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**UNEMPLOYMENT AS A DISEQUILIBRIUM PHENOMENON:
THE ECONOMICS OF KEYNES AND HOW TO GO AHEAD
FROM PATINKIN, LEIJONHUFVUD AND HICKS**

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Unemployment as a Disequilibrium Phenomenon: the economics of Keynes and how to go ahead from Patinkin, Leijonhufvud and Hicks

Mario Amendola* and Jean-Luc Gaffard**

Abstract

Keynes's theory can be interpreted as dealing with unemployment as a disequilibrium phenomenon in an essentially dynamic context. In this perspective, it is much more important to explain why unemployment changes than to identify a presumed level of equilibrium for this variable. Patinkin, an artisan of the so-called neo-classical synthesis, had the same intuition when maintaining that price and wage flexibility is not a cure for unemployment, and hence there is no unemployment equilibrium. However, two essential aspects of a thorough sequential analysis are missing in both authors: co-ordination failures and time. Leijonhufvud takes co-ordination failures due to imperfect knowledge into account by focussing on financial markets incapable of providing for the consistency of long-term production and consumption plans. The time dimension in the real side of the economy is introduced by Hicks who maintains that productive capacity must be built up before being used, and hence, by fossilising past events, appears as a factor of propagation of disequilibria. Coupling this time dimension of production with the imperfect knowledge that engenders co-ordination issues allows building-up a true dynamic analysis, which appears as the prolongation or the complement of Keynes's analysis. Within such an analytical framework, it becomes evident, that a fall not only in money wages but also in real wages, far from re-establishing full employment, is a source of global instability and threatens the viability of the economy. And above all, it becomes evident that understanding the role of money and financial behaviours is essential for explaining the ongoing crisis as the previous ones.

Key words: co-ordination, disequilibrium, money, production, time, unemployment, wage.

JEL Classification: B22, E12, E24

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1. Introduction

In the US economy, during the last decade, despite the fact that the Federal Reserve System lowered the federal funds rate drastically pouring liquidity into the economy no inflation pressures or increases in unemployment were detected. In Europe the rate of inflation has remained stable around 2% since the constitution of the Euro zone, notwithstanding the target of a 4.5% annual increase of the monetary base, which, according to the BCE was required to keep under control the risk of inflation, has not been maintained reaching actually peaks of even 10%. This has been interpreted by mainstream economic theory as meaning that the equilibrium rate of unemployment was very low: a mistake that by encouraging to relax the financial constraint has contributed to the build-up of a massive asset-prices bubble, leading to the recent financial and then real crises. Once the bubble broke-down, the rate of unemployment dramatically increased: a trend only attenuated by the decision of public authorities to augment public deficits.

This episode reminds us that the phenomenon of unemployment is dynamic in nature. Thus, it is much more important to explain why unemployment changes than to identify a presumed level of equilibrium for this variable.

Employment is an aspect of the productive capacity of the economy; its evolution, thus, reflects the evolution of the economy as a whole. Economic change, on the other hand, is a process that takes place out of equilibrium: it implies in the first place a breaking of the coordination over time between supply and demand all over the economy. As such it calls for a re-establishing of this coordination for the change itself to be successfully brought about.

True, equilibrium models have been often privileged, in the analysis of the phenomenon of unemployment; however, the debate about the real nature of this phenomenon – relevant, as we have seen, for the wider problem of processes of change of the economy - has already been present both before and after Keynes.

In particular, the hints contained in the analyses of unemployment of Patinkin, Leijonhufvud and Hicks help a reconstruction of the more general analysis of coordination problems over time that will also throw light on the recent experiences and crises of the western economies

The remainder of the paper is structured as follows. Section 2 revisits Patinkin's view on unemployment, as developed in the chapter 13 of *Money, Interest and Prices*, bringing into light, along Keynesian lines, that a fall in prices and wages aggravates unemployment rather than permitting to reabsorb it. Section 3 presents the kind of analytical issues that are involved when considering unemployment as a disequilibrium phenomenon. Following the interpretation given by Leijonhufvud in his book *On Keynesian Economics and the Economics of Keynes*, section 4 focuses on the coordination issues that prevail on financial markets and explain unemployment. Section 5, making reference to Hicks in *Capital and Time*, focuses on what might be considered as the missing element in the analysis of coordination failures, that is the breaking-up in the time structure of productive capacity, which necessarily emerges as a consequence of any change in the behaviour of economic agents. Combining Hicks's views on money and production, section 6 shows how to integrate real and monetary disequilibria in a sequential context. Section 7 revisits and enlarges Keynes's results on the relation between changes in (money or real) wages and employment. Section 8 finally stresses the more generally relevant theoretical framework that can be derived from the analysis of coordination problems carried out and applies it to the recent performances and crises of western economies.

2. Equilibrium and disequilibrium unemployment

In the analysis of the economists of the beginning of last century, like Wicksell or Marshall, equilibrium was looked at as a state, a position towards which the economy necessarily gravitates. The main tenet of this analysis is that the competitive behaviour of markets and flexible prices assure full employment of resources, whatever the prevailing technology, in the equilibrium state associated with the latter. In this context unemployment appears as a transitory phenomenon due to the time needed for the adjustment mechanism set in motion by a change in technology to work out its effects. The adjustment is seen as a process that brings about the new equilibrium price structure that assures the full employment of all production factors with the new technique, and hence the re-absorption of the labour force displaced by the original technological shock. However, this process has no bearing whatsoever on the final equilibrium state, only defined by the intrinsic characteristics of technology, and hence appears rather as a predetermined trajectory to this state.

