A NOTE ON STRUCTURAL CHANGE, ECONOMIC DYNAMICS, AND CRISIS

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Version: February 15, 1999. Paper prepared for the conference "Topics in the Analysis of Structural Change and Economic Dynamics" organized by the Editorial Board of Structural Change and Economic Dynamics, *Siena, July 13-14, 1990. We thank Mark Glick for his aid in the translation of this text into English.*

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Abstract

This paper compares four approaches to the relationship between structural change and crisis. The first two traditional contributions are those of Marx and Schumpeter. Marx links the propensity of capitalist economies toward crises to the tendency for the rate of profit to fall. For Schumpeter, the business cycle mirrors the discontinuity of structural change (evolution). These views are then compared to those of the Regulation School. The Regulationists relate major crises to the deficient balance of the structural evolution of labor productivity and real wages. The balance between these two variables must be insured historically by specific sets of institutions called "Regulations". Thus, major crises provoke in turn the transformation of the institutional framework. We contend that a tendency exists in capitalism toward increasing instability (propensity to enter into crisis), due to the progress of management responding to structural change, in particular the tendency for the rate of profit to fall. This increasing instability induces progress in the institutions of macro management of the general level of economic activity. Consequently, the economy is constantly maintained on its stability frontier and, therefore, prone to crisis.

INTRODUCTION

Although it is a common view that the profile of business fluctuations, as well as their underlying determinants, underwent major transformations along the history of capitalism, the exact nature of the relationship between *structural change* and *crisis* has not been often specified. The purpose of this note is to contribute to the clarification of this issue by contrasting four distinct approaches.

The analyses of Marx and Schumpeter represent, in many respects, the culmination of two centuries of maturation of economic thought. In the works of the two economists, the relationship between structural change and stability is central. The two other approaches considered in this note are quite distinct in character from the previous. In the second and third parts, we will contrast our own thesis with the analyses in terms of regulation developed in France in the late 1970s.

In spite of obvious differences, these four analyses share a common interest in the relationship between structural change and crisis :

In Marx's terminology, structural change refers primarily to historical tendencies, such as the famous tendency for the rate of profit to fall. He linked the recurrent business cycle that he observed in England in the 19th century to the operation of these tendencies.

1. In the work of Shumpeter, the relationship between structural change and crisis is central. The business cycle is defined as the manifestation of the irregular character of structural change denoted as evolution.

2. According to the analysis of the Regulation School, stability requires that the movements of technology (labor productivity) must be paralleled by that of the real wage. This balance is maintained by a specific set of institutional relations called "Regimes of Regulation". When the various components of this structural framework are not transformed harmoniously, a major crisis follows. This crisis coincides with a metamorphosis of institutions.

3. In our analysis, which we denote as the "Tendential Instability Thesis", instability is defined as the recurrence of crises. Historical tendencies (one aspect of structural change) build a growing instability into the economic system. Reciprocally, this increasing instability induces, in turns, the metamorphosis of the institutions which are in charge of the overall macro management of stability.

A closer investigation reveals that these four analyses refer to a *dynamic process* whose instability is revealed at some point by the occurence of a crisis (or, more generally, business fluctuations). This process is related (or sometimes identified) with structural transformations. But the causality does not run exclusively from structures to crises. In turn, crises may provoke a structural metamorphosis of the system which conditions this dynamic process. These various elements are not always explicit in each demonstration considered, but define a convenient framework of analysis, which we will apply to the four analyses.

In what follows, we will consider the four approaches successively : Marx (part 1), Schumpeter (part 2), the Regulation School (part 3), and our own analysis (part 4).

1 - MARX

Section 1.1 briefly recalls Marx's analysis, which is then more fully discussed in section 1.2.

1.1 HISTORICAL TENDENCY AND CRISIS

Structural change, in the context of Karl Marx's analysis of capitalism, primarily refers to his notion of historical tendencies.[1] Marx borrowed from Smith and Ricardo the idea that capitalism is subject to such historical laws. As is well known, the *tendency for the rate of profit to fall* is central to his analysis. It is important, however, to stress that this tendency is only one element in a system of, at least, five such laws: 1) The increase of the mass of use-values paralleling their diminishing exchange value (the increasing productivity of labor), 2) The rise of the organic composition of capital, 3) An increasing rate of surplus value, 4) The tendency for the rate of profit to fall, and 5) The Acceleration of accumulation.

