Evolutionary and Institutional Economics Review (2021) 18:435–446
https://doi.org/10.1007/s40844-021-00221-5

NOTE

The pausing view of unemployment

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Received: 21 January 2021 / Accepted: 14 August 2021 / Published online: 21 August 2021

Abstract
This paper develops a theory of business cycle unemployment based on the idea that the economy may temporarily pause in response to heightened uncertainty. The pausing of actions in some quarters of the economy eases decision-making in other quarters, thereby leading the way to recovery. Both the heightening of uncertainty and the 'pausing phenomena' emerge from the interaction between firms with interrelated plans in a high-dimensional system. Unemployment therefore is an emergent phenomena and occurs without the imposition of sticky wages or appropriability problems at the micro level.

Keywords Unemployment · Schumpeter · Innovation · Adaptation · Disequilibrium

JEL Classification E24 · B22 · D50

"Wise is the man who sees inaction in action and action in inaction".
(Bhagavad Gita, 4:18)

1 Introduction

One of the central problems of macroeconomic theory is to explain the fluctuations in the observed rates of unemployment from quarter-to-quarter. This question is somewhat different from, and perhaps even tangential to, the more rhetorical question of 'why is that workers who are willing to work at the prevailing wage cannot find jobs'. The latter question either leads towards an investigation into reasons why the wage rate does not clear the market for labor or degenerates into philosophical exertions into the meanings of the words 'willing' and 'prevailing'. This paper intends to follow neither of the paths. Rather we shall argue that unemployment

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increases during recessions because firms do not know the directions in which to employ labor.

Consider an evenly rotating economy with many firms connected to each other as buyers and sellers of intermediate inputs. Economic life each day resembles life the day before. The same goods flow from the same buyers to the same sellers, all produced with the combination of inputs yesterday. Each firm is aware of the reaction function of its competitors. Firms also know how the sellers of their inputs and buyers of their output are likely to respond to price changes. In other words, reaction functions are common knowledge, possibly gained with the passing of long periods of undisturbed time. Production function within firms, production relations between firms, and products themselves are fixed. In such a setting, an exogenous shock like a bad monsoon or a sizeable earthquake will tend to generate adjustments along the price-quantity dimension. Some firms will decrease output by moving to lower isoquants, others will increase output by moving to higher isoquants. And some firms will change their input combinations by sliding along their isoquants. These profit maximizing decisions generate, and are generated by, relative price adjustments that drive the economy towards equilibrium. The mutual adjustment of agents to new circumstances is aided by the fact that each agent knows the reaction function of others on whom its own plans depend. In an evenly rotating economy, agents find it relatively easy to recoordinate in response to exogenous shocks by forecasting each others' responses to new circumstances. Price adjustments are sufficient to clear all markets including the market for labor, the problem being merely one of discovering new equilibrium prices through decentralized interactions.

Matters are wholly different in the wake of an innovation. The process of adaptation to innovation involves decisions beyond the price-quantity dimension. In so far as an innovation disturbs the plans of some agents, a reformulation of many interrelated plans becomes necessary to recoordinate the economy. Such a reformulation of plans is not merely the computing of new equilibrium prices and quantities but involves discovering new production relations. Recoordination is a difficult process because of the interdependencies between the decisions of many agents. More specifically, to formulate new plans in the wake of the disturbances generated by an innovation, each agent must forecast the non-price decisions of others on whose decisions its own plan depends. The interdependent forecasting of non-price decisions heightens the uncertainty associated with decision-making.[1] The root cause of this uncertainty is that firms can no longer rely on prior knowledge of each others' reaction functions because production functions and production relations change amidst the process of adaptation. The uncertainty associated with decision-making may heighten to such an extent that some firms suspend economic activity. The motivation for the suspension of economic action is the gathering of more knowledge about the decisions of others on whose plans one's own plans depend. Such suspension of economic actions generates unemployment, which is nothing but the

[1] By 'uncertainty', we mean the Knightian notion that outcomes and or the probabilities associated with outcomes are unknown (Knight 1921). See Hoogduin (1987) for a discussion of the difference between Knightian and Keynesian uncertainty.

postponement of the decision to employ labor. Unemployment emerges due to reasons that have little to do with the question of sticky wages.

