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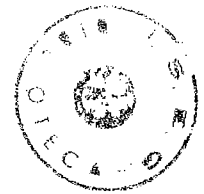


FIVE WAYS OUT OF DEPRESSION: 19/20th
CENTURY EXPERIENCE AND 21st
CENTURY PROSPECTS

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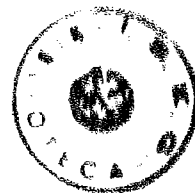


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Resumo

A teoria económica discutiu até hoje cinco caminhos pelos quais uma economia pode emergir de uma depressão. Esta comunicação apresenta uma breve perspectiva do desempenho desses cinco caminhos de superação de uma depressão durante os séculos 19 e 20 e prognostica o seu futuro no século 21. As inovações aparecem como o meio mais eficiente de ultrapassar depressões. Isto conduz a uma análise da tipologia das inovações de Schumpeter e a uma discussão da afirmação da teoria do crescimento endógeno de que as inovações já não são o resultado da actividade dos empresários, mas se tornaram uma característica inerente às economias capitalistas de mercado. A comunicação conclui com uma consideração da sustentabilidade do fluxo de inovações no futuro, dados os fenómenos da estabilização da população e da redução dos recursos naturais disponíveis, que irão muito provavelmente caracterizar a evolução da economia mundial. Defendemos que diferentes tipos de inovações desempenharão com toda a probabilidade papéis muito diferentes no futuro da economia mundial.

Abstract

Economic theory has hitherto discussed five ways in which an economy can emerge from a depression. This paper presents a brief review of the performance of these five ways out of depression during the 19th and 20th centuries, and prognosticates their future in the 21st century. Innovations appear as the most effective way to overcome depressions. This leads to an analysis of Schumpeter's typology of innovations and to a discussion of the claim of endogenous growth theory that innovations are no longer the result of the activity of entrepreneurs, but have become a built-in feature of market capitalist economies. The paper concludes with a consideration of the sustainability of the flow of innovations in the future, in view of the phenomena of population stabilisation and the reduction in available natural resources, which will very probably characterise the evolution of the world economy. We argue that different types of innovations are likely to play quite different roles in the future of the world economy.

0. Introduction¹

Economic theory has hitherto discussed five ways in which an economy can emerge from a depression. Mainstream classical and neoclassical authors believe that there are automatic mechanisms that propel any economy in depression out of such a situation, i. e., they believe that crises are just one phase of cycles. This perspective will be considered in section 1. Marxian authors believe that only the replacement of the capitalist mode of production by the communist mode of production can ensure the definitive extinction of the business cycle, i. e., they believe that crises are a structural characteristic of the capitalist system. This perspective will be considered in section 2. Two new perspectives, which stressed the need for state intervention of some kind to overcome depressions, appeared during the inter-war years. One of them (which may be equated with Keynesianism) emphasised the possibility of stimulating the level of economic activity by using fiscal and monetary policies. The other (which may be labelled neomercantilist) emphasised the possibility of exporting difficulties to other countries by using exchange and protectionist policies. These perspectives will be discussed in sections 3 and 4, respectively. The inter-war period also saw a lasting attempt to interweave the explanations of long-term modern economic growth and business cycles into one single theory of capitalist dynamics. This was Schumpeter's approach, which stressed the role of innovations as the most effective way to overcome depressions. This will be considered in section 5.

Section 6 will attempt to discuss the sustainability of the flow of innovations in the future. The discussion will be based on the analysis of Schumpeter's typology of innovations and the claim of endogenous growth theory that innovations are no longer the result of the activity of entrepreneurs, but have become a built-in feature of market capitalist economies. We conclude that the phenomena of population stabilisation and the reduction in available natural resources, which will very probably characterise the future evolution of the world economy, will not hinder the flow of innovations. However, significant social changes may be needed to ensure the efficiency of this process.

1. Crises within cycles: automatic mechanisms for emerging from depression.

Cycles have been one of the permanent characteristics of the evolution of the capitalist world-economy since its beginnings (Schumpeter, 1939: chapters VI, VII, XIV and XV)². However,

¹ Paper presented at the conference 'Théorisations du long terme et dépassement des phases dépressives', Montpellier, Septembre 1999. Revised version.