A different line of analysis, always within an equilibrium perspective, has gradually gained consensus in 1990s' so as to become dominant: it views unemployment not as a transient phenomenon, but as a 'natural' state of the economy due to structural factors. This is a more 'general' analysis of unemployment in that it is not confined to the consideration of the effects of changes in technology. As a matter of fact, in many models technology does not even appear as a main determinant of unemployment as its effects are reckoned to be only transitory. This is the case, in particular, of the standard model where the NAIRU (the long run natural rate of unemployment interpreted as a 'non accelerating inflation rate of unemployment') depends mainly on stable features of the labour market, paramount the wage-fixing institutions, which affect wage bargains and thus determine the equilibrium conditions of the labour market itself (see e.g. Layard, Nickell and Jackman, 1991). The belief that perfect wage flexibility would assure a quick re-absorption of the unemployment due to a technological (or any other sort of shock) – a belief that comes from postulating the existence of an inverse relation between unemployment and the real wage rate – suggests policy interventions in the labour market aimed at modifying wage-fixing institutions so as to remove the obstacles to this flexibility.

In any case unemployment, interpreted as an equilibrium phenomenon, depends on the 'fundamentals' of the economy, whether the traditional ones (technology¹ and preferences) or other structural factors like the institutions and, paramount, the wage-fixing institutions as in the case just mentioned. It is invariant not only to monetary disturbances (which can only bring about a mounting inflation) but to all sort of changes in demand, whether real or nominal.

The change of perspective in the view of unemployment from the beginning of the century to our days goes along with a change in the interpretation of equilibrium: from a position of the economy, to be reached as the result of a process, to an analytical construction which, in the modern version of equilibrium theory, has come to be generally accepted as the very expression of economic theory. Unemployment, originally viewed as a disequilibrium phenomenon arising temporarily during the adjustment to a given equilibrium position, becomes a stable feature, a distinctive

¹ Like in the comparative dynamics analysis of Phelps (1994) where technical progress is brought back at the centre of the stage by focusing on changes in the rate of change of productivity that have a permanent effect on unemployment.

attribute of an equilibrium seen as the only possible configuration of the economy, and that hence excludes the consideration of any kind of adjustment.

Keynes has an ambivalent view on this point. In the *General Theory*, he defines the existence of an equilibrium characterised by a given level of activity and unemployment determined by aggregate demand - that depends on expectations (of firms, about the marginal efficiency of capital, and of speculators, about the money rate of interest) which affect consumption and investment decisions – thus looking at this involuntary unemployment as an equilibrium phenomenon. But when analysing the effects on unemployment of a reduction in money wages he points to a process during which the economy is certainly not in equilibrium: a process, as is well known, to which, on the other hand, he denies the possibility of reducing involuntary unemployment.

As a matter of fact, he maintains that “the classical theory ... is wholly unable to answer the question what effect on unemployment a reduction in money-wages will have. For it has no method of analysis wherewith to tackle the problem” (Keynes 1936 p. 260). This question is crucial in the perspective of understanding the real nature of unemployment. The required method cannot be but a truly dynamic method able to describe the sequence of events starting with the breaking-up of full employment equilibrium. However, Keynes has not worked out a thorough analysis of this process. This is due to the difficulty he had of building-up a robust method, and to his desire of delivering the message that unemployment cannot be resolved by the market mechanisms that led him to propose an equilibrium model.

Patinkin (1965) approaches the unemployment problem from a general equilibrium perspective. In his analysis, however, unlike in the modern equilibrium analyses just mentioned, there are hints at the fact that unemployment should be considered rather as a disequilibrium phenomenon. He imagines an economy that has been in a state of general equilibrium for a long period of time. All the markets have instantaneously and continuously cleared, and all agents' expectations have been systematically confirmed by the realized market outcomes. He supposes that in a period zero this initial position of full employment equilibrium is disturbed by a sudden change in preferences (may be in consumers' or firms' time preferences), which causes the aggregate demand to shift downwards. This brings the economy to a pseudo equilibrium position, in which supply equates final demand, but productive capacity is

in excess and unemployment appears. As a matter of fact, whatever the cause of the sudden downward drift of final demand, it creates a gap between the existing productive capacity and the level of final demand for some time after the period zero.

A Wicksellian equilibrium has been disrupted, and this leads to a Wicksellian cumulative process². Unemployment and excess capacity cause a decline in money wages and prices, respectively, and hence an increase in the real quantity of money that should cause an upward shift in the aggregate demand curve, bringing the economy back to a full employment equilibrium. But if the economy is a pure inside money economy, as envisaged by Wicksell, there is no place for automatic stabilizers. As a matter of fact, falling prices and wages also result in an increase of debts in real terms, which prevents an increase of demand, thus leading the economy far away the full employment equilibrium. In this context expansive monetary policy should be preferred to price and wage downward flexibility.

