex system can be modelled only by a complex system (Le Moigne, 1990). An almost similar statement was made by Eucken: ""..because economic events make up an interdependent whole, economics itself must form an interconnected body of knowledge. It does this by developing a morphological scheme and a systematic theory. The structure and interrelationships of events, and the way they fit together, has to be matched by the interrelationships in the system of our scientific knowledge. Otherwise scientific knowledge is incomplete. To be systematic it must be organised as an interrelated unity" (p.304).

This sets clearly what the ambition of Eucken was. Did he succeed in explaining "genuinely" and "free of all bias and subjectivism" the "interrelationships of everyday economic life"?(p.33) Another distinctive feature is the interdependence of orders (or systems). It applies first to the relationships between partial orders (today, we would say subsystems) within an economic order. It pertains also to the connections with other orders, notably the legal system. And we can extend it to a defense of interdisciplinarity when Eucken emphasizes the points of contact between economics and other sciences such as history, business administration, and law.

The Theory of Regulation

Regulation in the Theory of Regulation denotes the process of mutual adjustment of production and demand at a global level. It emerges from local economic adjustments occurring within a given configuration of institutional forms[3].

What appeared ex post as a rather consistent programme arising from the findings of economists sharing similar basic dissatisfactions with the then prevailing approaches in economics originated in a pragmatic and rather disseminated way among economists mainly based in Paris in the early seventies and became progressively perceived as the Regulation School. It started practically simultaneously with the study of long run and structural

[3] This presentation of the Theory of Regulation is inspired from Delorme (2000) See also the chapters by Boyer and Vidal in this book.

change in the French and the US economies based on a macroeconomic, sectoral and historical, empirical approach. Michel Aglietta analysed the growth of the US economy in the long run (Aglietta 1976). A simultaneous inquiry on the secular evolution of output and prices in France was conducted at CEPREMAP (Centre d'études prospectives d'économie mathématique appliquées à la planification, Paris) by several researchers. It gave rise to several publications, the first of which was Robert Boyer and Jacques Mistral (1978).

The then dominating approaches in France were Keynesian, neoclassical and Marxist. Keynesian based modelling, with its emphasis on aggregate supply and demand in the short run, was felt too limited for dealing with mid term and long run changes, notably those concerning production. Neoclassical theory, with its emphasis on rationally substantive agents, on coordination obtained exclusively through markets and on equilibrium, was considered too narrow and static. Last but not least, those who engaged in the regulation programme shared a basic interest in the way Marx introduced an analysis of the long run dynamics of capitalism with an emphasis on social relations and on the process of accumulation. But they rejected the somewhat mechanical and deterministic interpretations of Marxism and the idea of a predefined end state to the evolution of capitalist economies. These latter criticisms are a key to understanding what makes regulation distinctive and also what makes it belong to the broader contemporary thrust toward an open ended evolutionary-institutional- socio-economic stance. It is these premises and the convergence of my own findings on the long run growth of public spending in France with those of early regulationists, that made me join the regulation perspective.

It is worth adding that regulation has diffused and raised interest among a growing number of scholars. A recent survey of the Theory of Regulation contains fifty-four chapters written by fourty-six authors (Boyer and Saillard 1995).

Indeed two main insights arise. First, macroeconomic theorising in general is often criticized for not taking institutions properly into account. What makes the Theory of Regulation truly original within economic theory is its attempt to include institutions in macroeconomic theorising and to build a frame in which institutions play an explicit and important role. A second insight comes from the open endedness of the Theory of Regulation. It is an open ended institutionalism. This creates immediately a challenge : how to theorise without the closure associated with the more deterministic standard ways of thinking in the economic discipline ? It is well known that this is the main criticism usually addressed to what has come to be called "old institutionalism" by proponents of the "new institutionalism".

The basic concepts

Three concepts are at the basis of regulation. They are the institutional forms, the regime of accumulation and the mode of regulation. The dynamics of regulation arises from their interplay.