² Almost all economists would agree with this sentence, but only some would agree with Schumpeter's meaning, which implies a rough regularity of period and amplitude in capitalist economic fluctuations, in contrast with irregularity in pre-capitalist economic fluctuations. We will use the term cycle in its broad sense (no regularity

the phenomenon came only late to the attention of the economists (Schumpeter, 1954: 739-750; 1117-1135). Although both the mercantilist literature and the forerunners of economic science touched upon the subject of disturbances of the normal course of economic activity, it may be said that the controversy about the possibility of general gluts in the early 19th century was the first systematic discussion of the topic.

The controversy on the possibility of general gluts, i. e., a general impossibility of selling commodities at a profit, which opposed the views of Say, 1803 and Ricardo, 1817 on the one hand and the views of Sismondi, 1819 and Malthus, 1820, on the other, ended with a clear triumph for the denial of the possibility of general gluts. This set the mould for mainstream classical and neo-classical theories of crises and cycles. Crises and cycles may be acknowledged as possible, and even as normal, features of market capitalist economies, but, at the same time, it is claimed that there exist automatic mechanisms that propel any economy in depression out of such a situation. Thus, for the classical school, exogenous crisis theories based on disturbing political or natural factors and endogenous crisis theories of the disproportionality type were acceptable. Crisis theories of the underconsumption and overproduction type, either caused by oversaving or mass poverty, were unacceptable, and became the field of heterodox economists. The crucial point to notice is that the acceptable causes of crises within the classical paradigm were all of a short-term character, which implies that crises do not last forever. Heterodox economists believed in structural causes of crises that could have no automatic solution.

The study of crises gradually unveiled the fact that they are just one phase of cycles made up of expansions, crises, depressions and recoveries¹. This called for the development of new and more sophisticated cycle theories. Typical neoclassical cycle theories of the second half of the 19th century and early 20th century started from a normal (post-depression) state of economic activity, presented explanations for the development of the expansionary phase and for the downturn point that marked the beginning of the crisis and interpreted depressions as a liquidation phase of business endeavours that could only survive in the exceptionally favourable context of the expansionary phase. Some exogenous or endogenous factor, occurring with more or less periodical regularity, was considered necessary for the start of the expansion. A broad division of these theories into two groups, the real cycle theories and the monetary cycle theories, according to the role they assigned to real and monetary factors at the beginning of the expansion process, is usually considered a useful classification. Robertson, 1915, Mitchell, 1927 and Spietoff, 1955 may be mentioned as the most important real cycle theories which developed until the end of the inter-war period. Wicksell, 1898, Mises, 1912, Hayek, 1935 and Fisher, 1932 may be mentioned as the most important monetary cycle theories which developed until the end

implied), although it should be borne in mind that it bears its narrow sense (regularity implied) within the context of certain theoretical paradigms (e. g. the Schumpeterian one).

¹ The cycles identified by 19th-century economists were the Juglar, roughly decennial, cycles that characterised the evolution of 19th-century capitalist economy. The most decisive work was, of course, Juglar, 1860.

of the inter-war period. Of course, the dividing line is sometimes difficult to ascertain, and most theories may be labelled as eclectic (i. e., simultaneously real and monetary) without much distortion. Anyway, the very fact that crises and depression are always followed by recoveries and expansions, according to the standard morphology of cycles, underlines the existence of automatic mechanisms for overcoming depressions.

Neoclassical cycle theories experienced a significant retreat during the immediate post-World War II decades, due to the predominance of the approaches to be considered in sections 3 and 4 below. However, the failure of the policy recommendations suggested by these approaches for overcoming the economic problems of the 1970s brought a revival of neoclassical cycle theories during the last quarter of the 20th century, in the context of the so-called 'new classical school'.

Real and monetary business cycle theories of the late 20th century showed increased analytical sophistication and developed mainly from two sources: the general equilibrium framework, already presented by Walras, 1874-1877, but which only received its definitive shape from Arrow, Debreu, 1954, and the rational expectations hypothesis, formulated by Muth, 1961. Kydland, Prescott, 1982 and Long, Plosser, 1983 may be mentioned as the most significant new real business cycle theories. Lucas, 1972 and Barro, 1976 may be mentioned as the most significant new monetary business cycle theories.