Marx's vision of the transformation of capitalism cannot be reduced to this analysis of historical tendencies which are basically related to *technology* and *distribution*. It is well known, for example, that he also described a tendency toward the concentration and centralisation of capital, that he was well aware of the development of financial institutions, corporations, salaried managers, etc. However, these transformations played a subordinate role, in his analysis, in comparison to the above tendencies.

It is obvious that the tendency for the rate of profit to fall was related in Marx's mind to the historical (transitory) character of capitalism. But he was also aware that, abstracting from the final collapse of the system, capitalism was suppose to transform itself under the impulse of these tendencies. It was precisely the purpose of the notion of countertendency to account for the structural transformation which capitalism developed in response to the operation of the law.[2]

At the beginning of chapter XV, "The Development of the Law's Internal Contradictions", Marx briefly summarizes his view of the importance of the law of the tendency for the rate of profit to fall in relation to Ricardo's analysis:

> On the other hand, however, in view of the fact that the rate at which the total capital is valorized, *i.e.*, the rate of profit, is the spur to capitalist production (in the same way as the valorization of capital is its sole purpose), a fall in this rate slows down the formation of new, independent capitals and thus appears as a threat to the development of the capitalist production process; it promotes overproduction, speculation and crises, and leads to the existence of excess capital alongside a surplus population. Thus economists like Ricardo, who take the capitalist mode of production as an absolute, feel here that this mode of production creates a barrier for itself and seek the source of this barrier not in production,

1. Obviously the succession of modes of production defines another dimension of structural change, which we will not consider here.

2. Actually, Marx defined two types of counteracting factors (K. Marx, *Capital, Volume III*, New York: First Vintage Book Edition, 1894, ch. 14). Some, such as the increased exploitation of labor, merely reduce (or offset) the fall. Others, such as the extension of share capital, allow for the survival or development of capitalism, despite a low profit rate.

> but rather in nature (in the theory of rent). The important thing in their horror at the falling rate of profit is the feeling that the capitalist mode of production comes up against a barrier to the development of the productive forces which has nothing to do with the production of wealth as such ; but this characteristic barrier in fact testifies to the restrictiveness and the solely historical and transitory character of the capitalist mode of prodution ; it bears witness that this is not an absolute mode of production for the production of wealth but actually comes into conflict at a certain stage with the latter's further development.[3].

In this paragraph, the tendency for the rate of profit to fall is related to the historical character of capitalism: The law poses a threat to the system. However, the analysis is interesting in a second respect which has more relevance concerning the present situation of capitalism and the investigation in this paper. The reasons why *profitability matters in capitalism* are suggested in the quotation: *The diminishing profitability of capital builds more and more instability into the system, in the sense of an increasing propensity to crisis.*

Thus, Marx provides a theoretical grounding for the relationship between structural change and crisis. For Marx, structural change (specified as historical tendencies) provokes business fluctuations, which are related to the diminishing profitability of capital.

Unfortunately, the exact nature of the relation is not unambiguous. When Marx writes: "*it promotes overproduction, speculation and crises, and leads to the existence of excess capital alongside a surplus population*", the central idea being expressed is obviously crisis, although the accumulation of terms describing these difficulties does not add to the clarity of the analysis, and this ambiguity is clearly reflected in modern Marxist literature. A low profit rate can result in a lack of demand, a slow rate of accumulation (since profits are the source of accumulation), or a weak inducement to invest (since profits are the purpose of accumulation), and it is asserted, rather than demonstrated, that these situations may provoke crises.

It is well known that in other parts of Marx's work, crisis is linked to credit mechanisms or to wages. This is, in particular, the case in volume III of *Capital*, when Marx analyses the situation of *overaccumulation*, in which capital confronts the limits of the available labor force, and profits are squeezed by rising labor costs. Again the relationship between this mechanism and the effects of the falling profit rate are not clear.

