Rethinking the Theoretical Foundation of Economics IV: The Embedded Economy and Its Uncertainties

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Contents

Abstract

This article explores four core themes of the multilevel paradigm, all associated through the notion of flexible, multiple levels of functional organization: the embedded economy, radical

uncertainty, theory pluralism, and multilevel sources of flourishing. First, the concept of the "embedded economy" indicates that economic activity is defined by the political, social and natural worlds in which it takes place and, by implication, economic activity cannot be understood independently of these systems in which economies are embedded. Second, we argue that radical uncertainty (lying beyond probabilistic analysis) is the rule, not the exception, in economic decision-making. Third, in the presence of uncertainty, it is important to embrace theory pluralism, in order to respond adaptively to surprises. Finally, we examine how human flourishing occurs at multiple levels, associated with multiple levels of selection. These themes call for a reappraisal of the purpose of economics.

1. Introduction

Every economic paradigm must have at least the following four components: (1) a description of human nature and its implications for economic decision making, (2) a description of the environment – in particular, the social, political and natural environment – in which economic decisions are made and of the interactions between economic decisions and this environment, (3) a portrayal of the objectives to be achieved through economic activities, and (4) an explanation of the policies that enable humans – given their nature and environment – to make progress towards these objectives. Economic paradigms are also commonly associated with methodological guidelines that are meant to shed light on the analysis of (1)-(4).

Part 2 in this series, on functional organization, provided the multilevel paradigm perspective on human nature and its implications for economic decisions (component 1). In Part 3, we examine our paradigm's distinctive approach to the environment in which economic decisions are made (component 2) and its articulation of desirable objectives (component 3). In particular, the environment is the "embedded economy," i.e., an economic domain that is shaped by the political, social and natural domains, under conditions dominated

by radical uncertainty. The desirable objectives are identified as multilevel sources of human flourishing, which extend far beyond the individuated, consumption-oriented objectives of the neoclassical paradigm. We also outline distinctive methodological guidelines for multilevel theorizing, focusing on the need for theory pluralism. We conclude with a reappraisal of the purpose of economics. As indicated in Part 2, these core themes of the multilevel paradigm gain their special significance through their association with flexible, multiple levels of functional organization. In the next article of this series (Part 5), we will turn to our paradigm's approach to policies.

As in the other articles in this series, the aim is not to rewrite economic theory, but rather to provide an integrative framework of thought in which the significance of many insightful contributions, currently on the periphery of neoclassical and behavioral economics, can be brought into complementary relations with one another and the boundaries of economic can be extended in ways that promote human flourishing.

2. The Embedded Economy

The multilevel paradigm views economic relations as special kinds of social relations, namely, ones that can be anonymized sufficiently so that contractual relationships can be specified independently of personal identities. Many economic activities have both transactional and social-relatedness components.[1] Transactions in equity markets are at one extreme of anonymizaton; gifts are at the other extreme. Most economic transactions fall within these extremes. When I chat with my employer or my paid child carer, I am engaging in a social exchange combined with a purely economic one. Many transactions in labor markets take the form of a "partial gift exchange."[2]

[1] See, for example, G. Akerlof, 2007; G. Akerlof & J. Yellen, 1990; R. Akerlof, 2017.
[2] Akerlof (1982).

On this account, economic relations are embedded within social relations. Furthermore, economic relations are also embedded in political relations, describing the distribution of power among economic agents. The economic, political and social spheres are, in turn, all embedded in environmental relations, governing the natural world in which all activities take place.

The embedded economy is pictured in Figure 1. It resembles the biologist's picture of an ecosystem more than the traditional economist's picture of an economy as a machine with many moving parts.

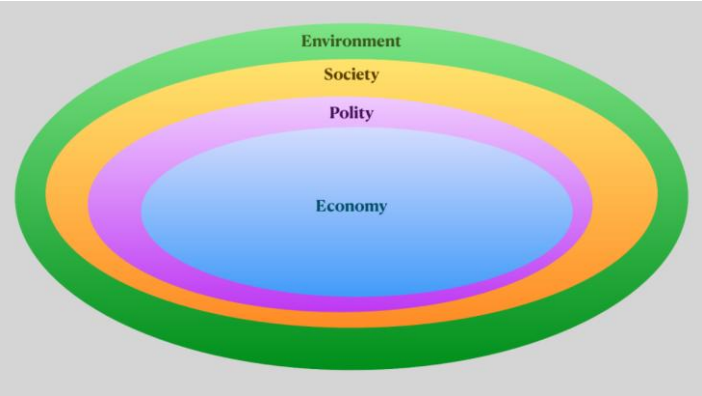


Figure 1: The Embedded Economy

Like biological systems, economies are complex, adaptive systems, evolving through the forces of variation (innovation), selection (multilevel decision making) and replication (cultural transmission). These principles underlie behavior of learning organizations that adapt to their environment (e.g., Hall, 2005). Like biological systems, economic systems are modular hierarchical structures (as explained by Simon (1996) as well as Beer (1995) and Booch (2007)). Biological systems depend on homeostasis to deal with external perturbations and internal problems that may arise; homeostasis plays an analogous, but largely unexplored, role in economic decision-making in terms of habits, organizational rules, tolerance in deviations from social norms and more (Damasio, 2016). Like biological systems, economic systems depend upon predictive processing of information (Clark, 2013). Nevertheless, there