Patinkin reminds us “that wage rigidities are *not* an *assumption* of Keynes’ analysis, but rather a policy conclusion, that follows his investigation of the probable effects of *wage flexibility*” (Patinkin 1948, p.283n). He visibly shares this viewpoint, quite opposite to that of modern equilibrium analyses. Indeed as well underlined, “to an astonishing degree, the theoretical fraternity has taken the real balance effect to be a conclusive refutation of Keynes. Perhaps it does refute his claim to have found underemployment equilibria. If involuntary unemployment and excess capacity are pushing nominal wages and prices down, the economy is not in equilibrium in any sense. It is not in a position of rest, markets are not clearing, and expectations are not being realized” (Tobin 1993 p. 59)

With these considerations, Patinkin seems to be trying to escape from the intrinsic limits of the static analysis developed by Keynes in the *General Theory*. But, on the one hand, he does not make explicit how and to what extent the disruption of the full equilibrium due to changes in ‘fundamentals’ generates the co-ordination problems that, we shall see, actually characterise a thorough process of change. On the other

² Iwai (1981) distinguished two notions of equilibrium. The one – the wicksellian equilibrium – is a state in which the product and labour market gaps are equal to zero; it is a synchronic notion of equilibrium. The other is concerned with expectations of all the agents of the economy; it is a diachronic notion. And “whenever the condition for wicksellian equilibrium is disrupted, at least one firm will ineluctably be thrown out of its expectational equilibrium, thereby disturbing expectational equilibrium of the economy as a whole” (Iwai *ibid.* p. 85)

hand, he considers only changes in the final demand. The supply side does not change along the way in the sense that the capital stock is given.

3. From equilibrium to an out-of-equilibrium context

In what follows, making use of analyses developed by Leijonhufvud and Hicks, we intend to take into account these two aspects, so as to be able to transform Keynes' and Patinkin's intuitions into a thorough analysis of unemployment as a disequilibrium phenomenon associated with a process of change in real time.

The first step of our analysis is to go back to the view of unemployment as a disequilibrium phenomenon arising during an adjustment, but to interpret adjustment not as predetermined trajectory to a given point of arrival, as it is necessarily the case when we stick to an equilibrium analytical approach, whichever way we interpret the concept of equilibrium. To look at adjustment in an equilibrium perspective, in fact, only allows to evoke the problems that this involves³, not to deal analytically with them: that is, to investigate what actually happens during the adjustment itself.

We shall instead look at adjustment as at the out-of-equilibrium process undergone by an economy submitted to a shock that changes its way of functioning - a thorough process that sets its own pace and direction. This process, as we shall see, is characterised by a complex dynamics sketched out step by step by a sequence 'constraints-decisions-constraints' in which money plays an essential role.

What matters, in this context, is not the nature of the original shock considered (whether it affects or not the 'fundamentals', as in the dominant equilibrium theory) but the co-ordination problems raised by the shock itself and the way these are dealt with by the economy⁴. Unemployment, in particular, appears as a disequilibrium phenomenon due to co-ordination problems, which affect not only the fixing of prices and wages but also the availability of the productive resources required by the process of accumulation of productive capacity, which, out of equilibrium, sketches out the evolution path actually followed by the economy. Dealing with these problems implies dealing with the accumulation and the management of financial and physical

³ As it is the case with the neo-classical economists of the beginning of last century.

⁴ It can be shown, e. g., that even a supply shock affecting positively the 'fundamentals' (a change in the technique implying a positive productivity shock) may result in a permanent fall in productivity as the result of the out-of-equilibrium process of adjustment to the new technique followed by the economy when co-ordination problems are not properly dealt with. This, by the way, will also provide an explanation of the 'productivity paradox' different from the prevailing ones (Amendola and Gaffard 1998).

stocks resulting from the breaking of coordination over time between supply and demand associated with any process of change.

4. Co-ordination failures and finance: Leijonhufvud's message

Leijonhufvud (1968) explicitly deals with the issue of co-ordination⁵ in proposing the interpretation of the *General Theory* as an attempt to introduce problems of coordination in the Neo-classical model. The standard IS-LM approach interprets instead Keynes as a fix-price (and hence short run) case of the general Walrasian model. The IS-LM is an equilibrium construct, in which markets are complete, and the price vector conveys all the information necessary to fully coordinate agents' decisions. In this framework, unemployment can only stem from nominal rigidities in the relevant market, namely the labour market⁶.

Leijonhufvud, on the other hand, claims that Keynes' main innovation lies in the method, i.e. the attempt to see unemployment as a disequilibrium phenomenon linked to the adjustment process following an exogenous disturbance. Co-ordination problems arise in particular in the market for savings and investment, where agents with different time horizons interact. "Financial markets are manifestly incapable of providing for the consistency of long-term production and consumption plans" (p.56). This depends on the existence and the management of disequilibrium stocks -namely, of financial assets - emerging as the result of coordination failures. According to Leijonhufvud, a problem arises when the price of financial assets is too low due to excessive sales of the speculators expecting a rise in the interest rate, as this hampers the rate of interest to fall thus stimulating real investments. But, we may add, the opposite can also be true, even if acting through a different channel. The fact that the price of financial assets increases too much may crowd out real investments by providing greater returns with respect to investments in productive capacities, as shown e.g. by the recent experience of the major western economies.