1.2 A POWERFUL BUT INCOMPLETE ANALYTICAL DEVICE

The framework of analysis developed by Marx is promising. If structural change is taken in the sense of historical tendencies, it is clear that these transformations were crucial in Marx's analysis of the recurrence of crises in capitalism.

A first problem, which we will not discuss here, is that of the *origin* of the tendency. The second issue is that of its *consequences*. These analyses remained, to a large extent, implicit in Marx's work. In spite of brief references to various mechanisms related to the outbreak of crises, it is impossible to locate in this work an unambiguous description of the exact *process* involved.

Historical tendencies, as viewed by Marx, define a coherent system of trends. There is no obstacle in the transformation of technology and distribution in the history of capitalism.

3. K. Marx, *ibid.*, p. 350.

A crisis does not mirror the "divergence" of these tendencies, in the strict sense of the term divergence, as in a dynamic process. However, the fall of the profit rate jeopardizes the ability of the system to maintain its general level of activity.

The notion of a feedback of crises on the structural transformation of the system is certainly not alien to Marx's analysis. Marx sees crises as solutions to the internal contradictions of the system, the violent resolution of accumulating tensions. In this point of view, it seems obvious that the recovery from a crisis will coincide with structural transformations. However, it is again clear that Marx did not specify the exact nature of this feedback relation.

2 - SCHUMPETER

Section 2.1 briefly describes Schumpeter's analysis of the relationship between structural change and the business cycle. Some elements of discussion are then presented in section 2.2.

2.1 EVOLUTION AND THE BUSINESS CYCLE

In the work of Joseph Schumpeter, the relationship between structural change and stability is clearly stated. *The Theory of Economic Development* (J. Schumpeter, *The Theory of Economic Development, An Inquiry into Profits, Credit, Interest, and the Business Cycle* (English translation of the second German edition), New York: Oxford University Press, 1926) devotes an entire chapter (Chapter 6, the last in the second edition) to "The Business Cycle" and, obviously, the issue of business fluctuations is central in *Business Cycles* (J. Schumpeter, *Business Cycles*, New York: McGraw-Hill, 1939).

In Shumpeter's words, the relationship between crisis and structural change must be specified as that which links *business cycles* to the process of historical *evolution*:

> This process of economic change or evolution, moreover, goes on in units separated from each other by neighborhoods of equilibrium. Each of these units, in turns, consists of two distinct phases, during the first of which the system, under the impulse of entrepreneurial activity, draws away from an equilibrium position, and during the second of which it draws toward an other equilibrium position. [...] Our model reproduces by its mere working, that very sequence of events which we observe in the course of those fluctuations in economic life which have come to be called business cycles...[4].

An equilibrium, in the sense of a Walrasian equilibrium, is characterized by given endowments, tastes, technology, etc. However, these factors are also subject to transformation. The course of this transformation is what Schumpeter calls "evolution". If equilibrium is seen as a target toward which the economy is moving, or around which it is gravitating, evolution accounts for the movements of this target.

4. J. Schumpeter, *ibid.*, Vol. I, p. 138.

This displacement of equilibrium is the effect of *innovation*. As is well known, Schumpeter defines this concept broadly, including under its umbrella technological change, progress in organization, new products, etc. Innovation is the manifestation of entrepreneurial activity, which differs in this respect from managerial activity, even if the individuals involved in these processes are often identical. Innovation is also dependent on the credit systems which provides the funds.

Concerning the business cycle, the important point is that the process of innovation is not smooth, but jerky :

> Why is it that economic development in our sense does not proceed evenly as a tree grows, but as it were jerkily ; why does it display those characteristic ups and downs ?
> The answer cannot be short and precise enough : exclusively because the new combinations are not, as one would expect according to general principles of probability, evenly distributed through time — in such a way that equal intervals of time could be chosen, in each of which the carrying out of one new combination would fall — but appear, if at all, discontinuously in groups or swarms.[5].

In both *The Theory of Economic Development* and *Business Cycles*, Schumpeter accounts for the profile of the cycle by distinguishing two "waves" in the progress of innovation. During the second wave, credit mechanisms support the general expansion of the economy, instead of being confined to innovation (as should be the case following Schumpeter). The liquidation of this second wave has disastrous effects. It leads, first, to a recession (on the way to equilibrium), but as this return is progressively undertaken, new disequilibria may also develop (J. Schumpeter, *Business Cycles*, New York : McGraw-Hill, 1939, p. 147) and provoke a depression, which will be ultimately followed by a recovery.