Much of contemporary macroeconomic theory presumes the existence of a labor market with jobs that are to be filled. Work on search-theoretic unemployment, for instance, studies how 'pre-existing jobs' are filled by 'pre-formed labor'. In this setting, unemployment exists because decentralized interactions take time to match unique items on the demand and supply side of the market. Our analysis in contrast begins with the idea that the labor market is not an extra economic entity, certainly not in the context of business cycles. The demand side of labor is not like buckets—occasionally changing in size in response to exogenous shocks—to be filled to different levels by different kinds of labor. Rather the demand side of labor consists of entrepreneurs who envision jobs needed to pursue their plans of producing specific goods and services, which in turn depend on the plans of other entrepreneurs to produce other goods and services. As Simon (1984, p. 50) put it, "Before there can be an offer or acceptance of employment, there must be a job to be filled. And jobs exist in the minds of employers". It is precisely these minds that postpone the decision to create jobs in response to the uncertainty generated by the process of adaptation. Unemployment emerges in the process of adaptation because firms do not know the directions in which to employ labor. Within our setting, unemployment is not necessarily time spend searching for jobs, but may well be time in which labor does nothing, simply because there is nothing to do till employers figure out what to produce, how to produce, and for whom to produce. The directions in which to employ labor is not a given and immutable feature of the labor market, rather they emerge from the decisions of forward looking entrepreneurs who consider new directions in which to employ labor when circumstances prod them to do so. Contrary to conventional wisdom, the co-movement between unemployment and output may well emerge from forces that are tangential to those responsible for the sluggishness of wage adjustments.

One of the motivations for writing this paper is to develop a theory of unemployment consistent with the primal forces of Schumpeter's business cycle theory. Schumpeter's business cycle theory was critized on the ground that it did not explain unemployment dynamics (Lange 1941; Goodwin 1991). Prima facia it is difficult to fault this assessment. There is little mention of unemployment in Schumpeter's writings on business cycles except for a passage on a second approximation to his model. In that passage, Schumpeter (1939, p. 161) notes that the process of adaptation is capable of generating disequilibrium unemployment. No one has since developed the ways in which adaptation to innovation can generate disequilibrium unemployment in the absence of sticky wages or appropriability problems. Our paper is a small step in the direction.[2]

The rest of our paper is organized as follows. Section 2 develops the role of decision-making outside the price-quantity dimension in the process of adaptation to

[2] This is partly because many macroeconomists do not view the notion of 'disequilibrium unemployment' as a sensible or workable idea (Rothschild 1973). Others with some interest in disequilibrium unemployment have implemented it via Keynesian wage stickiness (Dosi et al. 2010).

innovation. Section 3 discusses the pausing of decision-making in response to the heightening of uncertainty amidst the process of adaption. Section 4 argues that our pausing-theory presents a non-reductionist view of unemployment, whereby unemployment emerges from the interaction between many interdependent but autonomously acting entities. In this light of this observation, the section compares the pausing theory to the equilibrium-churn model developed by Caballero and Hammour. Section 5 presents concluding thoughts.

2 Outside the price-quantity dimension

As Schumpeter noted long ago, an innovation is not necessarily a novel scientific discovery. Most societies have an abundance of scientific knowledge waiting to be put to economic use, the case of water-driven mills in eleventh century France is illustrative (Baumol 1996). Nor is an innovation merely a change in the technique of production of the kind which occurs as a firm moves along its production possibility set in response to changes in the cost of factors of production. Innovation is the creation of new production possibility sets and new cost curves. The innovating firm expands production by drawing resources towards itself, and in turn away from other firms, some of whom happen to be competitors and others merely users of common inputs. The drawing of resources by the innovating firm on one hand, and the expansion of production by it on the other, alters relative prices in its input and output markets. In an economy with millions of firms related to each other through buyer-seller relations, one firm's input is another firm's output. The relative price changes generated by the innovating firm in its input and output markets percolate upstream and downstream through long chains of buyer-seller linkages between firms in the economy's production network. Overall, a new set of circumstances emerge in response to the innovation. Some firms cannot go on with life as usual because erstwhile economic plans are not profitable in light of relative price changes brought about by the innovation. Other firms may not be able to continue as before simply because their former plans are no longer technically feasible (the providers of some inputs may have had to close business).

