

A Macro Economy as an Emergent Ecology of Plans

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Abstract

Orthodox macro theories reflect a choice-theoretic orientation wherein aggregate variables act directly on one another. Hence, macro phenomena are reduced to the same order of simplicity as micro phenomena. In contrast, this paper explores how macro theory might be pursued when it is recognized that macro phenomena are of a higher order of complexity than micro phenomena. Rather than reducing macro to micro, macro phenomena supervene on micro interaction. Hence, a macro economy is treated as a complex ecology of plans that constitute a non-equilibrium process of spontaneous ordering.

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Orthodox macro theories of all types are choice-theoretic in character. Regardless of whether the theoretical framework is classified as new Classical, new Keynesian, Monetarist, or Austrian, the theoretical framework posits a direct relationship among macro variables. Changes in rates of unemployment, for instance, are related directly to changes in aggregate spending. These relationships, moreover, are generally regarded as causal and not merely statistical. While the distinction between macro and micro theory is generally thought to correspond to a distinction between a whole and its parts, macro theory nonetheless operates on the same level of simplicity as micro theory.

In contrast to these various orthodoxies, this paper takes an emergent-theoretic orientation toward macro phenomena. This alternative orientation brings along several analytical commitments in its theoretical train. Macro phenomena are of a higher order of complexity than micro phenomena. There is no reduction of macro to micro; instead, macro phenomena supervene on micro-level interaction. To theorize about macro phenomena requires theorizing in terms of distinct levels of phenomena, where interaction among entities at a micro level of action generates distinct phenomena at a macro level which are not direct objects of action but are products of interaction among acting entities. Within this emergent-theoretic orientation, the macro level is the arena of spontaneous ordering and unseen hands while the micro level is the locus of intentional planning and action.

A Fork in the Theoretical Road

Where micro theory is mostly the domain of relationships among the entities that comprise an economy, macro theory is the domain of the economy as a whole. This, anyway, is how most economists treat the distinction. The relationship between micro and macro is thus one of parts to whole. The relationship between parts and whole is the province of the micro foundations of macro theory (Janssen 1993). Table 1 contrasts two frameworks for constructing a macro theory, which I characterize as choice-theoretic and emergent-theoretic. The choice-theoretic framework is the prevailing orthodoxy. There is, of course, much controversy among macro theorists, as conveyed nicely in Snowden and Vane (2005), but these are all intra-mural controversies within an orthodoxy in which all theorists treat macro phenomena in choice-theoretic terms. Some of those theorists take the suitable micro foundation for macro theory to be the theory of perfect competition and its Pareto efficiency, which leaves no space for macro policy to serve as a corrective tool: macro observations are of perfectly competitive equilibria, as illustrated by formulations of real business cycles. Other theorists embrace a micro foundation of imperfect competition and its Pareto inefficiency, and, furthermore, locate the state outside the macro economy to provide analytical space for macro policy to be employed as a corrective tool. What is particularly notable about either version of orthodoxy is that macro is reduced to micro by working with representative agents or, equivalently, by seeking to explain averages and their variation.

A macro economy is reduced to an individual chooser who is assumed to be a miniature instance of the macro economy. This individual possesses both the capacities and the limitations that are thought to characterize the macro economy. These days there are two prime forms of macro theory in play. One form embraces the strong rationality that dominated economic theory through most of the 20th century. The other form invokes a weaker version of rationality, and is a macro-level counterpart of the introduction of behavioral ideas into economic theory. The strong view of rationality maps into claims that macro observations are of perfectly competitive equilibria, as illustrated by formulations of real business cycles. The weak view maps into claims that macro observations pertain to states of imperfect competition, and with that imperfection capable of taking various forms, including the presence of market power and weaknesses in the cognitive faculties of individuals. By reducing macro to micro, the theoretical framework of micro theory is carried forward to macro theory. Macro theory is thus predicated on the existence of direct relationships upon aggregate variables, where one such variable acts directly on another such variable. I do not seek to adjudicate between these alternative orientations toward macro theory and the form of micro foundations on which they rest. Rather, I seek to probe some features of an emergent alternative to the orthodox treatment of the relation between micro and macro phenomena wherein aggregate variables do not act directly on other aggregate variables. This is not to deny the presence of statistical relationships that might appear stable over some significant interval of

time. It is rather to replace the presumption that macro can be reduced to micro with the presumption that macro supervenes on micro.