The institutional forms

The institutional forms set a bridge between observed regularities of socio-economic life and agents' behaviour. Agents act within basic rules of interaction or institutional forms which consist in a codification of the main social relationships. It is consistent with the assumption of bounded rationality of agents. Five institutional forms are identified. First is the monetary and credit relationship. The configuration it takes depends on the type of monetary management, the kind of causality between money and credit, the structure and degree of development of national and international financial systems. The wage-labour nexus is the second institutional form. It has a key role since it is conceived as covering the main features of work organization and of the standard of living of wage-earners. Five components are distinguished by Boyer (1988a) : the organization of the work process ; the stratification of skills ; workers' mobility ; direct and indirect wage formation and the use of wage income. Third are the forms of competition. A basic distinction is between traditional price competition and oligopolistic competition. Fourth is the configuration of the state. It is characterized in recent work as a mode of interaction between the state and the economy (Delorme, 1995) in order to convey the idea of stabilized configurations over some periods of time with differences through history for a given country and also differences across countries. Finally there is the relationship between an economy and other economies in the world. It is the mode of interaction with the international economy or, equivalently, the type of articulation with the international regime.

The regime of accumulation.

The logic of accumulation is a central feature of a capitalist system. History provides evidence that accumulation is not linear : there are cumulative growth patterns separated by crises. These patterns can be viewed as stabilized configurations of the economy over some periods of time. The concept of regime of accumulation is aimed at depicting such patterns. It is defined by the set of regularities which allow a general compatibility between capital formation, production, the distribution of income and the genesis of demand. It expresses macroeconomic consistency. Given the evolution of technical coefficients, income shares, the composition of demand and time lags, it is possible to model these regularities in a dynamic setting.

Empirical investigations have revealed different regimes through history and across countries at a given period of time. A variety of regimes of accumulation exists, depending on the character and intensity of technical change and on the size and the structure of demand or, broadly speaking, on the norms of production and the norms of consumption.

The mode of regulation

The mode of regulation is a concept enabling to pass from partial regularities involving numerous agents acting autonomously to the possibility of a consistent dynamic system. Several ways of adjusting production to demand, credit to money, income distribution to demand formation are possible. Institutional forms may or may not induce a coherent adjustment process for the economy as a whole. Institutions and forms of organization (markets, hierarchies - private firms and public units - and networks) jointly determine economic and social dynamics. Hence regulation depends on the behaviour of agents and of social groups insofar as it ensures the relative coherence and stability of the existing regime of accumulation. Then a more specificied definition of regulation can be given at this point. It is a conjunction of mechanisms of adjustment associated with a configuration of institutional forms. It provides an alternative to the notion of static equilibrium. A mode of regulation is a set of rules and individual and collective behaviours which render potentially conflicting decentralized decisions mutually compatible without the need for decision units of gathering the information necessary to understand the working of the entire system, and which regulate the regime of accumulation.

Regulation, tensions and crises

In the Theory of Regulation, the long rum dynamics is seen as being discontinous. Periods of relative dynamic stability, during which basic regularities prevail, reach limits and leave room to phases of changes during which the consistency among previous components vanishes, with unstability and disorder until a new consistency settles. These changes can be either structural or small. This is the reason why crises play such an important role in the Theory of Regulation.

Tension and the potential for crisis are never absent from regulation. Indeed, although the term crisis is used in many ways, it is basic to the regulation approach to distinguish two categories of crises : “small” and “large” crises. The former are of a rather cyclical nature. They are in the essence of regulation. They express the kind of self-equilibration process through which recurrent imbalances of accumulation occur within the system as a result of the necessary lags between the demand and capacity effects of investment, for instance. Variations in inventories, production, investment, employment

and prices are part of these adjustments. These variations depict actually the usual business cycle. However, the institutional forms are likely to change only slowly, from cycle to cycle, leaving the character of regulation as a whole unaffected.