Firms related to the innovating firm either directly, or indirectly through long chains of buyer-seller relations, must respond to the new circumstances. Firms can take infinitesimal steps to adapt to the new environment or drop their passive attitude and react by doing new things (Schumpeter 1927). The original act of innovation by one firm widens the horizon of decision-making beyond the price-quantity dimension for other firms. The product becomes an economic variable, so does the nexus of buyer-seller relations between firms. The new circumstances created by an innovation forces some firms to decide anew what to produce, how to produce, and for whom to produce. These firms no longer face the question of computing solutions to well-defined problems but of imagining the future (Shackle 1972). In the wake of an innovation, firms do not merely reflect the logic of their position. Rather firms create new positions by forming relations with new buyers and new sellers (Gualdi and Mandel 2019).

Adaptation, or equivalently recoordination, is a process of discovering new products, production relations, and associated equilibrium prices. Adaptation is a complex and difficult process. There is a quantum difference between a firm's decision problem in the process of adaptation and the decision problem it meets within an evenly rotating economy. In an evenly rotating economy, firms can form rational expectations about the behavior of prices, quantities, and other attributes of their buyers and sellers. In such a setting, mutual adjustments to an exogenous shock happens in a foreseeable manner. Firms are in a position to forecast the price-quantity responses of their buyers and sellers to exogenous shocks using knowledge of each others' reaction functions. This allows firms to react optimally to each others' response, thereby generating a near-simultaneous interlocking of plans. With reaction functions as common knowledge, the economy either jumps to the new equilibrium or moves to it relatively rapidly.

Matters are wholly different in the process of adaptation to innovation. Firms are no longer in a position to form rational expectations about each others' behavior. The formation of rational expectations depends on stable ways of collecting and processing information (Lucas 1977, p. 15). And stable ways of collecting and processing information are amongst the first of the fatalities of changing production relations. Firms cannot use knowledge of past reaction functions of other firms to make decisions. This is because some of those firms no longer exist and others no longer react in old ways. As Schumpeter (1927, p. 297) put it, the creative response to innovation alters "the bases of calculation".

The economy must discover a new equilibrium with a new set of production plans that dovetail each other. What makes the process of discovering the new equilibrium difficult is the making of decisions beyond the price-quantity dimension in a system without a central coordinator. Adaptation occurs through a bottom-up trial and error process in which agents form plans with limited knowledge about the plans of others (Eliasson 1977). Many re-arrangements are attempted, some of which "are disavowed by the next day" because they are not profitable or feasible within the nexus of plans of different firms (Schumpeter 1939, p. 137). The disavowal of plans involves losses which appear as errors ex-post. The failure of ex-ante economic plans to match ex-post outcomes reflects the ignorance of economic actors of each others' plans. Such ignorance is acute in the process of adaptation to innovation because many firms are forming and reforming new plans in response to each others actions. In such an environment, the difficulty of planning new things increases and so does the risk of failure. Each firm's acute ignorance of the plans of others heightens the uncertainty of decision-making. A matter which has much to do with the emergence of unemployment in the midst of a recession.

3 The pausing of economic actions

We have so far argued that the uncertainty associated with decision-making increases amidst the process of adaptation to innovation. With the heightening of uncertainty, firms find it difficult to formulate new plans as the risk of failure is

greatly increased.[3] Some firms respond to these circumstances by suspending economic actions, or as Schumpeter (1939, p. 135) put it, they find it "necessary to wait until things settle down" to carry out new economic plans. What we mean by 'settling down' is not a decrease in the volatility of some macro variable like GDP or aggregate investment but the settling of the plans of agents in the economy. More specifically, the root cause of the uncertainty faced by a firm is the volatility in the plans of its input sellers, output buyers, and competitors. In so far as the realization of the plans of a firm depends on the plans of others with whom it shares competitive and symbiotic relations, the volatility in the plans of other firms makes it difficult to formulate its own plan.[4]

The suspension of activity in some quarters of the economy serves a useful economic function. A general suspension of economic activity allows some firms to forge ahead with new plans more reliably than before, as the plans of those on whom their plans depend are on hold and therefore not volatile. In other words, the dampening of activity in some quarters of the economy makes it easier for firms in other quarters to formulate new plans, much like how the freezing of some members of a crowd allows other members to more easily move to new locations. As some firms forge ahead with new plans, those who had suspended economic action gain more knowledge about the plans of those on whom their plans depend. The gained knowledge allows these firms to formulate new plans which are more consistent with the plans of others and therefore more likely to be realized. The economic system uses a staggered decision-making process to re-establish coordination in the wake of an innovation. Such a staggered approach cannot be followed without a temporary suspension of activity in some quarters of the economy.