are aspects of the economy that have no parallel in biology. In particular, money, prices, anonymous (or rather quasi-anonymous) transactions have no direct parallels in the biological world.[3]

Four Domains

The broadest domain is the "**environment**," the natural world, within which all human activities take place. Within this context lies the second domain, "**society**," containing all groups of people living in persistent interactions with one another. These social groups may be small (such as families) or large (such as nations), and they may comprise groups of groups. In this sense, society may be conceived as the sum of all human relationships. In the absence of society, there are no interactions among people and consequently no political or economic interactions either. Different cultures are associated with different social interactions, which generally imply different political and economic interactions.

When the social networks break down within which economic activities take place – such as when trust collapses or when conflict breaks out – voluntary economic transactions fall. Obversely, great disparities of economic opportunities and outcomes may weaken the cooperative interactions within social networks. (The appendix provides a formal model of the social embeddedness of economic activity.)

The third domain is "**polity**," containing all organized forms of institutionalized social relations that involve allocating power. It refers to "a distinctive form of rule whereby people act together through institutionalized procedures to resolve differences, to conciliate diverse interests and values and to make public policies in the pursuit of common purposes" (Crick, 1972). Polity arises from society. Without groups of people living in persistent interaction, there would be no need for polity. Polity is the subset of power-allocating social interactions.

[3] We are deeply indebted to George Ellis for his insights into the comparison of economic and biological systems.

The most basic political rules governing a market economy are laws of property, contract and crime. Since these and other economically relevant rules differ across countries, the market economy tends to function differently in different countries. In the absence of polity, we have "failed states," where laws of property, contract and crime are not observed. Under these circumstances, the market economy cannot function, since powerful, selfish people will prefer to grab resources rather than conduct voluntary exchange.

The final domain is "**economy**," containing all social relations involving the production, distribution, consumption and exchange of goods and services. A market economy is one where the exchange is voluntary, in accordance with the demands and supplies of the economic decision makers. Society and polity set the norms and rules whereby economy functions. These norms and rules determine the channels whereby production, distribution, consumption and exchange take place.

This picture of the embedded economy stands in contrast to the conventional depiction of the economy through the circular flow of income and product, underlying the Walrasian general equilibrium system. In the circular-flow account, households supply factor services to the firms, while the firms supply final goods and services to the households. In return, firms pay for the factor services (thereby generating income) and households pay for the good and services (thereby generating revenue). In this depiction – initially conceived by Paul Samuelson – economic transactions are portrayed independently of the political, social and environmental underpinnings. Standard rationale is that these underpinnings are assumed constant while the circular flow of income and product proceeds.

However, many changes in the environmental, political and social domains occur with the same or greater frequency as changes in the economic domain. Furthermore, many important changes in the economic domain can arise from feedback effects among these domains. Consequently, there is no justification for holding the political, social and environmental underpinnings constant for the examination of economic activities.

Conventional economic models incorporate social, political and environmental influences as special cases, rather than the setting within which economic activities take place. The subdiscipline of environmental economics explores the interrelation between economic and environmental activities; the subdiscipline of political economy examines the interrelation between economic and political activities; and the subdiscipline of social economics investigates how social forces (such as social norms) affect economic activities and are affected by the latter. However, each of these subdisciplines usually takes neoclassical or behavioral economics as a point of reference. What is characteristically missing from these subdisciplines is a systematic examination of the evolution of the economy, embedded in polity, society and environment, operating through flexible multiple levels of functional organization.

Modularity

The organization of human collaboration and the structure of accumulated knowledge are *modular* because both have evolved to manage the complexity and uncertainty inherent in social life. Modularity—dividing systems into semi-independent units that interact through structured interfaces—enables humans to coordinate across scales, innovate adaptively, and maintain social coherence while accommodating change.

This modular structure underpins not only biological and cognitive systems but also social and institutional ones, providing both *resilience* and *flexibility* in the face of uncertainty.

Why human collaboration and knowledge are modular

Human societies face the problem of coordinating many agents with limited cognitive capacities in environments too complex for any individual to understand or control. To solve this, humans organize collaboration into modules—small, cohesive groups (families, teams,

firms, guilds, research units) that perform specialized functions within a broader system (Simon, 1962; Baldwin & Clark, 2000).