⁵An issue absent from Patinkin's analysis, that describes the adjustment as an implicitly well co-ordinated process, which is supposed to allow the economy to go back to the full equilibrium initially disrupted by a given shock.

⁶ However, we maintain that Hicks – to whom the standard IS-LM analytical approach is usually attributed - in a personal reinterpretation of this approach (1937) is much more interested by the effect of expectations by speculators (liquidity preference) or by firms (marginal efficiency of capital) on the rate of unemployment than by the effect of nominal wage rigidity. On this point, his analysis is close to that of Keynes.

The conclusion, according to Leijonhufvud, is that “It was Keynes' position that it is the failure of the incomplete market mechanism to reconcile the implied values of forward demand and supplies [...] that is the source of the trouble. Unemployment of labour and other resources is a derivative phenomenon” (p. 276). Clearly, “Keynes's point is that when the appropriate price relation does *not* obtain, *it is in general not wages but asset demand prices that are out of line*” (p. 336).

Leijonhufvud's interpretation of the *General Theory* tries to subtract it to the fate of a special case of the neo-classical system. Furthermore, it underlines the attempt to bring to the foreground the problem that (the lack of) coordination poses. Suboptimal equilibria cannot be reduced, as in the standard neo-classical theory, to a problem of prices that do not take their equilibrium value. Coordination failures cannot be identified with price distortions and hence price flexibility is not always the way to re-establish coordination⁷.

Rather in Leijonhufvud's analysis, there is a first hint at the role of quantity stocks, and constraints, that at each moment in time affect the agent's plans; and at the sequence of suboptimal choices triggered by these constraints which renders the very notion of an equilibrium price meaningless as the price itself would change continuously along adjustment processes.

5. Production in time: the other missing element

What do the market disequilibria (whether concerning prices or quantities), which appear during adjustment processes, come from? In other words: what brings about the co-ordination problems and the resulting stocks and quantity constraints that are the main determinant of the sequence of disequilibria actually making up this adjustment process?

To give a satisfactory answer to both questions we must first look at the production side of the economy, to the element missing both in Keynes' and in Patinkin's analyses. The Neo-Austrian representation of production (Hicks 1973, Amendola and Gaffard 1988, 1998) is best suited to the task.

⁷ As a matter of fact Keynes reverses the common wisdom on wage rigidity, that rather than a source of disequilibrium, in his framework becomes a necessary institutional feature to avoid the implosion of the system. “If money-wages were to fall without limit whenever there was a tendency for less than full employment, [...] there would be no resting place below full employment until either the rate of interest was incapable of falling further, or wages were zero. In fact, we must have some factor, the value of which in terms of money is, if not fixed, at least sticky, to give us any stability of values in a monetary system” (Keynes, 1936, p. 303).

It makes it possible not only to stress the time dimension of production but also to take explicitly into account the phase of construction of productive capacity – absent from standard production theories – and its relation over time with the phase of utilization of this capacity, the only one actually taken into account by standard theories. This is essential both for realizing that it is actually from the breaking of the equilibrium relation over time between construction and utilization that the market disequilibria originate, and for understanding that it is how this distortion of productive capacity is dealt with that determines whether an adjustment process is successfully brought about or less.

A Neo-Austrian production process is defined as a fully vertically integrated process (where labour is the only primary input contemplated) taking place through a sequence of periods which make up a phase of construction and, following it, a phase of utilization of productive capacity. Although in equilibrium this representation comes down to a representation in terms of standard production functions, it also allows showing what happens out of equilibrium, when the time dimension of production comes to the fore, with all its analytical implications. In Neo-Austrian terms an equilibrium structure of productive capacity is represented by an array of production processes in the (different periods of the) phase of construction and of the phase of utilization, which are consistent with each other, in the sense of supporting a steady state of the economy. This age structure of productive capacity implies not only a horizontal dimension, the number and age structure of production processes at each given moment of time, but also a vertical dimension, the time pattern of production consistent with the former. When this is so, not only construction and utilization, but also the economic activities behind these phases, investment and consumption and supply and demand of final output, are consistent with each other, at each moment of time and over time. The complementarity over time of the production process (that is, the complementarity between construction and utilization) implies the co-ordination over time of the decision (and allocation) process. Production, as to its effects, is synchronized.

Any shock resulting in an attempt to modify the existing behaviour of the economy, throws the economy itself out of equilibrium in that it results in a breaking of the intertemporal complementarity of the ongoing processes of production. This implies the appearance of problems of co-ordination, as saving, investment and consumption

go out of balance in correspondence to the fact that the phases of construction and utilization of productive capacity are no longer consistent with each other. The time dimension of production becomes relevant.

Reaction to these distortions, and the adjustments of productive capacity aimed at re-establishing the consistency over time of construction and utilization disturbed by the original shock, stimulate an out-of-equilibrium process that propagates the initial distortion over time without needing any further shock. What happens then to the economy must be looked at as a process sketched out step by step by sequentially interacting disequilibria that engender a complex dynamics. The backbone of this process is the accumulation through which adjustments, which necessarily imply a restructuring of productive capacity, take place in time.