It is pointless to discuss here the various cycle theories mentioned, but the theoretical reasons for the belief in the spontaneous correction of gluts by market mechanisms must be considered in more detail. The basic argument may be expressed in a general equilibrium form: as aggregate demand must equal aggregate supply and markets must clear, partial excesses, say, of demand over supply must be compensated by partial excesses of supply over demand. Given well-behaved utility and production functions, increases in the prices of goods for which demand exceeds supply and decreases in the prices of goods for which supply exceeds demand will lead to the exact coincidence of demand and supply in all markets — that is Walras' *tâtonnement* process. As resources markets clear, just like all other markets, there will be no unemployment of resources and actual production will equate potential production. Thus, crises and depressions will be overcome, at least after the period required for the *tâtonnement* process to unfold. The rational expectations hypothesis helped to substantiate the reasons for the existence of well-behaved utility functions.

2. Crises within the system: the need to change the capitalist system to definitively overcome depressions.

Until the inter-war period, disagreement with classical and neoclassical views came mainly from the Marxian camp. Marxian economic theory was built according to the classical paradigm, but


pointed to socialism as an inevitable outcome of the evolution of capitalism, both for theoretical and doctrinal reasons.

Although an explicit discussion of cycles remained the main 'unwritten chapter' of Marx's works, as has been repeatedly pointed out, Marx's contribution to the theory of business cycles was a significant one. According to Schumpeter, 1954: (i) he stressed the distinction between permissive factors (the whole structure of the market capitalist economy), causes (the fall in the rate of profit and the replacement cycle of durable capital), and symptoms (e. g., overproduction, financial breakdowns, etc.); (ii) he identified accumulation, driven by the very need to counteract the tendency for the rate of profit to fall and by competition among capitalists, as the main propeller of expansions; (iii) he understood that crises are processes to restore equilibrium and set the basis for another expansion, through the massive destruction of capital (this may be equated with the liquidation of economic endeavours unable to survive except under expansion conditions). Moreover, he suggested that crises would become more and more severe as time went by, leading to an exceptionally deep final crisis of the capitalist system, and, of course, believed that only the replacement of the capitalist mode of production by the communist mode of production could ensure the definitive extinction of the business cycle.

In a certain sense, Marx's analysis of cycles proceeded along the lines of the classical paradigm, as did most of his analysis of the capitalist mode of production. Thus, he believed that there are mechanisms that propel capitalist economies out of depressions, although he presented a less optimistic view of these mechanisms than the mainstream classical and neoclassical economists. In another sense, however, he departed from the classical belief that capitalism would be able to survive, in spite of its long-term tendency towards a stationary state and its short-term tendency to recurrent economic crises. These facts, which he explained as the consequence of the tendency for the rate of profit to fall, would lead, in his view, to the final collapse of the capitalist mode of production and to the emergence of the communist mode of production¹.

The absence of a systematic treatment of the subject of cycles in Marx's works left much ground for exploration and much room for disagreement among his followers. Until the inter-war period, the main development was the theory of monopoly capitalism. According to this theory, the destruction of capital linked to the overcoming of successive depressions led to a high degree of concentration of capital, which put an end to competition capitalism, involving mainly small firms, and replaced it by monopoly capitalism, involving mainly large firms. At the same time, the need to find outlets for certain types of goods that had not found adequate demand within the previous capitalist world-economy led to the process of imperialist expansion into regions that had not yet been included in the capitalist world-economy, allowing for the temporary overcoming

¹ Of course, the difference between the classics and Marx lies mainly in their understanding of the long-term dynamics of the capitalist economy and not on their view of cycles.



of the impending threat of a final crisis of capitalism. There was no agreement, however, on the sectors that needed such external expansion. Thus, the competing theories of financial imperialism (e. g. Hilferding, 1910) and commercial imperialism (e. g. Luxemburg, 1912) appeared.