This alternative micro foundation for macro is emergent theoretic and not choice theoretic. Table 1 contrasts reductionist and emergent forms of macro theorizing. In both cases, the relation between micro and macro is one of parts to whole. But there are two divergent paths by which part and whole might be connected.¹ The contrast between the theoretical frameworks described in Table 1 is stark, and the remainder of this paper will plumb some facets of the emergent theoretical path toward the construction of macro-level theories. All reductionist theories rest upon a presumption that observations pertain to equilibrium states, and with those states capable of being evaluated differently according to Paretian criteria. This presumption makes it straightforward to reduce macro to micro, either directly through the construction of representative agents or indirectly through reasoning based on relationships among average values of variables. In either case, society is treated as an organization that can be reduced to some such point-mass entity as a parade. Macro phenomena are thus equally simple as micro phenomena, for macro is just a scaled up version of micro. Reductionist macro theory also works with an equally simple sketch of the relationship between polity and economy within a system of political economy; economy and polity are both reduced to point-mass entities, and with polity acting on economy much as one billiard ball would act upon another. Just as

¹ Before continuing this comparison, it is useful to remember that the entity we describe as a macro economy is not something that we can observe directly. It is rather something we construct through some preceding theoretical effort. Any theoretical construction unavoidably will highlight some phenomena while neglecting other phenomena.

theorists differ with respect to the Pareto efficiency of market outcomes, they differ as to the implications of political action for Pareto efficiency. Those theorists, however, commonly embrace an analytical framework wherein a political entity acts upon an alternative entity denoted as a market economy.

The emergent theoretical framework explored here differs from the reductionist framework in all these respects. Societies are treated as networked ecologies of enterprises. There is no reduction of macro to micro; to the contrary, macro supervenes on micro. Macro and micro operate on different theoretical levels, which bring attention to the relationship between the levels. Society is an order of organizations (including individuals) and not an organization; it is analogous to a moving crowd of pedestrians and not to a parade, although the pedestrian crowd is also an orderly even if turbulent group of people. Macro phenomena are thus inherently complex and not simple. The move from micro to macro is a move from simple to complex phenomena (Hayek 1967). Finally, neither polity nor economy is reasonably reducible to a point-mass entity; moreover, the relationship among those entities is entangled and not separated (Wagner 2007). The remainder of this paper shall proceed by sketching and exploring some of the differences that might arise for macro theory by pursuing this alternative theoretical framework.

Two Images of Macro Coordination: Postulated and Emergent

The world appears to us as generally orderly. The reasonableness of that appearance is attested by our ability to pursue deliberate action in the world with

reasonable success. Not complete success to be sure, but certainly with quite a bit of success. The world presents itself largely as a form of orderly turbulence. This perception of orderliness provides the point of departure for social theorizing; if there were no sense of orderliness, there would be no object to theorize about. That point of departure, however, presents an immediate fork in the theoretical road. One branch of that fork entails the postulation of orderliness as a systemic condition that is conveyed by models of equilibrium. Whether that equilibrium is thought to be perfect or imperfect in Paretian terms is a point of controversy among theorists, but behind this controversy resides acceptance of the presumption that the perception of orderliness is best carried forward analytically by models of systemic or general equilibrium.

Systemic equilibrium portends placidity and not turbulence. You can get to turbulence from equilibrium only by postulating exogenous shocks. Turbulence is brought in through a *deus ex machina* rather than being treated as an intelligible feature of the ecology of plans. In contrast, turbulence is a normal feature of most ecologies. To treat both orderliness and turbulence as properties of the life of the ecology of plans that constitutes a macro economy requires that we follow the emergent-theoretic branch of that analytical fork, which seeks to explain the emergence or generation of orderliness instead of postulating it as an analytical point of departure.² An emergent analytical framework would seek to explain macro coordination as something that arises through interaction among non-coordinated entities, and would reflect a bottom-up orientation toward macro

² In a related vein, Bruno Latour (2005) objects to forms of social theorizing that explain social phenomena in terms of other social phenomena; he argues instead that social phenomena should be explained as emerging out of interaction among non-social phenomena.

theorizing as illustrated by De Grauwe (2010). Coordination would thus be a variable quality of societal processes and not a maintained hypothesis to guide theoretical effort, as illustrated, for instance, in the generative style of theorizing conveyed in Axtell and Epstein (1996) and in the essays collected in Epstein, ed. (2006).