Hicks exploits the potentialities of the Neo-Austrian analytical framework only in part, though. In his analysis of the Traverse (1973), the transition of a barter economy to a superior technique, he relies in fact on the Full Performance assumption, according to which all the output not absorbed by consumption out of wages paid to workers engaged on existing production processes (both in construction and in utilisation) or by consumption out of profits is in fact used to start new production processes. This implies flow equilibrium in each period, both in the sense that final output is totally absorbed by existing demand and in the sense that investment is equal to *ex ante* saving.

However, the breaking of coordination due to the technological shock affects the equilibrium on the labour market. Unemployment then appears – a proof of the well known Ricardo ‘machinery effect’ – which is certainly a main result of the analysis, confirming in a dynamic context Keynes, Patinkin and Leijonhufvud's views of unemployment as a phenomenon resulting from coordination problems.

This coexistence of equilibrium and disequilibrium is however unsatisfying from a purely analytical viewpoint but is sufficient to highlight the crucial role of the time dimension of production in adjustment processes. “The relevance, to economic fluctuations, of the time-structure of production was the discovery of professor Hayek, that there is such a relevance our present analysis confirms” (Hicks 1973, p. 133). Indeed, “it is not true that by getting rid of money, one is automatically in equilibrium” (ibid.).

This framework can be enlarged to take into account disequilibria on the good market, that is, in a way that reintroduces what has been pointed out by Keynes as a crucial aspect of an economic process characterised by an increase in unemployment. Let us consider a situation in which the rate of starts engenders, for any reason, a volume of employment (and hence of effective demand) that is insufficient to absorb the current output. Output must be going to waste and some production processes must be scrapped. “The economy would thus be in a state of *over-production*; and the natural reaction, to a state of over-production is to *reduce* the rate of starts. But that exacerbates the disequilibrium. If this reaction is dominant, we have the downward instability, which to the followers of Keynes (and Harrod) is very familiar” (Hicks 1973 p. 52). In this case there is no a long-term equilibrium which will be an attractor for the economy and we may suspect that money matters.

6. Integrating real and monetary disequilibria in a sequential context.

So far so good. But where do we go from here? The great step forward of *Capital and Time* is the analysis of production (and technology) in terms of a fully integrated representation of the process of production. Its limit, we have seen, is to have conducted this analysis within the context of the Traverse, where equilibrium and disequilibrium coexist and stability gets mixed up with effective adjustment. Only minor although interesting refinements are possible as long as we remain within this context.

The specific character of economic change, and hence the essence of the problem of adjustment, is that this is in the nature of a thorough process, not of a more or less predetermined trajectory. A process of change takes place by definition out of equilibrium. A substantial development along the line opened by *Capital and Time* thus requires to remove all ambiguity and to pass from Traverse to a full out-of-equilibrium context, where co-ordination problems are the natural counterpart of intertemporal complementarity problems. Full Performance, naturally at ease in a (perfect) barter context, does not allow the distortions of the production process to be transmitted to the decision process, exactly because it excludes the consideration of a thorough decision process. We must dispense with it. If we do we realize that, as Clower puts it, “goods will accumulate or decumulate somewhere in the economic system during periods of market disequilibrium. This forces us to consider possible extensions of traditional theory to deal explicitly with asset-holding phenomena” (p.

114), the expression of a disequilibrium that has a bearing on decision processes. Among these assets there will be physical assets, in fact the productive capacity, but also financial assets.

In the analysis of out-of-equilibrium processes of change, money, conveniently absent in the analysis of the Traverse, appears as an essential ingredient. Not in the sense that these processes are necessarily stirred by monetary shocks. Here shocks – whether monetary, real or expectational (their nature is not relevant) – matter only because they trigger adjustment processes. The main focus of the analysis of these processes is in the first place on the loss of co-ordination that follows a shock, and, later on, on what can help or hamper the recovery of co-ordination, thus making the process of change viable or not. This is where money comes in as an essential analytical ingredient. Let us see how.

A qualitative change is a change in the way of functioning of the economy, that is, a structural modification. In a neo-Austrian context, this is characterised in the first place by a change in the balance between processes in the phase of construction and processes in the phase of utilisation of productive capacity, no longer harmonised over time, and hence by a dissociation of inputs from output and of costs from proceeds. In general, this distortion of productive capacity comes down to the abrupt disappearance of a part of the existing capacity (scrapping of production processes), with the sudden arising of imbalances between supply and demand and investment and consumption, themselves no longer harmonised over time. Suitable hypotheses (e.g. a barter economy and Full Performance) do not allow this distortion to bring about co-ordination problems. We have seen that this reduces the process of change to a sequence that can be fully predetermined, where expectations play no role and supply and demand of final output are continuously kept in equilibrium. Thus structural modifications do not necessarily stir out-of-equilibrium processes that may imply a cumulative causation or erratic fluctuations.

However, we repeat, this happens only in particular cases characterised by very strong assumptions. When this is not so, and a thorough decision process is taken into account, the existence of money allows the co-ordination problems resulting from the breaking of the intertemporal complementarity of production to come to the surface. As a matter of fact the piling up of idle money balances is the physical expression of the dissociation of investment from ex ante saving, and of demand from supply, that

always characterises a distortion of productive capacity. Thus the appearance of idle balances, whether voluntarily or involuntarily accumulated, reflects the fact that a change implying a structural modification that cannot be instantaneously realised⁸ is being attempted.