Kondratiev, 1925 is another contribution from the Marxian camp that cannot be ignored. The identification of long-wave movements in capitalist economies and a first attempt at their explanation based on the replacement cycle of durable capital were the main insights presented by this author. However, these insights would be explored mainly by Schumpeter and the evolutionist and institutionalist schools, at least until the development of the neo-Marxian approaches of the late 20th century mentioned below.

The closure of a global (capitalist) world economy in the late 19th century, the huge troubles caused by the world wars and great depression during the first half of the 20th century, and the first attempts to build socialist societies which started during the late years of the First World War seemed for a while to herald the last days of the capitalist system. However, capitalism was able to overcome such difficulties, and this called for new theoretical insights.

As will be seen in sections 3 and 4, increased intervention of the state in the economic life of capitalist countries both in extension and depth may be considered the main instrument behind the good performance of capitalist economies during the third quarter of the 20th century. Kalecki, 1943 foresaw this evolution, suggesting it would lead to some kind of political business cycle and stating it would be unable to overcome the problems that would lead to the final collapse of capitalist societies.

Marxian analyses from the third quarter of the 20th century, such as Mandel, 1962 and Baran, Sweezy, 1966 proceeded along similar lines. They argued that, given the difficulty or impossibility of depressive factors being spontaneously overcome by market forces, the state increasingly took on the role of active promoter of the changes needed to restore the conditions of expansion after each round of destruction of capital. Some labelled this new phase of capitalist development 'state monopoly capitalism'.

The problems faced by capitalist economies after the mid-1970s crisis gave rise to fresh analyses of their long-term transformations. Most authors, however, departed from strict Marxian standards, and combined these with post-Keynesian and neo-Schumpeterian approaches in what may be called neo-Marxian theories. This was the case of the regulationist school.

The regulationist school distinguishes different types of crises, namely minor crises or regulation crises (which may be equated with the crises of Juglar cycles), and structural or transformational crises (which may be equated with the crises of Kondratiev cycles). Focusing on the latter, it explains such crises as resulting from a lasting period of overaccumulation (in a Marxian sense) and overexpansion (in a Keynesian sense). To overcome a structural or transformational crisis needs not only a process of destruction of capital (in a Marxian sense), but also a new regime of accumulation. This implies a new type of interaction between the dynamics of the productive system and social demand, as well as new institutional forms which embody a

new mode of regulation, i.e. new mechanisms and principles of adjustment related to wage relations, competition, state intervention and international order. During the (structural) depression, such a new institutional environment replaces the old one, setting the conditions for a new period of intensive accumulation (Boyer, 1979, and Dockès, Rosier, 1983).

3. Beggar my future: Keynesianism and its devices for delaying the unhappy hour.

The huge shock of the world wars and great depression fostered the development of new perspectives on the fluctuations of the capitalist economy, which rejected the optimistic mainstream neoclassical view as being contradicted by the facts, but refused to accept the Marxist idea that this implied that capitalism was condemned. Keynesianism became the standard paradigm of these perspectives.

A careful analysis of the neoclassical argument on the automatic mechanisms that ensure the overcoming of depressions shows that the absence of a spontaneous correction of depressions must be the consequence of one of three facts: (i) absence of market clearing, either at aggregate or particular market level, or, in other terms, a possibility of permanent disequilibrium; (ii) absence of adequate behaviour of utility or production functions, which is usually attributed to monetary illusion; (iii) price rigidity, which amounts to the absence of effective market mechanisms¹.

All three possible reasons for the absence of a spontaneous correction of depressions by market mechanisms — disequilibrium, monetary illusion and price rigidities — were considered in Keynes, 1936, which gave theoretical support for interventionist practices, and paved the way for a new programme of research into economic fluctuations.