Central to this generative orientation are theories that reflect emergent phenomena, which require theorizing in terms of levels of phenomena as against treating all phenomena as residing on the same theoretical plane. Mitchel Resnick's (1994) computational analysis of a traffic jam illustrates the analytical distinction nicely. Imagine that cars enter a highway and follow the simple rule of driving as fast as they can until they are three car lengths behind the car in front of them, at which time they maintain that distance. What results from this formulation is a steady state where the cars in the mainstream of traffic could be reduced to a point-mass equilibrium. Suppose the cars in the steady state are traveling at 80 MPH. Now suppose one car in that stream of traffic slows down momentarily. This will cause a traffic jam among the following cars as they slow down to try to maintain their distance from the car in front of them. The traffic jam would be recognized by the presence of cars that are traveling at less than 80 MPH. The traffic jam, however, is an object that is distinct from the cars that constitute the jam. If you were to take a sequence of photographs of the traffic jam, the jam will be moving backwards. Initially, the jam might have started at, say, mile marker 100 along the highway. Thirty minutes later the jam might start at the 90 mile mark, and it might start at the 80 mile mark 30 minutes after that.

The starting position would move continually backward as cars left the jam and resumed their 80 MPH speed.

It would not be accurate to describe the traffic jam as a gigantic car, perhaps of ten-mile width, that is moving backward. No car ever moves backward; they move only forward, only at less than 80 MPH until they clear the jam. The traffic jam is a distinct object that emerges out of interaction among the cars that constitute the jam. It is this quality of emergence that must be brought into play in treating a macro economy as an ecology of plans. A central feature of that ecology, as any ecology, is the emergence of non-linearity through interaction among participants within the ecology.

For instance, the ecology around a grove of 100 oak trees will differ from the 100 ecologies beneath 100 individually isolated oak trees. A grove with 100 trees cannot be reasonably reduced to a single tree because doing so would eliminate significant phenomena that arise through interaction. Among other things, patterns of shade differ within the grove than would characterize isolated trees, leading to different the shapes and sizes of the trees. Moreover, amounts of moisture and rates of evaporation will differ when the 100 trees comprise a grove than when each tree stands in isolation. The effects of wind will likewise differ when some of the trees in the grove shelter other trees. Furthermore, the grove will attract different animals and plants than would a set of isolated trees, due in part to differences in shade and moisture.

This distinction between theories based on postulated order and on emergent order can be conveyed by an illustration I have invoked before

(Wagner 2010). Parades and crowds of pedestrians leaving a stadium are both orderly social formations, though a parade would surely be judged by an impartial spectator as more orderly than a pedestrian crowd, perhaps perfectly orderly in contrast to the imperfect order of the pedestrian crowd. The pedestrian crowd reflects a particular ecology of plans, but a parade reflects only a single plan. The parade is an organization whose orderliness resides in the plan of a parade marshal. The pedestrian crowd is an order of organizations: some of those organizations will be individuals and some of them will be small clusters of individuals who are traveling together. The orderliness of the parade resides in the plan of the parade marshal, along with the musical and marching skills of the members of the parade. The orderliness of the pedestrian crowd resides in the rules and principles that govern interaction among the participants. It would be ontologically mistaken to treat the pedestrian as an imperfect parade that potentially could be perfected through policy, even though it is conceivable that the orderliness of the crowd could be improved along the lines examined in Schelling (1978).

A parade is appropriately reducible to a point-mass entity; this reduction fits the nature of a parade. A pedestrian crowd is not appropriately reducible to a point-mass entity that can be represented by a field. It is rather a form of spontaneously ordered network. For a parade, you can tell where it is going by looking at any single participant: the parade is reducible to a point mass entity. The pedestrian crowd as an aggregate of people is not going anywhere. Its members are going in different directions to many different places. Following one

member gives you little to no useful information about where the other members are going. It is a pedestrian crowd and not a parade that is an appropriate analogy to the orderly social configuration that I denote as an ecology of plans.