While the suspension of economic activity is a necessary means for recoordinating plans, such recoordination can be costly. Not the least of the costs is the unemployment generated by it. Labor is one of the ingredients of the production process, the suspension of economic plans means many ingredients will remain unused. Unemployment emerges not because firms do not charge market clearing wages but because firms do not know the directions in which to employ labor. Amidst the process of adaptation to innovation firms do not simply face the problem of 'how much labor to hire' but more fundamentally 'what to hire labor for'. And without knowing 'what to hire labor for', firms cannot compute the price and quantity in which to hire labor.

[3] Bennion (1943, p. 342) recognizes that during the process of adaptation to innovation "it becomes increasingly difficult to plan new things and the risk of failure increases greatly". He however goes on to add Keynesian elements to Schumpeter's business cycle theory to generate unemployment dynamics, rather than developing Schumpeter's own theme of the 'difficulty of planning new things' and the processes by which the difficulty may be resolved.

[4] Note that firms do not suspend economic actions and related investments because they are waiting for the economy to get out of recession. The knowledge which dormant firms gain by waiting is not knowledge about macroeconomic variables but about the specific actions of particular other firms on whose plans their own plans depend (Reddy and Veetil 2021, Section 2). Aggregate variables do not tell firms how well their plans fit within the plans of others (Hayek 1974). The plans of economic agents are a bit like pieces of a puzzle that must fit together: knowledge of the average shape is not a particularly useful statistic.

The labor market process sketched in this paper offers a simple solution to the often-stated problem that amidst a depression many people appear "willing to work, but are unable to find employment at the prevailing wage" (Romer 1993, p. 5). Within our schema, people cannot find work at the prevailing wage because the wage is not the problem. The problem is determining the directions in which to put people to work. In the midst of a depression, many people may be willing to work but few know the directions in which to put them to work Veetil and Wagner (2015, pp. 134–137). This view of the labor market stands in sharp contrast to that of Keynes (1936, p. 144) who believed that "when effective demand is deficient there is under-employment of labor in the sense that there are men unemployed who would be willing to work at less than the existing real wage". Within our schema, the problem is neither the deficiency of an aggregate variable, nor the wage rate but the suspension of economic activity which emerges in the midst of adaptation to innovation.[5]

Most economists view the suspension of economic activity as a needless waste, reflective of a failure of the invisible hand. From our point of view, the suspension of economic activity amidst a recession is akin to a writer pausing to think. Saying unemployment arises from sticky wages is somewhat like saying a writer stops writing only when he runs out of ink. Writers must and do stop writing every now and then to ponder over what to write. The wage rate is a bit like ink, in the same way that ink becomes useful once a writer figures out what to write, the wage rate becomes useful once employers know the directions in which to employ labor. There is little reason to seek ink when one does not know what to write, and little reason to discover wages when one does not know what to produce. The economy is not merely a system within which automatons go about performing random tasks in the sameway that writing is not merely the scribbling of random words. Figuring out what to do is what gives meaning and purpose to all economic activity, and such 'figuring out' takes time particularly when the problem of mutual adjustment of plans becomes difficult in the wake of the disturbances generated by an innovation.

4 Beyond a reductionist view of unemployment

Reductionism is the idea that the behavior of the 'whole' can be deduced *primarily* by analysing the behavior of the constituent parts either in isolation from each other or as interacting randomly in numbers large enough to be governed by statistical laws (Weiss 1969). This is the approach of the classical physics towards the material world (von Bertalanffy 1969). A great deal of the economic analysis of unemployment follows the reductionist approach. Consider for instance Caballero

[5] The unemployment generated by the 'pausing of economic activity' is capable of generating secondary unemployment via demand constraints in the market for final goods and services. More specifically, while the problem of unemployment initially originates from the interdependencies between firms and therefore in the market for intermediate inputs, it may be propagated via the market for final goods. This is simply because unemployment will necessarily generate a decline in the demand for final goods and therefore a shrinking of economic activity.

and Hammour's model of Schumpeterian unemployment. They study unemployment that originates from the reallocation of labor in the wake of microeconomic disturbances.[6] The existence of perennial microeconomic shocks means that labor must be reallocated from old production units to new production units. The smooth functioning of the labor market is however impeded by an "appropriability problem". By which they mean that labor is in a position to extract rents from specific investments made by firms. This is an additional cost of investment and therefore reduces the rate of creation of new production units below the optimal level. More pertinently, the appropriability problem can reduce the rate of creation of new production units below the rate of their destruction in response to microeconomic productivity shocks, with the difference between the two rates generating unemployment dynamics.