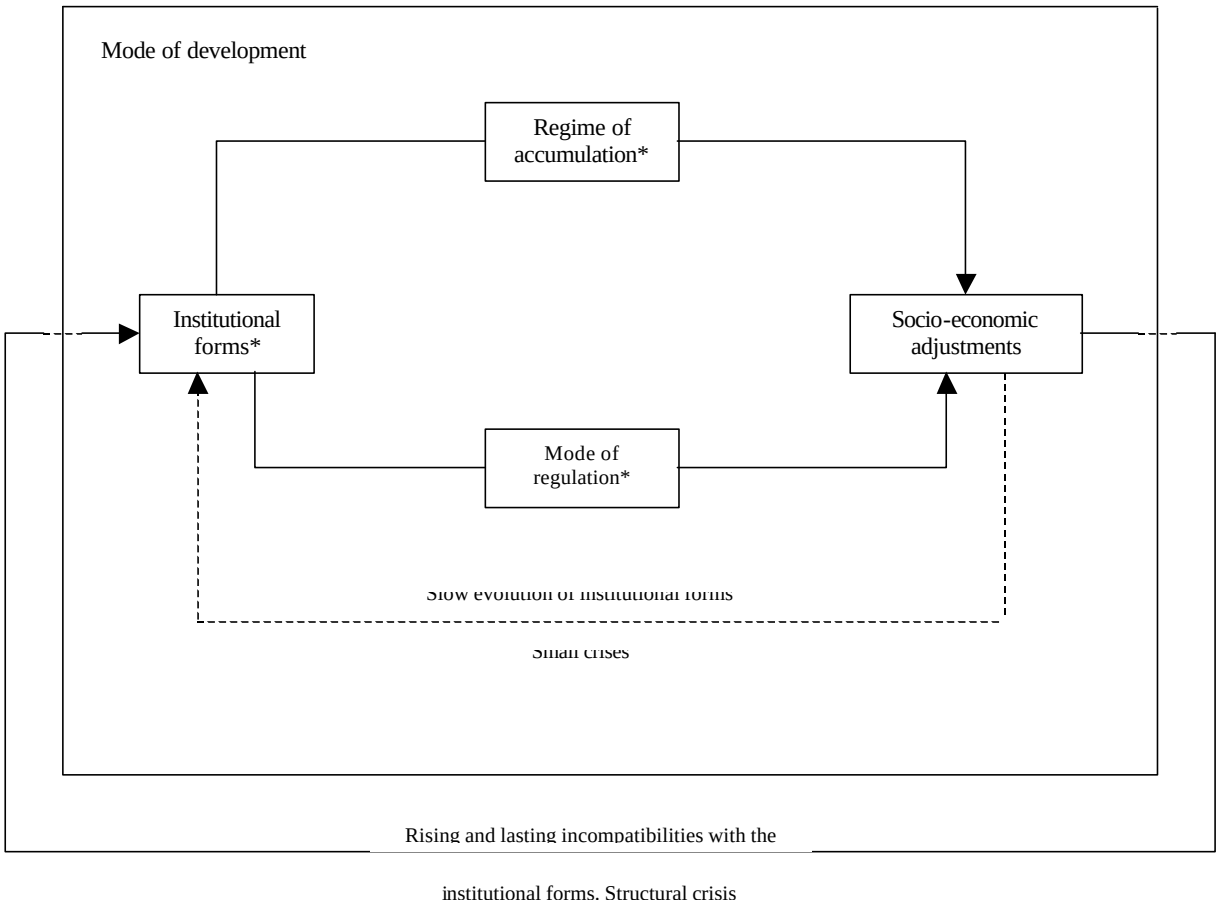
The latter are of a structural nature. In structural crises, the very process of accumulation becomes less and less compatible with the stability of institutional forms and the regulation which sustains it. In such a situation increasing doubts arise on the long term viability of the system. It can no longer reproduce itself in the long run on the same institutional basis. Imbalances are such that within the given mode of regulation, former self correcting mechanisms become ineffective. Institutional forms become more and more questioned by the spreading of the misadjustments. Ultimately it is the whole combination of the mode of regulation, institutional forms and the regime of accumulation, which constitutes a mode of development (Figure 1) that may become questioned.

This distinction is central to the regulation approach. Contemporaneous and lasting high levels of unemployment in many industrialized countries are for this approach the manifestation of a structural crisis which appeared in the early 1970s.

These notions render possible to identify varying institutional forms, regimes of accumulation and forms of regulation over time and across economies. Their combination constitutes a mode of development when some form of compatibility holds. Hence, post World-War II growth is interpreted as the Fordist mode of development, combining intensive accumulation with mass consumption, modifications in the monetary regime with an increased place of credit based money supply and primarily a shift in the wage-labour nexus (new wage norms involving the diffusion of productivity gains to wage earners on a nation-wide basis, extension of social security bringing a permanent improvement in consumption norms).

A distinctive feature of the regulation approach is to make possible to account endogenously for both growth and crisis. Hence, the very development of Fordism as a social, economic and technical regime led to new conflicts and imbalances which, beyond some threshold, induced tendencies toward a lasting slowdown of growth, stagnation and pressures towards changes in institutional forms.