Choice, Emergence, and the Macro Ecology of Plans

While a large menu of macro models can be found in use today, they are unified in their reduction of an economy to some point-mass entity even if they differ regarding some of the properties of that mass. A widely used macro formulation is an expectations-augmented version of the Philips relationship between inflation and employment, as conveyed by

$$E_t = E^* + \lambda(P_t - E(P_t)) \quad [\lambda > 0].$$

In this analytical framework, aggregate employment (or output) has two components: what is considered a natural or normal volume of employment, E^* , and a deviation from that output due to monetary shocks that produce a gap between actual and expected prices. This analytical framework posits direct theoretical relationships among such aggregate variables as employment, output, prices, and money. These formulations map into some Phillips formulation at the aggregate level. It is easy enough to work with these formulations. They are the stuff of macro theory, though, of course, to different effect among different theorists. My interest here, however, is not any adjudication among macro theories but rather resides in exploring an emergent ecology of plans and how this articulation leads to a treatment of macro observations as supervening on micro interactions.

Emergent phenomena are products of interaction. In the social world they are phenomena that cannot be reduced to an individual because they emerge through interaction among individuals. Emergence theorizing thus operates in terms of levels of theorization, where some of the objects of theoretical interest supervene on other objects of interest. Emergent objects are distinct from the objects on which they supervene. This paper is concerned with aggregate economic variables and not such objects as traffic jams, patterns of termite droppings of wood, or patterns made by ants in searching for food. Nonetheless, each of these phenomena entails aggregate patterns that emerge out of micro-level interaction among acting entities and not through some act of intentional construction or coordination. Macro level theorizing, too, displays the centralized mindset that Resnick (1994) describes. Dissolution of the centralized mindset requires the construction of theories based on emergence, and supervenience, where micro and macro designate different analytical levels and where macro-level variables supervene on micro-level interaction. Within such an alternative research program, macro theory would not seek to specify direct theoretical relations among aggregate variables because such relations are intermediated through supervenience between the levels, or among micro, meso, and macro levels in the formulation of Potts and Morrison (2007).

Put differently, the macro level is inert in that it is not the locus of action but rather is a statistical characterization of past action and interaction at the micro level. The activity we call policy would likewise be located at the micro level, for that is where all action must be located. Consider open market

operations by a central bank. In particular, assume the central bank buys government debt from the public. This is the standard illustration of money creation, and from here it is a short step to inquire into the effect of such money creation on such aggregate variables as prices, output, and employment. It is certainly possible to construct statistical relationships among those variables, but a statistical relationship is not a theoretical relationship.

There is no direct theoretical relationship, though this lack of relationship is obscured by the presumption that our observations are of equilibrium states. This is not to deny that purchase of government debt by a central bank can generate changes in such aggregate variables as prices, outputs, and employment. It is only to assert the significance of the networked structure of micro-level interaction for understanding both the causes of those central bank actions and their consequences. These phenomena cannot be captured adequately by remaining at the macro level, for a central bank resides at the micro level along with regular banks and other enterprises. There is no macro level at which anyone can reside. It could be claimed that macro actions and policies are identified by their size: they are large relative to most actions and policies. This claim would have some coherence to it, but it would be a statistical and not a theoretical coherence. The central bank operates within some networked structure of relationships, with different structures having consequences both for central bank activities and the consequences of those activities. This is a general feature of networks where knowledge is local and distributed.

The challenge embraced here is to analyze the generation of orderliness cum turbulence within the ecology of plans that constitute a macro economy and not to compare the properties of some equilibrium arrangement of plans against some postulated Paretian standard. This ecology is analogized to a crowd of pedestrians and not to a parade. With respect to what is denoted as policy, moreover, the entities of state are likewise members of the crowd and nothing like a parade marshal. Within an ecology of plans, new plans continually are being inserted into the ecology while existing plans sometimes are being revised or even allowed to die. The interconnection among plans in this ecology is a source of turbulence, not as an exogenous shock but as a systemic feature of what is a living even if not sentient organism.