The crucial element in the cycle is the departure from equilibrium due to the two waves, innovation and expansion, and the return to the new equilibrium, through recession. The depression itself is, thus, an unnecessary accident (J. Schumpeter, *ibid.*, p. 150).

2.2 THE COURSE OF INNOVATION AND CREDIT MECHANISMS

Once structural change has been specified as *evolution*, and crisis defined as one particular stage in the *business cycle*, the relationship between the two types of phenomena appears central in Schumpeter's analysis.

As in the case of Marx, Schumpeter also fails to make explicit the fundamental properties of capitalism on which his analysis is based. The jerky character of innovation, which is reflected in the irregular profile of output, is considered as a given or a natural *property* of evolution.

In Schumpeter's analysis, innovation initiates a very specific *dynamic process*, in which credit mechanisms are crucial. Innovation is made possible by loans based on the issuance of money. Unfortunately, this creation of purchasing power overshoots the target, not because it is simply too abundant, but because credit progressively finances expansion,

5. J. Schumpeter, *The Theory of Economic Development, An Inquiry into Profits, Credit, Interest, and the Business Cycle* (English translation of the second German edition), New York : Oxford University Press, 1926, p. 223.

independently of innovation. It seems to be an inherent property of credit mechanisms, that once a first wave has been launched, the movement becomes uncontrollable.

Thus, the displacement from one equilibrium to the next is accompained by a wave of *growth*, in the strict sense, *i.e., still reflecting the specific features (tastes, technology, etc.) of the previous equilibrium.* The correction which follows is violent. The configuration of the business cycle results from this difficulty to restrict the movement of the economy to the actual transition from one equilibrium to the next.

The notion of a feedback from crisis to structural change is not central to Schumpeter's analysis. Crisis, for Schumpeter, is viewed as a process which eliminates the fraction of the productive system which is not in line with the new equilibrium. In this sense, it is simply part of the transformation of the economy. In addition, the crisis, in this analysis, does not condition technological change.

3 - THE REGULATION SCHOOL

The Regulation School provides an example of a contemporary analysis with both Marxist and Keynesian influences, in which the relationship between structural change and crisis plays a central role. In section 3.1 we will set out the general line of argument concerning the transformations of capitalism and, in section 3.2, discuss the mechanisms involved.

In what follows we will mainly rely on three (among the numerous) major works by the Regulation School, Michel Aglietta (M. Aglietta, *A Theory of Capitalist Regulation*, London : New Left Books, 1979), Alain Lipietz (A. Lipietz, "La mondialisation de la crise générale du Fordisme", *Les Temps Modernes*, p. 696-736), and Robert Boyer (R. Boyer, *The Regulation School : A Critical Introduction*, New York : Columbia University Press, 1989).

3.1 THREE REGIMES OF ACCUMULATION

The analysis of the Regulation School is based on the distinction between three different regimes of accumulation, extensive accumulation, intensive accumulation without mass consumption, and intensive accumulation with mass consumption. Lipietz (A. Lipietz, "La mondialisation de la crise générale du Fordisme", *Les Temps Modernes*, p. 696-736) defines these regimes on the basis of Marx's distinction between two productive sectors in the reproduction schemes : one sector which produces investment goods and the other which produces consumption goods.

Extensive accumulation corresponds to the proportional growth of the two productive sectors, with a balance of supply and demand, and little technological change. *Intensive accumulation without mass consumption* is a regime in which the growth in the sector producing investment good is only "validated" by the increase of constant capital in this same sector which, consequently, grows faster than the second. *Intensive accumulation with mass consumption* differs from the previous inasmuch as the growth of the purchasing

power of the workers allows a development in the sector producing consumption goods parallel to that occuring in the other sector. This regime can be characterized by the proportional growth of the two sectors.