Figure 1 : The basic notions of the Theory of Regulation



* Institutional forms : monetary regime
forms of competition
wage labour nexus
place and role of the state
relationship with the international economy

* Regime of accumulation: dynamic compatibility between output, income distribution and demand.

* Mode of regulation: channelling of individual and group behaviours in accordance with the regime of accumulation; reproduction of institutional forms.

Adapted from Boyer (Boyer et Saillard, 1995)

This much schematized sketch of the Theory of Regulation is only intended to present some basic information about this theory. The Theory of Regulation developed in the ignorance of *Ordnungstheorie* by its founders. Its origins are quite different. The central question arises from a macroeconomic level although it converges with the classical basic interrogation about the coordination in a unified whole of a multiplicity of decentralised autonomous behaviours. This very question is also Eucken's starting point although he deals with it in a different way emphasizing the micro level of plans as a point of departure.

The necessary integration of economic history and economic theory is at the heart of the problematic of the Theory of Regulation. The answer proposed by the Theory of Regulation relies on an architecture of hierarchised intermediary notions of forms, regimes and processes identified through an historical and morphological investigation. This method renders possible to account for their variability over time and across space and to articulate partial regularities with global regulation.

It provides a macroeconomic theory *with* institutions and an open ended institutionalism *with* a theoretical core. It is worth pointing out these two features since they are distinctive insights of the Theory of Regulation on two traditional dilemmas of economics, namely systematically articulating institutions with macroeconomics in a unified setting and rendering compatible the open endedness of history with theorising.

The parallel with *Ordnungstheorie* is striking. Both theories attempt at answering the question of integrating the two traditionally irreducible features of history and theory in economics. They develop at a general level of theorising. *Ordnungstheorie* relies on a microeconomic standpoint and provides a morphological theory highlighting form and process. The Theory of Regulation starts from a macroeconomic standpoint and develops a morphological theory articulating form and process at the intermediary and macroeconomic levels.

III. A common salient feature: essential complexity

The meaning of essential complexity

Complexity is increasingly evoked in the economic literature either to denote an otherwise undefined very important difficulty in solving some problem or to designate the enlarging family of work based on nonlinear dynamics, especially chaos theory. Indeed A. Kirman, in his reflection on the evolution of economics, refers only to the latter (Kirman, 1997). This is not the place to develop it, but it can be shown that it is a partial view (Delorme, 1999). Non linear dynamics is but one form of complexity. Complexity means the

irreducibility to a satisfactory level of reduction. It can be applied to a phenomenon and to the knowledge we have of this phenomenon. In this case "knowing" means reducing our ignorance. Wether we perceive a phenomenon as complex or not will depend on our level of aspiration in terms of reduction of our ignorance. Taking again the example of chaos, chaos is complex because of the irreducibility of the deterministic unpredictability of the evolution it covers, to the extent that the goal is to obtain predictability. But things run differently here. The Great Antinomy presents *Ordnungstheorie* with a complex problem to the extent that history and theory appear irreducible to one another and that Eucken rejects considering them as dualistic notions, put side to side. A similar irreducibility arises in the Theory of Regulation

Other theoretical systems are based on the recognition of a complexity intrinsic to the subject matter of economics or political economy. This is the case for the Keynesian and the Hayekian approaches. It is also true of the so called "old institutionalism" in the tradition of Veblen.

An important feature of Eucken's argumentation and of the Theory of Regulation, which does not seem to have raised a particular attention until now, lies in the reasons these authors find for departing from the established doctrines. In both cases, the morphological schemes appear as the common solution to the problem of irreducibility with which they are confronted. It is an irreducibility of such an importance that it leads these authors to reject unambiguously the available doctrines and the methods attached to them.

We already evoked Eucken writing that a "new start is necessary" and that a "completely new approach" must be made "because the established doctrines fail before the Great Antinomy". The Great Antinomy does not leave untouched the method for treating the subject matter. It is different from the usual treatment of chaos for which it would seem difficult to find in the literature a declaration about the new methodological start it would involve. In another study we designate the former kind of complexity by reflexive complexity and the latter by object based complexity. A synonym to reflexive complexity is essential complexity. We use it here since it has already been introduced in another context by FA Hayek (1989-1974; 1967). It is essential in the sense that it entails a profound change in scientific inquiry while non essential complexity can be treated satisfactorily with available methods.

An example may help clarify this central difference. We borrow it from the article by W. Weaver (1948) which inspired F.A. Hayek. Weaver identified three degrees of complexity ranging from what he called simplicity to disorganized complexity and organized complexity. Organization plays an essential role in defining these notions.