Equilibrium theory can, of course, give an account of interdependence among economic activities. Indeed, such an account is perhaps the prime virtue of this theoretical framework. What it can't do, however, is give an account of turbulence that arises through inconsistencies among plans because no action is presumed to take place until all plans are mutually consistent. All plans are pre-reconciled within the equilibrium framework, just as the actions of the members of a parade are pre-reconciled. The alternative to the equilibrium framework is to treat the ecology as an emergent process where macro-level objects supervene on micro-level interaction. Any relation among macro-level variables is thus intermediated through interaction among entities at the micro level.

What would result from this analytical effort is a form of spontaneous order macro theory. Micro theory would be the domain of intentional action; macro

theory would be the domain of emergent phenomena, spontaneous order, and unintended consequences. Micro theory is praxeology; macro theory is catallactics. This line of analysis would reassert the sense of the distinction between what is seen and what is unseen. The micro domain of praxeological action pertains to what is seen and intentional. The macro domain of catallactical and emergent interaction pertains to what is not part of anyone's direct intention, but rather reflects interaction among participants. With respect to micro foundations, this effort points toward emergent-theoretic foundations for macro theory, as distinct from choice-theoretic foundations..

Macro-Micro Supervenience

Figure 1 illustrates some features that come into play in describing macro phenomena as reflecting an ecology of plans that emerges out of interaction at the micro level. The upper part of Figure 1 illustrates three possible observations in Phillips-curve space. For my purposes it doesn't matter how those observations are accounted for. They could represent three different natural rates in some New Classical formulation. Alternatively, they could represent three different historical observations and given a New Keynesian interpretation in terms of hysteresis. They could also represent three different claims about the implications of different state policies.

The central point in any case is that the macro level is distinct from the micro level, just as a traffic jam is distinct from the cars that constitute the jam. The jam itself is not an acting entity, but rather supervenes on interaction among

the cars that are the acting entities. It is the same with macro-micro supervenience. Action can take place only on the micro level. The macro level is a derivation from micro interaction, just as is a traffic jam. The macro level consists of statistics, projections of future circumstances, and ideological beliefs and presumptions. Such macro phenomena can well influence micro-level action, just as beliefs about future traffic patterns might influence highway construction today.

Action can take place only on the micro level, with interaction among actors within the ecology generating subsequent macro observations. The three lightning bolts that separate the upper and lower part of Figure 1 denote this movement from the micro level to the macro level. The aphorism “think globally but act locally” has the macro-micro relationship almost right. The only emendation required is to note that action can only be local, with the subsequent global impact of an action depending on numerous qualities of that action. The micro level is where action takes place. The macro level is not an arena of action. It is in part a subsequent portrayal of some features of those actions during the previous period. It is also the domain of various projections, forecasts, and ideologies. Such macro portrayals and variables might well induce some participants at the micro level to revise their activities. Even so, that subsequent action likewise takes place on the micro level, with a subsequent macro-level pattern again supervening on the micro action. Those macro-level representations emerge out of interactions at the micro level that resides analytically beneath the macro level, as befits the relationship of supervenience.

Several implications follow from this supervenience of macro on micro. For one thing, emergence takes time. The macro level description pertains to micro interaction in the past, and also to forecasts and beliefs about future circumstances. The simplest way of making this point, and one that is readily amenable to agent-based modeling, is to assert that micro interaction at t_1 produces macro level observations at t_2 . A second implication is that the flow between micro and macro is uni-directional; the lightning bolts in Figure 1 point from micro to macro. Micro interaction yields macro phenomena. Macro observations or beliefs might influence micro actions, but they don't directly generate macro variables any more than a traffic jam generates cars. A third and less immediately observable implication is that the ecology of plans depicted in the lower part of Figure 3 is comprised of distinct types of entities, as illustrated by some of the entities being triangles and others circles. Similar to Wagner (2007), the circles denote market-based entities and the triangles denote state-based entities.

The bottom part of Figure 3 represents both a conversion of polities and economies into networks of entities in place of unified fields and a commingling of political and economic entities within an entangled web of political economy. Market-based entities are denoted by circles; polity-based entities are denoted by triangles. What is particularly notable in this sketch is that both types of entities engage in both competitive and complementary relationships across both types of networks. All such entities are, as if were, part of a crowd of moving

pedestrians, though with some of those pedestrians perhaps having different principles or rules of motion than other pedestrians.