These three regimes define a simple periodization of capitalism, before World War I, between the wars, and after World War II. The Great Depression is described as the natural outcome of the intermediate regime of intensive accumulation without mass consumption :

> As early as between the wars, the development of Taylorism and the embryonic forms of Fordism provokes the first large wave of intensive accumulation. Productivity increases at a 6 percent rate (triple the tendency in the 19th century), but purchasing power remains in line with its mediocre impetus. This scissor, highly favorable to the rate of profit — by way of the rise in the rate of exploitation, which is not compensated by the slow growth of the organic composition of capital — provokes an unprecedented crisis of overproduction : the 1930s crisis.[6 7].

It is easy to derive from this analysis the reasons for the outstanding performance of the economy after World War II. During this period, the growth of the real wage paralleled that of labor productivity (the golden age of Fordism).

The harmonious growth of labor productivity and real wage is dependent, still following the Regulation School, on a set of institutions concerning, in particular, the functioning of the labor market and the manner in which wages are pegged, or not pegged, to labor productivity. These institutions and mechanisms precisely define what is called the "mode of regulation" (*cf.* A. Lipietz, *ibid.*, p. 701).

This periodization is presented very clearly by Lipietz, but the same basic views can be found originally in Aglietta (M. Aglietta, *A Theory of Capitalist Regulation*, London : New Left Books, 1979, for example p. 303 of the French edition), as well as in Boyer's work (R. Boyer, *The Regulation School : A Critical Introduction*, New York : Columbia University Press, 1989, for example p. 73). However, the mechanisms involved in this analysis may differ significantly.

3.2 DISPROPORTIONS AND DIVERGING HISTORICAL TRENDS

It is clear that the relationship between structural change and crisis is central in the analysis developed by the Regulation School. Structural change refers to the historical profiles of technology, distribution, and institutions. Concerning crises, the Regulation School carefully distinguishes between two types of crises. Major crises, such as the Great Depression, reflect an inadequate institutional framework of institutions which insures the regulation. Minor fluctuations, such as the ordinary business cycle, are given less attention by the Regulationists. It is clear, however, in their analysis, that these fluctuations also

6. In this analysis, Lipietz considers the French economy. From a purely methodological point of view, his comparison between the rate of growth of labor productivity in the 19th century (a secular trend) and in the 1920s (a phase of a given business cycle) is quite questionable. Concerning the U.S. economy, which we studied (*cf.* G. Duménil, D. Lévy, The Regulation School in Light of One Century of the U.S. Economy, Cepremap, Larea-Cedra, Paris, 1989), none of the variables (labor productivity, profit rate, consumption) displays the profile described by Lipietz.

7. A. Lipietz, "La mondialisation de la crise générale du Fordisme", *Les Temps Modernes*, p. 696 -736, p. 703.

depend on these same institutions. For example, after World War II, the cycle is less pronounced than before World War I because of the conditions governing the formation of demand (which is guaranteed to some extent).

The exact nature of the dynamic process involved in the occurence of major crises is not unambiguously stated by the Regulationists. For example, the mechanisms described by Lipietz and Boyer differ significantly :

In Lipietz's analysis, as recalled in the previous section, difficulties arise in the productive system because of growing disproportions among the sector producing investment and consumption goods. Technological change is so rapid that the mechanisms governing the allocation of capital among industries cannot catch up with the changing proportions of demand. These disproportions "must" provoke, at some point, a major crisis.

4. Following Boyer, the problem is located at the level of what Marx called historical tendencies, and can be presented in a one commodity model. An equilibrium must be maintained between the rates of growth of labor productivity and real wages, but *this equilibrium is not stable* (R. Boyer, Réflexions sur la crise actuelle, Cepremap, #8706, Paris, 1987). A divergence follows.

In both cases, the issue is that of the lack of stability of a certain dynamic process, but the nature of this process differs in the two analyses.

The feedback effect which links crises to structural change is clearly established by the Regulation School. It is even a prominent aspect of this analysis. The crisis (the major crisis) ushers in the new regulation, *i.e.*, the new framework of institutions which conditions the dynamic of the system.

4 - THE TENDENTIAL INSTABILITY THESIS

In this part we present our own view of the relationship between structural change and crisis. In section 4.1, we briefly describe our analysis of stability in capitalism : stability in proportions and dimension, the condition for the stability in dimension, the stability frontier, business fluctuations. Section 4.2 focuses on the notion of *tendential* instability : How historical tendencies build more instability into the system and how this evolution induces the development of new institutions for the macroeconomic management of stability. Section 4.3 relates this analysis to that of Marx as recalled in the first part.