In the Caballero–Hammour model, the macro problem of unemployment can be understood by considering the appropriability problem between a single labor-firm pair on one hand, and random unstructured interactions between many such pairs on the other. Labor unbinds from existing firms but does not bind to new firms it randomly meets at the same rate, with the appropriability problem accounting for the difference between the unbinding rate and the binding rate. We are in some senses back in the world of classical physics, with the random interactions between molecules guiding their attachment and exogenous shocks causing detachment, albeit with a friction that inhibits new attachment. No questions are asked about what the production units produce, for whom they production, and how they produce. Not unexpectedly, such a reductionist approach to Schumpeterian unemployment appears awkward when considered within the larger context of Schumpeter's business cycle theory. For instance, (Caballero and Hammour 1996b, pp. 820–821) argue:

> ... the opportunity cost of creating unemployment is lowest at the bottom of a recession, when production is least profitable. It is therefore efficient to concentrate the unemployment needed to facilitate reallocation near the trough of a recession, and intensify at that time the process of creative destruction.

Within the Caballero–Hammour paradigm, an efficient economy would be one which gets the 'reallocation of labor done' at the trough of the recession when labor is least productive. The problem of unemployment is therefore divorced from the reasons for why there is recession to begin with. Whereas for Schumpeter, it is precisely the systemic miscoordination created by innovations that generates the recession, which in turn creates the need for a reallocation of labor. To speak of 'concentrating the reallocation of labor at the trough of the recession' is to assume away the possibility that it may be the inability to reallocate labor which causes the trough.

These oddities are not unique to Caballero and Hammour's reductionist model of Schumpeterian dynamics. They appear in other reductionist models like that of

[6] See Caballero and Hammour (1996a) and Caballero and Hammour (1998) for mild variants of the model. Caballero and Hammour are primarily concerned with short-term fluctuations in the rate of unemployment, for a treatment of long-term unemployment along similar lines see Neisser (1942) and Aghion and Howitt (1994).

DeLong (1990, p. 12), who claims that for pre-Keynesian theorists like Schumpeter labor market 'frictions' which drive unemployment dynamics are "remote from the central engine of the cycle itself". Our pausing theory of unemployment however suggests a different interpretation of Schumpeter. The fact that firms that employed workers have contracted or died but new firms that will employ workers in the future have not yet expanded or arrived on the scene is not mere 'friction'. Rather the decoupling of job-destruction and job-creation is a consequence of the postponing of decision-making in response to the heightening of uncertainty in the process of adaptation to innovation. Old ways of doing things are no longer feasible, thereby generating job-destruction. But workable new ways of doing things are yet to be discovered, or are slowly being discovered through an experimental bottom-up process, thereby causing job-creation to temporarily lag behind job-destruction.

The difficulty of the problem of discovering new ways in which the plans of different agents 'fit' together depends on the dimension of the economic system. DeLong's model considers n identical firms tied together because of their dependence on an aggregate variable, with no complex inter-temporal relations between them. Note that the n identical firms do not face the problem of what to produce, how to produce, and for whom to produce. Nor do they need to consider what the input-sellers and output-buyers intend to do in the future. Much like Caballero and Hammour, DeLong reduces the dimension of the economic system to well below that which Schumpeter appears to have worked with[7] (Frankl 1969, pp. 403–405). The reductionist method of classical physics works when the phenomena under study involves a handful of causal chains or a near infinite number of random chance processes (von Bertalanffy 1968, p. 35). The economy however is a system of "organized complexity" (Weaver 1948), with elements neither handful nor infinite, and where their teleological interactions are meditate through evolving structures. The 'whole' of the economic system is therefore more than the sum of its 'parts' (Anderson 1972). The properties of the whole are either non-existent or undefinable at the level of the parts, and therefore from the point of view of the 'parts' these properties appear as 'new' or 'emergent' (von Bertalanffy 1968, p. 55). Within such systems, any movement of any part is capable of disturbing relations within the whole and thereby altering properties of the whole not present in any of the parts. And these fluctuations cannot be understood by looking into the properties of the parts in isolation from each other, nor considering unstructured chance events between a large number of parts. Business cycle unemployment therefore is difficult to understand without a theory of the systemic miscoordination and the means by the recoordination in established.