One of those state-based entities might be a central bank. This bank operates on the micro level through the connections it has established with other entities in the ecology. The central bank is an enterprise located on the public square that interacts with other enterprises within the ecology of plans, as distinct from acting on that ecology as if it were reducible to some point-mass entity. Moreover, the central bank exemplifies what Roger Koppl (2002) calls a Big Player, which is a participant in the economic process that is not subject to the ordinary rules of private property and residual claimacy. Big Players inject uncertainty and turbulence into a catallaxy because the absence of residual claimacy renders their actions less predictable to other participants. Different patterns of interaction are thus likely to generate different macro observations. Furthermore, the resulting macro observations are not the province of the central bank alone because those observations depend on complex patterns of interaction within the catallaxy. Macro observations emerge through interaction among enterprises throughout the catallaxy. Principles of spontaneous order thus play out within the context of macro theory. Indeed, it is at the macro level where principles of spontaneous order would be at work, for spontaneous order and unintended consequences are products of interaction as distinct from action, and inhabit the macro or perhaps meso level level (Potts and Morrison (2007) and Aydinonat (2008) explore spontaneous order theorizing).

The central bank is an entity that resides on the same plane as other entities in society even if it is a Big Player. Several things are notable about this alternative line of theorization. One is that the macro impact is intermediated through the micro structure of networked relationships. The direction of movement is from micro-level action to macro-level summarization through statistics. Thus the activities of the central bank in buying government bonds leads to changes in the networked pattern of commercial relationships that statistically can be summarized by changes in indexes of outputs and prices. The properties of a network depend on its constitutive structure. Hence different network structures, as well as different paths of connection between a central bank and other participants in that network, will result in different outcomes at the macro level.

This does not mean that purchases of government debt by a central bank will yield weird results at the macro level. The macro result is a statistical characterization of the results of micro-level interaction. The point is simply that there is not a direct and immediate relationship between increases in the stock of money and changes in prices and outputs because that relationship is intermediated through particular patterns of interaction among micro level entities. Different network structures and different patterns of connection and relationship between a central bank and market participants will yield different macro-level patterns.

The point of this alternative formulation is not to derive some alternative relationship between monetary changes and changes in outputs or prices. It is

rather to pursue an alternative program of micro-foundations that reflects emergence and supervenience in micro-macro relationships. Doing this brings into the foreground relationships that are suppressed when macro entities are related to one another. A central bank can change its liabilities by changing its holding of government debt, which in turn will influence the stock of money. By moving from this observation to some statement about the resulting effect on prices and outputs is to leave out of view some significant features of the story, features that require a network conceptualization of society and the supervenience of macro on micro for their telling.

With respect to the upper part of Figure 1, suppose the distinction between points *a* and *c* is a projected outcome of some stimulus program. Such a projection would, of course, follow only from some and not all macro models. A significant implication of that projection is indifference about types and location of the added expenditure. No reasonable model of political economy would make such a claim. To illustrate, consider a parliamentary system divided into 99 districts, with the incumbent party able to spend \$99 billion. If macro theory pertained to human action, it would have to conclude that the composition of spending is irrelevant because only the aggregate size of spending appears in the theory. An incumbent party would be pleased even to let an opposition party choose the composition, provided only that the desired aggregate amount was spent. This presumption about the irrelevance of composition applies to no one, of course, for the micro level is where action occurs (Wagner 2001). This is as

true for policy action as it is for other types of action. Only people act and the macro aggregates are just statistical recordings of such action.

To make the point in stark fashion, suppose the 99 election districts are divided into three identical sets: one set will support the incumbent regardless of the efforts of challengers, one set will oppose the incumbent no matter what the incumbent might try to do, and the third set is a tightly contested battleground. Within this setting, ordinary calculation would the concentration of the \$99 billion on those 33 contested districts. Should a different pattern of electoral contestation be in play, a different composition would result. While these compositional matters would be eliminated through aggregation, this is simply to recognition that action occurs at the micro but not the macro level.