A specificity of our approach, as compared with those presented previously, is that it is based on the analysis of the stability of an equilibrium (short or long-term equilibrium), *in a given state of technology and distribution.* In this context, the modeling of market and monetary mechanisms plays a central role. The theory of business fluctuations is, first, considered in this limited framework, and the transformations of technology, distribution, and institutions are treated separately. Finally, these various elements are articulated, and the relationship between structural change and crisis made explicit.

4.1 THE STABILITY OF MARKET AND MONETARY MECHANISMS

In order to analyze the stability of an equilibrium, it is necessary to model *disequilibrium*. By disequilibrium, we mean a situation in which the supply of commodities differs from demand (inventories exist), productive capacities are not used at normal levels, rates of profit are not equal (or capital is not allocated properly), etc.

If disequilibrium prevails in the economy, it is necessary to model the behavior of economic agents in this context and not exclusively, as is the case in neoclassical microeconomics, under the assumption that equilibrium prevails. We call such microeconomics "disequilibrium microeconomics". The natural form of such behaviors is that of *adjustment*: Agents react to the observation of disequilibrium and modify their behavior.

This approach to the modeling of behaviors leads to the construction of dynamic models. We built several such models of *general disequilibrium* (for example, G. Duménil, D. Lévy, "The Analytics of the Competitive Process in a Fixed Capital Environment", *The Manchester School*, LVII (1989) p. 34-57, "Stability in Capitalism", *op. cit.* note 5, and "Micro Adjustment Toward Long-Term Equilibrium", *Journal of Economic Theory*, LIII (1991) p. 369-395). The problem is to determine whether the variables will converge toward (or gravitate around) an equilibrium (in the short or long runs), *i.e.*, to determine whether the equilibrium is stable.

In order to answer this question, it is first necessary to distinguish between two basic aspects of the stability problem, which we call *proportions* and *dimension*. By proportions we mean the relative values of the variables, such as relative prices or relative stocks of capital in the various industries. Dimension describes the general level of activity (or general level of prices).

These two aspects of the general stability problem refer to traditional distinctions in economic theory. For example, the classics (Smith, Ricardo, and Marx), in their theory of the formation of prices of production, treat a problem of proportions (allocation of capital and relative prices) and abstract from the determination of the general level of activity. Conversely, Keynesian macroeconomics do not consider proportions and restrict their analysis to the treatment of dimension (the general level of activity). The same is also true of Marx in his analysis of crises.

We believe that *capitalism is basically stable in proportions, but very unstable with respect to dimension*. This is equivalent to saying that commodities are available on the market without accumulation of inventories or shortages in specific industries, that investment are directed properly, and relative prices fixed adequately, but that the general level of activity is constantly oscillating and stabilizes only for limited periods of time. Note that this statement concerning the stability in proportions of capitalist economies contradicts underconsumption theories.

Because of this property of capitalism, the condition for stability in dimension is crucial. In our models, it is possible to give an analytical expression of this condition. The thesis that capitalism is very unstable with respect to dimension corresponds to the fact that this condition is sometimes satisfied and sometimes is not. More precisely, we say that capitalism remains in a vicinity of its *stability frontier*. Business fluctuations reflect this constant movement of the system in the vicinity of this condition, sometimes satisfied, sometimes violated.

In order to provide a theoretical justification for this property of capitalism, it is necessary to be more explicit concerning the condition for stability in dimension. The crucial parameters in the condition are the intensities of the reactions of economic agents to disequilibrium, in particular :

The reaction of enterprises to disequilibrium reflected in their inventories, in their decision to produce (a large stock of inventories of finished goods being associated with a diminished utilization rate and conversely).

5. The sensitivity of firms to disequilibrium reflected in their capacity utilization rate in their decision to borrow for investment (a large capacitity utilization rate being associated with a strong inducement to invest and conversely).

6. The willingness of the banking system to lend conditioned by the variations in the general price level, inflation or deflation (inflation being associated with a tighter attitude and conversely).