[7] Schumpeter appears to have implicitly worked with a high-dimensional economic systems. An explicit statement to the effect is found in Goodwin (1991, p. 30), who says that a true representation of a Schumpeterian economy would be a "large, multidimensional" system.

4.1 Institutions, policy, and unemployment

Within a non-reductionist view like our own, the institutional context of economic interactions shapes the dynamics of unemployment. This is in contrast to reductionist models in which policy tends to influence unemployment dynamics more than institutions. Reductionist models of Schumpeterian unemployment like that of Caballero and Hammour (1996a) begin with the proposition that the social value of the unemployment workers is less than that of the employed worker. These models naturally call for policy interventions aimed at creating new production units to employ the unemployed. Reductionist models omit questions about what new units ought to produce, how the units ought to produce these goods, whom they should purchase inputs from, and whom they ought to see their output to, along with the myriad other questions related to the internal management of firms. Once we admit these questions, the problem of recovering from a recession and thereby reducing aggregate unemployment, becomes one of discovery a more harmonious ecology of plans between millions of economic actors.

In so far as such discovery tends to be made through bottom-up experimental processes of rearrangements, the remedies for unemployment related to business cycles are likely to be found within the domain of 'institutions' rather than 'ad hoc policy'. Institutions with the following features are likely dampen the amplitude and duration of business cycle unemployment. First, institutions that facilitate a multitude of experiments with new plans that take the form of the creation and dissolution of firms (distributed decision-making within a market economy tends to facilitate such experiments). Second, institutions that incentivize the experimenters to adjust their plans by learning from the outcome of the experiments (the profit-motif encourages such learning). And third, institutions that promote the sharing of knowledge from the experiments conducted by different firms (the price-system conveys such knowledge). Note however that from a Schumpeterian point of view, the malady of business cycle unemployment is without cure. Certain institutional arrangements may facilitate recovery but even these are unlikely to do away with the problem of unemployment that emerges from the miscoordination generated by innovations in high-dimensional systems.

5 Concluding thoughts

Boulding (1956) distinguishes between nine-levels of theoretical discourse. Of these the lower levels involve static relations or simple dynamic relations with feedback. While the higher levels of theoretical discourse incorporate teleology, structural relations, and complex interactions. Boulding (1956, p. 207) says that the purpose of such a scheme is to "prevent us from accepting as final a level of theoretical analysis which is below the empirical world we are investigating". In some senses, standard theories of Schumpeterian unemployment are located well below the high dimensional economic system that generates unemployment dynamics, perhaps at the second or third level within Boulding's schema. We have in some senses attempted to develop a theory of unemployment which falls within a higher level of theoretical

discourse. We developed Schumpeter's remark that in light of the miscoordination generated by an innovation it may be "necessary to wait until things settle down" to formulate new plans and take up new investments. In so far as this waiting period intervenes between the abandoning of old plans and formulation of new plans, labor among other inputs must remain unemployed. We developed the reasons for the emergence of such a waiting period and the purposes served by the pausing of the economic system.

The ideas developed in this paper have not taken a mathematical form. We worked with the belief that a verbal model is better than no model at all. Numerous areas of science have had explicitly developed verbal models long before they were mathematized (von Bertalanffy 1968, p. 24). Often mathematical models are motivated by the vagueness, redundancy, and incompleteness of verbal models. In this sense, the weaknesses of our formulation may be more important than its strengths in generating a formal model of the pausing view of unemployment.

Lastly, the reader may wish to note that the pausing mechanism developed in this paper can be applied to other systems. Any system with autonomous agents faced with the problem of coordinating their actions with those of others using local information is in principle capable of generating the pausing phenomena. Such systems include ant-colonies, bee-hives, the physical movement of crowds of people, and even the system of neurones within the brain. As to whether these systems exhibit the pausing phenomena and if they do what is the external manifestation of such pausing are open questions. Whatever the answers to these questions may be, the problem of business cycle unemployment is likely to benefit from an investigation along the system-theoretic lines as developed by Ludwig von Bertalanffy.

Declarations

Conflict of interest There are is conflict of interest. No human or animal subjects were used. This paper complies with the ethical standards of the publisher.

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