The main novelty of the Keynesian perspective is the idea that there are at least some depressions that cannot be overcome by the automatic mechanism described in section 1. Thus, state intervention, in the shape of short-term fiscal and monetary policy, is needed to put an end to at least some depressive phases. The protracted nature of the great depression of the 1930s was an easy example to take to illustrate this argument, and even fostered the development of a new perspective on the structural evolution of the capitalist economy — the stagnationist view of Hansen, 1938. In his view, the tendency for consumption to grow at a lower rate than production, the end of the geographical expansion of the capitalist world-economy, and the absence of profitable investment opportunities, as a consequence of the depressive background created by

¹ It may be said that the argument in favour of automatic mechanisms for emerging from a depression and the list of its possible failures are flawed by the mixing together of different levels of abstraction. Although such an indictment must be acknowledged in purely theoretical terms, we believe that the implicit synthesis of the debate in terms of the history of economic analysis is correct.

these three facts, would lead the capitalist economy to a period of long-term stagnation. Once more, state intervention appeared as the solution to this situation.

The third quarter of the 20th century witnessed a general triumph of the Keynesian school, which became the dominant paradigm of macroeconomic analysis, condemning mainstream neoclassical analysis to the role of a somewhat minor companion only valid in microeconomic analysis, in spite of disagreement within the paradigm (e.g. Leijonhufvud, 1968) and criticism from the monetarist (e.g. Friedman, 1962), Austrian (e.g. Hayek, 1935) and new classical schools (e.g. Lucas, 1972). It was the unexpected failure of Keynesian policies to deal with the economic crisis triggered by the first oil shock during the 1970s that put an end to the dominance of what Samuelson, 1955 had called the neo-classical synthesis. From the 1970s on, the field of orthodox economic theory would be divided between neoclassical and neo-Keynesian approaches, especially in macroeconomic analysis. The neoclassical approach was already considered in section 1. In the neo-Keynesian field, mention must be made of the development of the political business cycle theory.

The idea of a political business cycle, already touched upon by Kalecki, as pointed out above, was developed later, mostly from a Keynesian perspective, for instance in Nordhaus, 1975. The scheme is based on the employment / inflation trade-off. Governments want to overcome depressions to avoid unemployment, but face constraints arising from the inflation pressures typical of expansion periods¹. Overcoming depressions in the political business cycle perspective is not different from overcoming depressions in the general Keynesian perspective, except that the timing of the process is controlled for political purposes and faces constraints arising from inflation pressures. Thus, governments schedule the overcoming of depressions for pre-election periods, and must be careful not to start the process too soon because they may face excessive inflation pressures before the election is held.

The problems of the 1970s also triggered the development of heterodox neo-Keynesian analyses, seeking to explain the new structural crisis of the capitalist system and the transition from Fordism to a post-Fordist capitalist productive system. This is the case with the post-Keynesians and the so-called 'social structure of accumulation school'.

Different groups within the 'post-Keynesian economics' combined Keynesian analytical tools and classical (neo-Ricardian, neo-Malthusian and neo-Marxian) elements to understand the difficulties faced by most economies in overcoming high rates of unemployment during the last quarter of the 20th century. They blame the lack of proper economic policy to stimulate demand. In their view, demand should be stimulated by reducing uncertainty and creating financial stability — financial tranquility (Minsky, 1977) — which would have a positive influence on the marginal efficiency of capital, investment and borrowing.

¹ Foreign payments are also considered as constraints in more sophisticated models.

The social structure of accumulation school combined neo-Marxist, pos-Keynesian and neo-Schumpeterian elements into an analysis that was quite similar to the one of the regulationist school, already examined in section 2 above (see Kotz, McDonough, Reich, 1994).

As a final note, it may be said that Keynesian and neo-Keynesian policies showed quite different performances when dealing with different depressive situations, as proved by the absence of significant economic crises during the third quarter of the 20th century and the experience of stagflation in the mid-1970s. From an Austrian perspective, this only means that Keynesian recipes are serviceable in delaying the unhappy hour of depression, but are unable to definitively overcome its inevitability. This is a consequence of the fact that the liquidation of economic endeavours unable to survive except under expansion conditions remains a task to be performed even after the application of expansionary fiscal and monetary policies. Thus, as a parallel to the beggar-my-neighbour view to be considered next, Keynesianism may be called, from an Austrian perspective, a beggar-my-future policy.