Via expectations, and in the attempt to correct these imbalances, a sequence 'constraints-decisions-constraints' that results in an out-of-equilibrium process sets in. This most likely shakes the economy in such a way as to cast doubts on the viability of the change undertaken.

Viability problems arise from the dissociation in time of costs and proceeds, due to a breaking of the intertemporal complementarity of production. Again, after signalling their appearance, money appears as an essential ingredient for dealing with these problems. Starting from the concept of liquidity elaborated by Hicks himself makes it possible to throw light on this point. The idea of liquidity as "a matter of a sequence of choices, a related sequence"(Hicks 1974, p. 38) is associated with a sequential framework. In this context liquidity provides intertemporal substitution between real and financial assets. A clear example is liquidity held because it 'gives time to think', that is, to postpone investment which "cannot be wisely chosen if it is too much hurried" (Hicks 1974, p. 57).

However, Hicks' analysis goes beyond that. From simple substitution it goes on to consider complementarity relations over time. Money is seen as strictly complementary to real running assets (not only goods in the pipeline and work in progress but also plant and machinery used to capacity) in the sense that there cannot be production of commodities unless there exist the required money balances (Hicks 1967). The *transaction* role of money is thus stressed by this complementarity relation between financial and real assets, in the same way as the *precautionary* motive was at the heart of the substitution relation between them.

A step forward, however, must now be moved. The transaction role of money must be understood with reference to a complementarity relation which is not limited to circulating capital, like in the example just made by Hicks, but also concerns the building process through which productive capacity is actually brought about. The Hicksian view of liquidity, which stresses the intertemporal aspect, is an obvious

⁸ Due to the time required by a restructuring of productive capacity

candidate to be introduced in the original Hicksian neo-Austrian framework, where money is absent, provided it is suitably redefined in the above sense (Amendola 1991).

Then the crucial role of money for the viability problem clearly stands up. Out of equilibrium, when production is no longer synchronised and the time articulation of the production process dissociates inputs from output and costs from proceeds, a complementarity problem arises. A bridge over time must then be launched to link the phases of construction and utilisation of productive capacity - no longer harmonised over time - and money does it. A financial constraint then emerges which, in a truly sequential context, appears as a relevant link over time between financial and productive assets, and hence between financial decisions and real choices.

To throw more light on this link, consider the process triggered by a technological shock, which would result in a higher labour productivity were co-ordination problems associated with this process correctly dealt with. This process takes place in an economy without financial intermediaries: there is only a central bank that prints outside money. As we have already mentioned, whatever the properties of the new and superior technology, this kind of shock inevitably generates a discrepancy between investment at cost and investment of output capacity. This capacity will be temporarily reduced with the consequence that, at a given moment of time, the gross output, and hence employment will be diminished. When co-ordination issues are considered, that is, within an analytical framework that allows taking into account the monetary dimension of transactions, this kind of discrepancy is not necessarily transitory. It can even be cumulative, bringing about fluctuations of output and employment that are a threat to the viability of the adjustment process (Amendola and Gaffard 1998). The only means to set a constraint to these fluctuations and to re-establish a viable evolution of the economy (a quasi-steady state), thus obtaining the productivity gains potentially embodied in the new technology and the re-absorption of unemployment, consists in promoting an accommodating monetary policy. That is, a policy that implies to have for a while a growth rate of money supply higher than that corresponding to the previous steady state. This policy is aimed at keeping investment of output capacity at a level that allows sustaining a viable evolution of the economy, that is, at a level which allows to re-establish the intertemporal complementarity of the production process (Amendola, Gaffard and Saraceno 2004).

In the context considered it appears as an ‘optimal’ investment strategy. Clearly, this kind of monetary policy is responsible for inflationary pressures, which appear as a necessary condition for the innovation process to be successful. As underlined by Hicks, “real investment does not begin as an addition to the stock of real assets; it begins as expenditure, of which the addition to the stock of real assets is a consequence” (Hicks 1977, p. 78). This implies that the goods on which the wages of the labour employed in the new investments carried out are spent are not the ones resulting from these investments, and hence an excess demand on the product market inevitably emerges.

In Wicksellian terms, the economic process considered can be characterised as one in which rising prices are associated with a monetary interest rate lower than the natural one. This process might be cumulative. On the other hand, we repeat, this is a necessary step in a successful adjustment process. Either money supply is increased, which implies rising prices, or the innovation process cannot result in productivity gains. Thus an innovation process, which will be characterised by a higher natural rate of interest when, and if, it is accomplished, requires additional liquidity to be brought about. And this requires in turn, although not necessarily, a lower money interest rate. The focus therefore is somewhat different from the Wicksellian one. It is on liquidity rather than on the rate of interest. As mentioned by Hicks himself “one need pay little attention to interest rates, changes which emerge as consequences of changes in liquidity” (Hicks 1977, p. 79).