Simplicity (or organized simplicity) occurs when there are a large number of insignificant factors and a small number of significant factors. Disorganized (or unorganized) complexity occurs when there is a large number of variables with a high degree of random behaviour. The behaviour of gas molecules is a common example. These two situations are tractable or reducible by use of well known analytical methods, the former by concentrating on few, specific elements, and the latter by statistical methods of calculation of the average properties of many variables. Organized complexity stands between these two polar cases and cannot be reduced either to few variables or to a large degree of randomness.

Essential complexity entails the same consequences as organized complexity. Unlike most fields of the physical sciences, social sciences have properties of essential complexity which render problematic to import the methods of physical sciences in economics. The criticism of scientism by Hayek follows from it.

In our terms, Hayekian irreducibility in dealing with structures of essential complexity comes from the impossibility to depict their significant properties by models having less variables than them (Hayek, 1967). It is a form of incompressibility. All in all, Hayek does not go as far as Eucken or the Theory of Regulation in developing a theoretical scheme. He remains at a rather doctrinal, normative and methodological level. Essential complexity is simply said by him to put limits to what we can expect science to achieve, notably to its goal of prediction.

From these considerations we are entitled to ask what kind of change and what theoretical alternative Eucken and the Theory of Regulation bring. An answer can be found by reference to the notion of scientific research programme introduced by I Lakatos (Latsis, 1976). According to the definition presented below it is not unreasonable to consider that *Ordnungstheorie* was, and Theory of Regulation is, conceived as research programmes.

A research programme is an organic unity which contains a rigid part, with essential components, and a flexible part. The rigid part includes a hard core and the heuristic. The hard core consists of the axioms and of the basic assumptions accepted by the scientists supporting the programme. They are not submitted to a test. The heuristic is divided into two parts. The positive heuristic consists of the “do’s”, the set of suggestions on how to construct hypotheses and testable variants of the research programme. It contains guidance as to how the programme should unfold, what falls within and what falls outside its scope. The negative heuristic comprises the “don’ts”, it indicates what should be avoided.

The flexible part or “protective belt” of a research programme is made of the non-essential, modifiable and replaceable components. They are the auxiliary assumptions and specific theories that can be submitted to the test of their validity and empirical evidence without compromising the hard core.

To take an image, a research programme can be pictured as a set of concentric circles, with the hard core at the center and the protective belt schematised by the other circles. The protective belt is not uniform. The further we move from the center toward the periphery the lesser is the strength of the links with the core principles. The competition between research programmes occurs in fact mainly between peripheral, local theories and leaves untouched the hard cores. Whether a research programme is expanding, cumulative and fruitful or not depends essentially on what occurs within the protective belt. The kind of systematicity which establishes in the research activity unfolding in the periphery is notably an important condition for cumulativeness and for assessing the consistency with the hard core. It is a central factor of clarification and for communication among the scientists adhering to the programme, and for communication with other scientists and other programmes. It serves both “internal” communication and “external” communication.

Two broad dimensions relevant for *Ordnungstheorie* and the Theory of Regulation emerge at this point and offer a basis for comparison. They are the fruitfulness and the systematicity.

The challenge

Our focus on essential complexity helps understand the challenge facing the two theories. It directs attention to the way they are, or are not, not only scientific research programmes, but on top of this, whether they are alternative, competitive programmes for what they both perceive as a mainstream programme, namely the neoclassical programme. We do not need to insist on the fact that this is the common term of comparison and the actual test for any alleged alternative programme. It has to pass the test of the comparison with what an important majority of economists regard as the legitimate way to do economic theory. On what terms can this comparison be made ?

A distinguishing feature of *Ordnungstheorie* and of the Theory of Regulation is that their founders discovered the irreducibility to one particular available theory of what they deemed especially relevant in their respective research paths. Consequently, they were driven to construct their own theories. The theories they obtain are naturally conceived at a high level of generality since they arise out of a rejection of basic principles of the available theories. This entails designing alternative, basic principles. In this sense they are general

theories. If we extend to them the notion of scientific research programme, we must consider the articulation between the general theory level, which furnishes the guidance, and the periphery or local theory level which constitutes the protective belt. Whether the general theory level is considered as a hard core or not, the question of an axiomatic, of the consistency assessed through the derivation from higher, explicit, first principles can hardly be eschewed. This is all the more true when a comparison with the neoclassical programme is pursued, since its axiomatic is often presented as its first strong point.