The reactions of firms in their decisions to produce and to borrow for investment are destabilizing, in the sense that the stability condition (in dimension) is violated if these reactions are strong. The reaction of the banking system to the variation of the general price level have the opposite, stabilizing effect. Thus, credit mechanisms have simultaneously stabilizing and destabilizing effects.

The stability frontier can be analyzed as the result of the confrontation between these two sets of mechanisms, stabilizing and destabilizing. Thus, our hypothesis concerning the instability of capitalism with respect to dimension, corresponds in this framework to the fact that these forces tend to balance one another.

4.2 TENDENTIAL INSTABILITY AND THE CONTROL OF STABILITY

What we call the "Tendential Instability Thesis" corresponds to the first set of destabilizing (or procyclical) mechanisms, concerning the decisions to produce and invest. *We believe that the intensity of these reactions tends to increase historically and, consequently, contributes to the growing instability of the system.*

The historical transformation of management has profoundly affected these reactions by firms to disequilibrium. The direction of this transformation is that of a tighter management, *i.e.*, swifter and larger reactions to disequilibrium.

This transformation is related in a double manner to the profitability of capital :

For a given ability of firms to manage themselves (a given "managerial technology") the profit rate conditions the intensities of reactions. If the firm maximizes its profit rate, a lower profit rate implies a stronger reaction to disequilibrium.[8]

7. The progress of management, whose purpose is the maximization of the profit rate, also implies a stronger reaction to disequilibrium. This can be easily understood considering,

8. We mentioned the importance of this relation in several papers since 1985 (G. Duménil, D. Lévy, "Stability and Instability in a Dynamic Model of Capitalist Production", *in* W. Semmler (ed.), *Competition, Instability, and Nonlinear Cycles*, Berlin : Springer Verlag, 1986, p. 132-169, "The Classical Legacy and Beyond", *Structural Change and Economic Dynamics*, II (1991) p. 37-67, or "The Real and Financial Determinants of Stability : The Law of the Tendency Toward Increasing Instability", *in* W. Semmler (ed.), *Financial Dynamics and Business Cycles : New Perspectives*, Armonk : Sharpe, 1989, p. 87-115). A model will be made available in a forthcoming paper.

for example, the reduction of the targeted stock of inventories, which is part of the capital advanced. Reducing the targeted values of inventories (and, thus, their average value) is a positive contribution to the profitability of the firm. However, low inventories may be costly because of lost sales. With a faster reaction to disequilibrium, shortages can be avoided or reduced to a minimum.

This increasing instability which is related to the progress of firm management must be checked by the development of the social control of stability. Individual private interest of firms does not work in the direction of increasing stability but, quite the contrary, build more and more instability into the system. The control of stability is a "social" task, in the sense that it must be handled at a higher level of organization, which transcends private interests. It is the function of economic policy, and the associated institutional framework of agencies, laws, and regulations, to insure the stability of the system, developing these countercyclical reactions mentioned above.

Because of the existence and growing efficiency of this institutional framework in charge of the control of stability, the tendential instability inherent to the system does not manifest itself as such. However, the progress in this social management of stability is difficult and demands time. There are also political obstacles to its development, since it sets some limits to private initiative, and is consequently often opposed by private interests. *For these reasons, the implementation of new devices in charge of the management of stability developed historically in response to instability, and not ex ante.*

This constant conflict between increasing instability and growing controls explains why the system evolves in the vicinity of the stability frontier.

4.3 A MARXIST INSPIRATION

A prominent aspect of the comparison between this approach to the relationship between structural change and crisis and the above is its relationship to Marx's analysis. Although the interpretation of Marx's works is always controversial, we present our analysis as a development of his views.

The tendency for the rate of profit to fall is a fundamental element in this analysis. We contend that the actual reduction of the profit rate, as well as the countertendencies to the law, both work in the same direction of an increasing instability in the system. This statement gives a precise content to Marx's insights concerning the influence of a falling profit rate on the propensity of the system to confront crises. We add to this analysis a new aspect of the countertendencial reaction. The "law of the tendency toward increasing instability" (*cf.* G. Duménil, D. Lévy, *ibid.*) is checked by the transformation of capitalism, the progress of the social control of stability.

Contents