7. Keynes’s results revisited

The fundamental issue raised by Keynes and Patinkin is whether an economy hit by a (negative) demand shock is able to return to the full employment equilibrium. One of the major results that Keynes obtains, we have seen, is that money wage flexibility is not a good means for re-establishing this equilibrium, as it would not “have the effect of reducing real wages and might even have the effect of increasing them, through its adverse influence on the volume of output” (Keynes 1936, p. 269). Furthermore, resistance to money wages cuts is not necessarily a cause of persistent unemployment. On the contrary, it may be considered as a necessary condition for avoiding that a cumulative process propels the economy far away the full employment equilibrium.

Patinkin goes further adding that “once we throw off the restrictions of static equilibrium analysis, we also free ourselves of the necessity of assuming wage rigidity as a necessary precondition of involuntary unemployment. For, during any given period of time, the dynamic workings of the system may well keep the workers at a point off their supply curve. In this departure from the supply curve lays the involuntariness of unemployment. The important point is that this situation can exist regardless of the shape of supply curve; that is, even if wages are not rigid” (Patinkin 1972 p. 30). The focus on real wage effects emphasized by Patinkin shows a distinguishing feature (and in our opinion a limit) of Keynes' unemployment theory, namely that it remains an essentially static theory, still firmly rooted into the classical inverse relation between real wage and employment

The analytical framework that we have just proposed, which focuses on the production side of the economy, avoids the limits of Keynes' static approach (Amendola and Gaffard 1998), and, in some sense, gives backbone to Patinkin's intuitions. It does so by focussing on the process of accumulation and stressing that what happens to productive capacity (its construction and/or its utilization) affects the evolution of all the relevant variables of the economy, and that this depends, in turn, on the prevailing price and wage regimes, and the prevailing monetary and fiscal policies.

The analysis of unemployment carried out by means of this analytical framework (Amendola, Gaffard and Saraceno 2004) highlights the crucial role of wages as a component of demand, but also the interaction of the latter with the evolution of supply and, behind it, of productive capacity. A decrease of the wage fund – due, e.g., by a hoarding of the firms – feeds back into the value of demand, which in turn causes scrapping of production processes and a further decrease of the wage fund. One may think that this ‘Keynesian’ effect is caused by the hypothesis of fixed prices, and that by allowing sufficient flexibility, the variation of prices and wages should bring the system back to equilibrium. But this is not so. By allowing the wage rate to change, the shock is not reabsorbed, and the system collapses. This happens because when demand starts decreasing, supply follows with a one period lag. This means that we continuously observe wage deflation (due to the recurrent excess supply, and unemployment), which keeps affecting demand negatively by further reducing the

wage fund. The process continues until there are no processes left in utilization, and the system collapses

Within this analytical framework, there is no longer an inverse relation between real wage and employment. Decreasing nominal wages may have the effect of reducing real wages. But, in this case unemployment, instead of being re-absorbed, is still increasing. A major result of our sequential analysis of out-of-equilibrium processes is that wage flexibility does not necessarily help to restore equilibrium face to an exogenous shock. More than that, it may be harmful, by triggering processes that bring the economy farther and farther from equilibrium. This confirms the conclusions of Keynes and Patinkin as regards money wages flexibility, generalizing it to real wages. The reason for this result is that when adjustment is not instantaneous, (both in the agent's decision processes and in the technological structure), and actions are irreversible, a frictionless system may become extremely unstable, while what are generally seen as 'market imperfections' contribute to smooth the effects of 'wrong' actions, and hence help maintaining the system viable. In a world characterized by adaptive behaviours, and by a temporally articulated production structure, the conventional wisdom is reversed: market imperfections may be a factor of stability of the system rather than an obstacle on the way to fully optimal equilibria. More specifically, given the characteristics of the system, the rigidity of wages is necessary to keep the system itself viable.

Another point of contact between our analysis and Keynes' approach is the importance of monetary policy. As stressed by Keynes, "while a flexible wage policy and a flexible money policy come, analytically, to the same thing, inasmuch as they are alternative means of changing the quantity of money in terms of wage units, in other respects there is, of course, a world of difference between them" (Keynes 1936, p. 267).

The 'world of difference' between these two instruments, in Keynes as well as in the neo-classical synthesis of Patinkin (1965), is mainly distributional, concerning the burden of the adjustment. By focusing on the problems of co-ordination faced by a perturbed economy, our analysis suggests a more crucial difference, namely the opposite effects of these policies on employment *via the structure of productive capacity*. A flexible or accommodating monetary policy allows smoothing liquidity constraints while the effect of flexible wages is to aggravate the distortions in the

structure of productive capacity. In our analysis there is no analytical equivalence between monetary policy and wage flexibility, and hence the difference between the two instruments may not be reduced to a problem of ‘social opportunity’.

To conclude, we believe that Keynes, Patinkin, and Leijonhufvud had the right intuition, when they perceived involuntary unemployment as the outcome of a disequilibrium process. This aspect of their analysis was nevertheless dropped in favour of a simpler static framework, in which the whole issue of coordination was reduced to a problem of Pareto inferior equilibria. This paper represents an attempt to focus on the problems of intertemporal coordination hinted at by Keynes' original intuition by considering it in the context of a sequential economy. The analysis of out-of-equilibrium paths carried out by extending Hicks' Neo Austrian model supports this intuition, and unemployment emerges as the result of a lack of coordination, due to irreversible constrained choices.