The other possibility is to emphasize the local theory side. If fruitfulness is to occur somewhere, it is mainly at the local theory level. Then whatever the ambiguities theories may contain, looking at them in terms of organic entities draws attention to their fruitfulness and to what we may call their systematicity. Systematicity pertains to the hard core, and to the strength of the link between it and what is practised. Paraphrasing M. Blaug who asks "Do economists practise what they preach ?" (Blaug, 1976, p.171) one may consider that the more what is preached is practised, the more systematic it is. This pragmatic systematicity comes in addition to the systematicity contained in the hard core and ensuring the consistency of the declared principles of the theory. How do the two theories fare on this account ? The Theory of Regulation, in its major part, follows clearly a strategy insisting on the fruitfulness side. The systematicity side consists essentially in basic concepts (mode of regulation, set of institutional forms, regime of accumulation). The reference to any derivation from an axiomatic is rejected on the ground that it would entail a too restricted view which would be at any rate incompatible with preserving the open endedness of the theory. Moreover it can be claimed that the neoclassical axiomatic is accompanied by numerous ad hoc assumptions thanks to which an overall consistency may still be proclaimed. But ad hocness plays an important role in it. This is the reason why some authors in the Theory of Regulation defend a "well-tempered "ad-hocness"" on the way of a "specific scientificity" (Amable et al, 1997). In this case ad hoc is understood in its common sense of methods appropriate to the subject studied, not as an assumption either insufficiently derived from the axiomatic or intended to produce the result sought by the theoretician and indispensable to that production (ibid, p.253-254). A similar claim is made by G. Duménil and D. Lévy (1997). They emphasize the need to articulate local theories submitted to direct empirical tests and reciprocal control as a test of their compatibility and to combine their explanatory powers at a global level, or at a general theory level in our own terms.

This means to accept the co-existence of various theories and models whose consistency depends heavily on a virtuous circle of mutual interplay, communication and criticism in the scientific community, a situation which seems to be still highly problematic in economics. Relying to such a degree

on the fruitfulness side even at the price of floating, methodologically uncontrolled eclecticism, finds some support in D. Hausman's advice, "…I would urge economists to be more eclectic, more opportunistic, more willing to gather data, more willing to work with generalizations with narrow scope, and more willing to collaborate with other social scientists". (Hausman, 1992, p.280).

Eucken's presentation of *Ordnungstheorie* emphasizes the method. Its originality comes primarily from it. In a first step Eucken claims to solve the complexity of the great antinomy by reducing it through a morphological analysis grounded in isolating abstraction and thinking in terms of orders. This leads to defining ideal types of orders. In a second step, the morphological moment provides the particular, historical frame to which theory is applied. Theory here seems to mean mainly established microeconomic theory. It is only in a third step, not analysed here, that the consequences of the superiority attributed to competition in curbing down economic power are fully developed in terms of economic policy principles and orientations. It constitutes *Ordnungstheorie* proper. All in all *Ordnungstheorie* seems to have been more fruitful for reflecting on economic policy than in the strict theoretical field. It seems that *Ordnungstheorie* did not give rise to significant cumulative local theorizing.

Finally one gets the impression that essential complexity creates a special difficulty for theorising when it is considered, as is done here, in terms of articulating general and local theory. The two theories studied here are caught in a kind of unresolved trade off between systematicity and fruitfulness. The Theory of Regulation emphasizes the fruitfulness side and is expanding on this basis. *Ordnungstheorie* relied on an attempt at systematicity and almost vanished. Can the expansion of the former survive its founders and retain some durability? Can the latter be revived or prolounged with changes, as is envisaged in M. Wohlgemuth's chapter ? These questions arise directly from the competition between research programmes in which these theories are taking part. They ambition to present alternatives to what they consider as a neoclassical mainstream. Yet, in the comparison with it, they suffer from a weak articulation of systematicity and fruitfulness. Systematicity without fruitfulness is useless. And fruitfulness without systematicity can succeed in the short run but at the risk of rising confusion and of being swallowed in the long run by the expanding character of the mainstream. Neoclassical economics can claim consistency obtained by its reliance on a chain of reasoning derived from axiomatic principles. It leaves unanswered the question of the validity of the predictions. But it relies on an explicit articulation between its foundations and the way it is applied. This is not saying that this articulation is satisfactory or not. Simply, it is firmly claimed. No such firmly established linkage appears to exist in the two theories studied here.