4. Beggar my neighbour: neomercantilist devices for exporting depressions.

The standard Keynesian approach dealt with a closed economy, but, of course, contemporary national capitalist economies are open economies. This creates room for an alternative way of overcoming depressions. Currency devaluation, decreasing relative real wages, export subsidies and direct protectionist measures, namely tariffs or quotas, may succeed in exporting depressions to foreign countries, in a mercantilist and neomercantilist fashion.

The formulation of these beggar-my-neighbour theories was first made by Robinson, 1937. She maintained that it could pay a country to implement policies to increase its trade balance as an efficient means of increasing output and employment. Such policies would lead to an increase in exports and import substitution. Both historically and theoretically, the efficiency of policies involving currency devaluation and the decrease of relative real wages is lower than that of export subsidies and direct protectionist measures, since they may create different contradictory effects (Krugman, Taylor, 1978) and international competition may depend on non-price factors.

However, as Robinson herself recognized, such policies suffer from a composition counter-effect. In a situation of general unemployment, the inevitable retaliation by other countries would not only disguise the possible benefits of these policies, but would make everybody worse off as a result of a reduction in the total volume of international trade relative to world output.

Thus, the rather traumatic experience of the 1930s gave rise to institutional settlements to prevent countries from implementing direct or indirect protectionist policies of the above-mentioned type. Despite the innumerable exceptions and derogations of the free trade rules, which framed the postwar international (monetary and trade) economic order, some would argue

that proper selective, *ad hoc* exceptions to free trade should be accepted, since in some cases, they may encourage 'good-neighbour' relations and still help to solve balance of payment problems. At least, such authors argue against the systematic deflationary policies imposed by the International Monetary Fund on countries enduring severe balance of payments deficits, as these may be of a 'bad-neighbour' type, inducing recession and unemployment. Recent history may be invoked in order to substantiate such claims.

5. The Schumpeterian approach: innovations as the triggers of economic expansions.

The aim of Schumpeter, 1939 was to interweave the explanations of long-term modern economic growth¹ and business cycles into one single theory of capitalist dynamics. Strictly speaking, the cycle theory of Schumpeter, 1939 is a mainstream neoclassical one. This means that Schumpeter believed that there are automatic mechanisms of the general equilibrium type that propel any economy in depression out of such a situation, once the liquidation of economic endeavours unable to survive except under expansion conditions is completed. Thus, in Schumpeter's view, a recovery phase characterized by positive growth rates will end the typical business cycle. Recovery, however, must not be confused with expansion. It is the return to normalcy, which is the consequence of recovery, that sets the conditions for the beginning of expansion. And according to the same perspective, the beginning of expansion is triggered, by successful innovations.

Any successful innovation is the basis for a primary expansionary wave, to which a secondary expansionary wave, based on the diffusion of the innovation and on economic endeavours that find a favourable background in the results of the primary wave, will usually be added. Different innovations will naturally have different impacts on economic activity and this accounts for the existence of economic cycles of different periods and amplitudes. According to Schumpeter, Kondratiev cycles with a period of slightly over half a century, Juglar cycles with a period of slightly over one decade² and Kitchin cycles with a period of slightly below three years³ had been the typical cycles of capitalist dynamics.

¹ The expression is, of course, taken from Kuznets, 1966, but it fits quite well into Schumpeter's perspective.

² According to Schumpeter, there were always six Juglars for every Kondratiev in the past, although he does not claim that there is any theoretical reason to expect the same pattern in the future.

³ According to Schumpeter, there were always four Kitchins for every Juglar (and twenty-four Kitchins for every Kondratiev) in the past, although, once more, he does not claim that there is any theoretical reason to expect the same pattern in the future.

This kind of grand synthesis met with various criticisms from the outset. Kuznets, 1940 is perhaps the best known of these early criticisms, focusing on the question of the regularity of cycles, which became one of the key issues of any discussion of Schumpeter's cycle theory¹.

Although Schumpeter's cycle theory did not become the leading paradigm of economic science in the following decades, it fostered the development of evolutionist and institutionalist analyses, sometimes described as neo-Schumpeterian.

Neo-Schumpeterian authors developed a new interpretation of the relationship between the different types of innovations in the context of cycle theories.