With micro-level relationships construed in networked fashion, macro-level observations will vary with changes in the structure of network relationships. For field-based models, structure is irrelevant. By contrast, structure matters greatly for network-based models, as explained by Potts (2000) and Barabási (2002). A world that is generated in network-based fashion can always be characterized *ex post* in field-based fashion. But when the connection between the field-based summary and the network-based source of generation is removed, the field-based summary is left standing by itself, and it doesn't look so good when seen in this manner because there is no micro structure from which the macro portrait is generated (Epstein 2006). It is reminiscent of Dennis Robertson's

description of the liquidity preference function: “a grin without a cat.” The path to sensible understanding surely resides in connecting the micro level of action with the macro-level summarization.

Suppose we theorize about societal coordination in terms of the image of a crowd of pedestrians and not a parade. The coordination of a crowd is not as smooth as that of a parade. For a parade, all marchers are evenly spaced and march at the same pace. Hence a parade has none of the jostling and bumping that you experience in a crowd; however, when viewed from high enough above, the two configurations would look similar, and with the crowd being an imperfect example of a parade. Among other things, the crowd would exhibit macro-level turbulence, and in principle it would be possible to develop measures of this turbulence, or at least some features of it (Tononi, Sporns, and Edelman 1999). These measures would all involve phenomena that would be absent from the parade. For instance, a person wanting to exit the moving mass from the middle of that mass would have to work to the edge before leaving. This could cause some jostling that would slow down other people; moreover, the person in question might not have made it to the edge in time to take the desired exit and so might have to traverse a longer route. Such things as I have just described are forms of capital losses where plans didn't work out as anticipated because the success of those plans depends also on actions taken by other participants in that nexus. One possibly significant source of turbulence arises because much individual action reflects not the

independently formed judgments that are implicit in standard formulations of utility theory but rather reflects inferences based on observations of what others are thought to be doing, as Alan Kirman (2009) explains.

That nexus, moreover, contains a mixture of entities formed under different institutional rules, as the lower part of Figure 1 illustrates.

Economics and political action occur simultaneously on the same plane of action, and with each being sources for the generation of data. Since the analytical challenge is to theorize about an ecology of enterprises in a setting where there are constitutive differences among the enterprises, the analogy to a crowd would seem naturally to assimilate to a model where market-based pedestrians have somewhat different rules of motion than polity-based pedestrians. In any of several ways, these differences among entities would generate interactions that were detectably different from those among market-based entities. For instance, market-based entities have strong incentives to settle disputes without trial because they can retain the costs of the litigation that would otherwise have been necessary. It is different with a dispute between a commercial and a political entity. For a political entity there is no residual to claim. The expenses of litigation can, however, serve as a form of investment in seeking higher office. The commercial calculus of profit-and-loss would give way to an alternative though related calculus of political gain. Two commercial disputants speak the same language as it were, but this claim cannot be made for disputes between commercial and political entities. Much of the orderliness of

ordinary pedestrian crowds comes about from the general dislike that people have in colliding with one another. The presence of political entities changes this setting by creating positions that gain utility by such collisions, as expressed by Jane Jacobs's (1992) treatment of how interaction between commercial and guardian syndromes can lead to "monstrous moral hybrids."

A Closing Note

Orthodox macro construes its object in simple fashion as befits its origination in the Keynesianesque vision of macro theory as an instrument of control. The spontaneous order alternative explored here does not allow direct control, for each individual agent has its own principles of action. Instead, it places the locus of normative interest on the patterns that people generate through their interactions. Those patterns can to some degree be shaped and influenced, as illustrated by Schelling (1978), but they are not subject directly to control. The spontaneous order orientation toward macro phenomena that has been adumbrated here connects directly with the concerns of constitutional political economy by probing into the way in which different constitutive frameworks at the micro level can influence the macro level patterns we observe, perceive, or experience.