IV. Conclusion. The need for a theory of essential complexity

The goal pursued here has been rather modest. It was to show how *Ordnungstheorie* and the Theory of Regulation are facing a common challenge as general theories. This challenge follows from their attempt at integrating essential complexity. Difficulties follow from it in their cumulativeness (or fruitfulness) and in their capacity to become more systematised programmes able to compete with the already systematised neoclassical programme. I simply focussed on a consequence of essential complexity for theorising. I did not attempt at detecting thoroughly whether these theories succeed in this task. I wish only to point to the available strategies that can be followed. I take the liberty of repeating that the Theory of Regulation puts the emphasis on the fruitfulness aspect more than on the systematicity side. With the hindsight we dispose of today, *Ordnungstheorie* appears to have relied more on a detailed construction of a method than on its theoretical cumulativeness. I would claim that it has been more fruitful in its inferences for economic policy, through *Ordnunsgpolitik* and the Social Market Economy orientation, however debated this success may be nowadays. Research in progress done by the author derived from his own experience suggests that a third strategy might be explored. It would be based on theorising about essential complexity in its own right since it is merely taken in these theories as a consequence of a profound problem of irreducibility which creates the need for a change of research programme. This change is dealt with in broad methodological terms. But nowhere can one find an attempt at exploring what essential complexity would mean if it were informed by a theory of essential complexity.

Given the pervasiveness of complexity and the important role it plays in these and other theories, one may think that it would be worthwhile to explore the connections between the various definitions and ways in which this notion is called for and to identify the possible regularities and properties which emerge. Such an investigation would at least be a starting point towards building a theoretical argumentation about what can be done with complexity. This is needed if we want to reduce the confusion that is surrounding this notion. Theorising might help clarify and systematise the knowledge of complexity and of its scope in economics.

In the two theories studied here, complexity is considered so important as to drive their authors to reject conventional theory and to design alternatives to it. The same situation and the same consequences can be observed in other general unorthodox theories. Among them are Veblen's plea for an evolutionary economics because of the historical and open ended character of the subject matter of economics (Veblen, 1919), Keynes's rejection of atomism in the name of the organic interdependence characterisrtic of social

phenomena (Keynes, 1921; Carabelli 1988), and Hayek's view of complex phenomena calling for a specific scientific practice. However, considering the diversity of these theories, it would be interesting to know if there is some unity in the essential complexity that is operating and, in such a case, how it remains compatible with such a diversity. Or, if there is no unity, a systematic inquiry into the differences among essential complexities would be useful. Another issue is understanding when complexity becomes essential, or what is non essential complexity. What are the kinds of complexity that do not entail the same consequences than essential complexity ? Do they imply specific behaviours or not ? We introduced above the notion of organization when we evoked Weaver's classification. Is it the only way to differentiate within complexity ?

Examination of the theories mentioned here suggests strongly that morphological analysis is one theoretical strategy among others in order to supposedly overcome essential complexity. We are left again with a feeling of diversity about the implications of complexity which cannot be clarified in the absence of a firm way of connecting these differences. Why not suppose that a part of what is perceived as a lack of clarity or even as an ambiguity is indeed an intrinsic ambivalence reflecting the open endedness associated with complexity ? But such a property can hardly be established without a firm grip of the mechanism which generates it and renders it legitimate. This example illustrates how the rather confused atmosphere enveloping complexity can hardly be clarified without a much deeper investigation susceptible to lead to a theory of complexity.

If the above development has some relevance, then we are entitled to wonder whether essential complexity can remain so centrally present in these theories without being based on a theory of essential complexity in its own right. Such a theory would aim at identifying essential complexity, at comparing it with other notions of complexity, at establishing in what sense it is original or not, at surveying the theories which include it, without using the name, and at discussing systematically the solutions proposed and the obstacles remaining. A reflection on this issue has already started in philosophy of science and in methodology.[4] However, there seems to be no easy and straightforward way to apply it to theorising on a substantial matter like the economy. It requires specific research. Work done in this direction has started to be published[5]. Like any other theoretical work, it will have to pass the test of its fruitfulness.

[4] See the references in Morin and Le Moigne.
[5] Delorme (1997, 1999).

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