Schumpeter, 1939: 84 distinguishes three types of innovations: 'technological change', 'the opening up of new markets or of new sources of supply' and 'the setting up of new business organizations'. We shall label these as technological, geographical and organisational innovations, respectively. According to the neo-Schumpeterian perspective, the flow of technological innovations is concentrated in depressive phases, because of the need to cut costs under unfavourable economic conditions. However, technological innovations are usually confronted with an inadequate organisational background. Thus, organisational innovations are necessary to allow technological innovations to achieve their full potentialities. Depression will continue as long as technological innovations are faced with an inadequate organisational background. Recovery and expansion will start as soon as organisational innovations are introduced that allow the full impact of previous technological innovations to be felt and foster the diffusion of these same technological innovations. In other words, the exploitation of the full potentiality of a new techno-economic paradigm calls for organisational innovations, involving the management and coordination of design, production and distribution. Depression is the phase when some firms are led to innovate whilst others lose ground, and when the new techno-economic paradigm mismatches the institutional, cultural and socio-political regime. To overcome depression, institutional and organisational innovations must conform to the new techno-economic paradigm. This involves a significant departure from Schumpeter, and one which must not be ignored: what matters for launching an expansion is not innovation, which occurs in depressions, but its diffusion, which is dependent on the solution of the mismatch between technology and organisation in a broad sense (Mensch, 1975, Freeman, 1982, Perez, 1983, Nelson, 1993). Tylecote, 1994 introduced further refinements into this scheme. According to the latter, the mismatch between technology and organisation may exist at different levels — microeconomic, macroeconomic and socio-political — and tends to be solved in that order, starting during the depression phase at the microeconomic level and ending during the expansion phase at the socio-political level.

¹ Period regularity may be explained in a strictly Schumpeterian context by the fact that, although the flow of attempted innovations may be uniformly distributed over time, conditions for successful innovations are specially favourable in the situation normally prevailing at the end of recovery, which may account for the clustering of successful innovations at this precise point in the cycle.

In spite of all these criticisms, the Schumpeterian perspective appears as the most adequate for understanding cycles in the context of the whole process of capitalist dynamics. Firstly, because it is the only theory that combines the explanation of business cycles with the explanation of the development process typical of the epoch of modern economic growth. Secondly, because it is the only theory that deals explicitly with the whole range of short and long-wave cyclical fluctuations. Thirdly, because it is the only theory that inserts theoretical work into the background of historical experience. Thus, the Schumpeterian perspective is clearly the one best suited for prospective studies.

Of course, this does not mean that the other ways out of depression, especially the automatic mechanisms stressed by the mainstream neoclassical approach and the policy mechanisms stressed by the Keynesian approach, are theoretically or empirically false, as was stated above and as will shortly be seen. It only means that their effects stand out more clearly against the background of the Schumpeterian approach.

6. Are innovations sustainable in the future ?

The questions that naturally arise when dealing with prospective studies are: (i) can modern economic growth be expected to go on in the future, or is it likely that what will prevail is a stationary state (as expected by the classical authors, as mentioned in section 1 above) or a long-term stagnation (as expected by Hansen, mentioned in section 3 above)?; (ii) will the Schumpeterian scheme of innovation → primary wave → secondary wave → end of impact of innovation + diffusion → recession / depression → recovery, or the neo-Schumpeterian scheme of successive technological innovations followed by organisational innovations, go on in the future, or is it likely that some kind of stabilisation mechanism will dominate short-term capitalist evolution ? (iii) what will be the role of state intervention in these processes ?

Innovation is the key variable in any attempt to reduce the degree of uncertainty that necessarily surrounds any such look into the future.

There are good reasons to expect the flow of science-based innovations to continue in the future. The main one is the change in the nature of innovations already suggested by Kuznets, 1966, and fully acknowledged by endogenous growth theories. According to Kuznets, 1966: 9, modern economic growth was the consequence of the systematic application of scientific knowledge to economic purposes. Endogenous growth theories underline that modern economic growth provides resources for scientific research, which increases the flow of useful discoveries that are the basis of innovations. There is a significant difference between traditional

economies, which do not benefit from this flow of useful discoveries, and contemporary developed economies, which do benefit from such a flow.