8. Which lessons for understanding the ongoing crisis?

The reconsideration of a Keynesian line of analysis of unemployment is not confined to the interpretation of the origin and causes of this phenomenon, though. The focus on unemployment as an aspect of the wider problem of intertemporal coordination in perturbed economies represents in fact just a first step of an analytical approach that allows a better understanding of the economic performances of western economies in the last decades and, in particular, of the recent financial and real worldwide crisis.

Once again the extended Keynesian line of analysis on coordination, in particular the way of considering the divorce between saving and business investment that focuses on the time dimension of the production process, helps to sketch out the main line of an analytical interpretation of this crisis quite opposite to the one proposed by mainstream economic theory.

What we have learned in extending Keynes' analysis is that, out of equilibrium, the time inconsistency between the construction and the utilization phases of the production process has a monetary and a financial counterpart. As a matter of fact, any structural change (whether due to a technological shock, a reorganization of industry or a redistribution of income) brings about market disequilibria and hence the appearance of involuntary stocks, both physical and financial. However, the link over time between financial and productive assets that emerges in a sequential context may

not be that required for the viability of the economy. What has happened in the last two decades in the western economies may throw a light on what has gone wrong.

In the large European countries during the 90s', a stringent monetary policy and the induced changes in the financial system, together with the budgetary rules adopted, constrained investment in new productive activities and prevented the restructuring of the economy required to take advantage of the continuously accruing innovative options. On the other hand the rigid monetary policy pursued for a long time strongly affected the propensity to consume of households, whose incomes were at the same time being reduced, although in different ways in different countries, by fiscal policies and structural reforms that brought about a significant increase in incomes inequality. This resulted in a stagnation of final demand, further discouraging already constrained real investments, which appears as a main determinant of the poor productivity and growth performances of the European economies in the 90's - compared, e.g. with the U.S., where, although an even stronger increase in incomes inequality was also taking place, accommodating monetary policies had been pursued all along.

True, in the last decade, a less restrictive monetary policy has been followed in Europe, so that it may be surprising to keep attributing the continuing poor growth performance of the European economies to monetary policy when real interest rates have been substantially reduced. But on the one hand low interest rates are not a guarantee that innovative investments will be actually carried out. And, more important, it must be stressed that the state of an economy at each moment of time is strongly linked to what has happened in the past. The breaking of coordination of the 90's between saving and investment, between supply and demand, has extended over time through the imbalances due to the time articulation of production processes and the ensuing accumulation of stocks handed over.

There have been different ways to deal with these imbalances.

In Germany, an inflation targeting monetary policy coupled with a strong process of redistribution of income due to labour market reforms checking wages would have strengthened the decrease in domestic final demand further discouraging investments in productive capacity and generating a higher rate of unemployment had it not been for the boost in exports due to the increases in competitiveness made possible by the just mentioned checking of wages. Instead of being signalled by a high rate of

unemployment, the breaking of coordination due to the divorce between the existing capacity and the domestic final demand has taken the form of a structural excess of the trade balance, result of a thorough ‘beggar my neighbour’ policy implying deficits for other countries, in particular the other European economies main trade partners of Germany which didn’t feel like following the same drastic wage policy. A policy, though, that will be difficult to keep pursuing if the trade partners of Germany will not be able to revamp their growth trades coming out of the stagnation into which they appear to be stuck at present.

A different way has been followed in the US, where a loose monetary policy has been pursued all the time, but income inequality has dramatically risen over the two last decades. A way strongly conditioned by a phenomenon that takes place when a scarcity of final demand discourages investments in productive capacity, and available liquidity, originating from the private sector or from monetary policy, is channelled neither towards real investment nor towards consumer goods.

The incomes accruing to all those taking advantage of the redistribution go then to finance the purchases of already existing stocks of wealth, strongly inflating their monetary values given the small percentage of these stocks actually put on the market. This increases the returns and the attractiveness of investment in these stocks thus crowding out investment in productive capacity whose returns are not only inferior but all the more uncertain in shrinking markets: with a result of a slowing down of the potential growth rate and hence further reductions in the final demand. This is nothing but the result of distortions in the temporal structure of productive capacity at the domestic level. The reasons for a stagnation of demand have become structural as the result of the policies followed in the past and this stagnation is at the basis of the current problems: the divorce between saving and productive investment; the useless or even counter effective creation of a liquidity diverted towards the purchases of already existing stocks of wealth (be them houses, new and ever more sophisticated financial assets, and so forth); the necessity to create a demand in any way. A way that in the U.S. has been found by allowing households to get indebted beyond any reasonable limit, and which has provided the spark for the explosion of the financial crisis

The explosion of the financial bubble is just the surface of the problem, though. At the root of it there is a real phenomenon: permanent distortions between investment and

consumption at the internal as well as at the international level, that is, distortions in the temporal structure of productive capacities.

In this light, the financial crisis and the resulting deep worldwide recession appear as the result of a coordination problem. If this is true, on the one hand, advocated structural market reforms like wages flexibility will only lead to an increasing unemployment, and, on the other hand, regulatory reforms concerning the financial system cannot be sufficient for restoring growth and employment. What we all need is more co-ordination between monetary and fiscal policies in the perspective of re-establishing a structural equilibrium between supply and demand over time both at the European and the international levels.

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