The concern with emergence and turbulence also points toward a non-equilibrium style of theorizing, illustrated, for instance, by Katzner

(1998) that avoids grounding theories in a presumption of potential harmony represented by an equilibrium set of market-clearing prices. In this respect, conflict is an on-going feature of life in society, as a feature of natural turbulence that is mostly confined and rarely widespread, and which can have salutary macro consequences as noted by Lewis Coser (1964). Whether policy action within a particular constitutional framework acts to mitigate or intensify conflict and turbulence would be a question of central interest within a theory concerned with the properties of social life within an emergent ecology of plans. In any case, conflict and its control and not a presumption of harmony would come to occupy the theoretical foreground, as illustrated by Hirshleifer (2001) and also Collins's (1994) treatment of the conflict tradition within sociology, and which was also central in the only paper written by Asik Radomyslyer (1946) before his untimely death.

Table 1: Contrasting Macro-theoretic Frameworks	
Choice Theoretic	Emergent Theoretic
Equilibrium states	Emergent ecologies
Reduction of macro to micro	Supervention of macro on micro
Society as parade	Society as turbulent crowd
Macro as simple phenomena	Macro as complex phenomena
Separable Political Economy	Entangled Political Economy

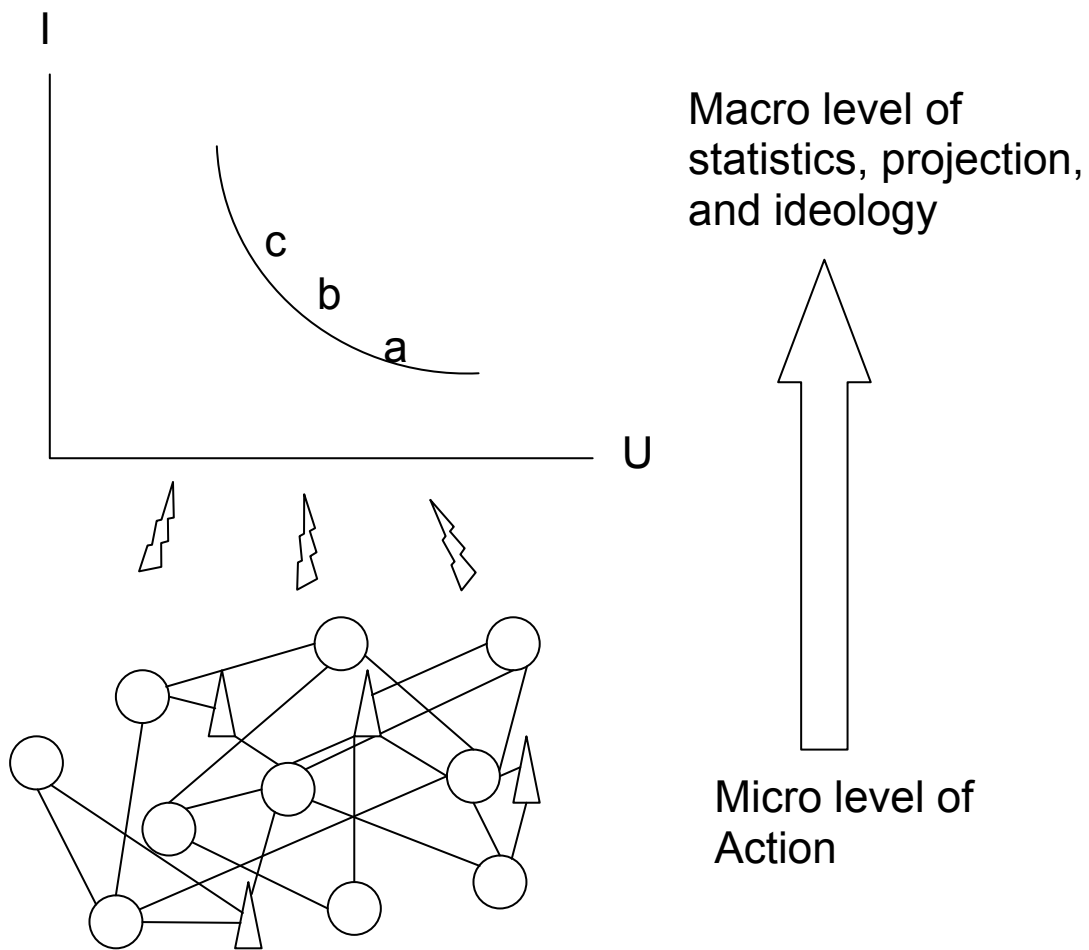


Figure 1: Micro-Macro Supervenience

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