Another relevant reason to expect the flow of science-based innovations to continue in the future is the tendency of the world economy to explore new spaces. Modern economic growth was always based on the exploration of new spaces and a deeper integration of existing spaces. The integration of all separated economic spaces, which still existed in the early 19th century, into one true single world economy was the most conspicuous aspect of this characteristic during the 19th century and early 20th century. It might seem that the closure of the world economy in the early 20th century was the end of such a process, but the use of air space and satellite space during the 20th century showed that this was not the case. There is no doubt that the possibility of exploring new spaces, such as the deep ocean spaces or the moon, during the 21st century, depends on the implementation of adequate innovations.

A third reason to expect the flow of science-based innovations to continue in the future has to do with the interaction between the stock of natural resources and population. The per capita stock of natural resources has been falling significantly during the last few decades and it is wise to expect such a trend to persist. Meanwhile, such a process has been accompanied by the destruction of important natural resources, which has given rise to the serious ecological problems that the world faces today. This situation implies significant changes of the technological paradigm in a long-term but foreseeable future. For instance, the current dependence upon fossil fuels is not sustainable. Anyway, in view of the high population densities attained during the process of modern economic growth, the very solution of ecological problems calls for innovations. This means that the evolution of natural resources presents significant challenges, but that, at the same time, as the economic history of the last two centuries shows, such challenges are likely to be a stimulus to innovations designed to overcome the restrictions imposed by them on modern economic growth.

Given a continuous flow of science-based (mainly technological) innovations, both modern economic growth and (short-term and long-wave) economic fluctuations are likely to continue in the future. As a matter of fact, according to the Schumpeterian theory, both phenomena are a consequence of innovations. This also means that most of the analyses that proved correct for the evolution of the world economy during the 19th and 20th centuries will almost certainly prove correct in the future. For instance, the neoclassical automatic mechanisms for emerging from depression will continue to work within the context of market economies, and its too slow results, at least in some circumstances, will continue to call for state intervention of the Keynesian type.

However, as the above discussion of the neo-Schumpeterian perspective showed, this scenario is not enough to ensure a smooth overcoming of long-wave depressive phases. Organisational innovations must support technological and geographical innovations to allow them to attain their full potentialities. A few further remarks may be useful in this context.

Significant periods during the 20th century showed a retreat from economic integration, both because of attempts to build centrally-planned socialist economies separated from the

capitalist world economy and the development of protectionist trends among capitalist economies. The late 20th century witnessed a reversal of these trends and an advance in the technological and organisational globalisation of the economy. Anyway, these ups and downs in the degree of integration underline the need for institutional support to ensure the ability to benefit fully from the potentialities for economic integration made possible by technology.

We suggested earlier that technological solutions are likely to appear for the problem of the relative and even absolute reduction of natural resources. This does not mean that they do not also imply organisational changes. Technically speaking, ecological problems are external effects, which imply a market failure, and, if they are serious enough, call for state intervention to implement adequate solutions. However, it is possible to argue that the most serious ecological problems, such as global warming and the ozone depletion, which present a world-wide threat, cannot be dealt with adequately at either the national state and even the regional supra-national level. This means that some form of world-wide governance, perhaps even some form of world-wide government, will be needed. Of course this does not imply any form of world socialism in a Marxian sense, but it does stress the fact that mere market mechanisms, although undoubtedly efficient to a certain degree, are not a universal panacea for all economic problems.

Population growth, which accompanied modern economic growth in the past, will certainly decline in the future, either because more and more countries will share the decline of birth rates associated in the past with the increase in living standards (recent developments in Southern Asia clearly illustrate this phenomenon), or because the traditional mechanisms of hunger, disease and war will increase the death rates (as shown by recent developments in Sub-Saharan Africa). The fall in population growth certainly destroys one stimulus to growth, but it is clearly impossible to sustain high rates of population growth without worsening the already rather serious ecological problems. And it should be stressed that population growth is not the only stimulus to economic growth. The improvement of the quality of life and the already-mentioned solution of ecological and other problems provide substantial room for stimuli to economic growth.

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