This mirrors the modular organization of biological systems, where independent subsystems (organs, cells, or genes) can adapt or evolve without destabilizing the whole organism (Herbert Simon, 1962; Kirschner & Gerhart, 1998). In social systems, modularity allows for specialization and innovation: each module can experiment and adapt locally while maintaining coherence with others through shared norms, communication channels, and institutions (Pagel, 2012).

Similarly, human knowledge systems—from scientific disciplines to technological platforms—are modular. Scientific fields, research traditions, and professional communities form semi-autonomous "knowledge modules" that develop specialized insights while interfacing with others through shared languages, standards, and institutions (Andersen, 2016). This modularity makes cumulative cultural evolution possible, as ideas can be recombined across domains without collapsing the larger structure (Henrich, 2016).

Social groups as modular hierarchical structures

Human collaboration typically takes the form of modular hierarchies: individuals belong to small groups, which in turn are nested within larger groups—families within communities, communities within regions, regions within nations, and nations within global networks. This nested, hierarchical modularity is a hallmark of human social organization (Turchin, 2016; Dunbar, 1998).

Such structures enable coordination and trust at multiple scales. At the lower level, face-to-face groups support intense cooperation through empathy and shared identity (Tomasello, 2014). At higher levels, symbolic systems—laws, markets, religions, bureaucracies—bind groups into "groups of groups," enabling collaboration among strangers (North, Wallis, & Weingast, 2009).

In essence, human societies achieve scalable cooperation through modularity: small groups handle local problems, while institutional frameworks integrate these modules into broader systems. Civil society, for example, functions as a web of interconnected modules—NGOs, associations, unions, networks—each pursuing distinct aims yet contributing to collective resilience and innovation.

Human flexibility in reorganizing modular structures

Humans differ from other animals in their ability to reconfigure social modules dynamically. While many species cooperate in stable groups (e.g., ants, wolves, or chimpanzees), their social structures are largely fixed by genetic and ecological constraints. Humans, in contrast, can form, dissolve, and recombine groups according to abstract goals, shared symbols, and cultural narratives (Richerson & Boyd, 2005; Tomasello, 2019).

This flexibility arises from three uniquely human capacities:

- **Shared intentionality** – the ability to align mental states and coordinate around collective goals (Tomasello, 2014).
- **Symbolic communication** – language and cultural representations allow humans to define roles, norms, and institutions beyond immediate perception (Deacon, 1997).
- **Metacognition and reflexivity** – humans can reflect on their social arrangements and intentionally redesign them (Giddens, 1984).

These capacities enable humans to create flexible modular systems—governments, firms, networks, or digital communities—that can be reorganized to meet new challenges. This capacity for institutional innovation underlies the adaptability of human civilizations.

Flexibility as both a source and response to radical uncertainty

Human flexibility in organizing modular social structures is adaptive, allowing societies to respond to radical uncertainty—novel, unpredictable changes in the environment, technology, or social relations (Knight, 1921; Tuckett & Nikolic, 2017). By experimenting

with new combinations of social modules—new forms of cooperation, governance, or knowledge-sharing—humans can explore multiple pathways of adaptation.

However, this same flexibility is also a source of uncertainty. Because social structures are reconfigurable, the space of possible futures expands dramatically. Institutional change, innovation, and cultural evolution generate new possibilities but also new risks—disrupting established equilibria, norms, and expectations. Thus, the modular organization of human societies both *absorbs* and *produces* uncertainty: it is a mechanism of resilience and a generator of novelty.

This duality reflects what Herbert Simon (1996) called the architecture of complexity: modular hierarchies make complex systems both manageable and dynamic. When applied to human society, modularity explains how communities can remain coherent while continuously transforming through collective learning.

The flexible modularity of human collaboration and cognition can be understood as a key aspect of flexible functional organization in the evolution of human behavior—an organizing principle that has deep roots in biological evolution and continues to shape cultural and economic evolution today. Within the framework of extended Darwinism, which applies evolutionary principles of variation, selection, and retention to cultural and institutional systems, modularity provides the structural basis for adaptive learning and innovation in the embedded economy—that is, an economy situated within, and coevolving with, social, political, and environmental systems.

In sum, human collaboration and knowledge are modular because modularity offers a way to manage complexity, distribute cognition, and enable innovation. Our social world is built as a nested hierarchy of modules—from small cooperative groups to global institutions—linked through shared meaning systems. Unlike other animals, humans can reorganize these modules flexibly, guided by symbolic reasoning and collective imagination.

This flexibility is essential for adaptation under uncertainty—but it also creates new layers of unpredictability as societies reshape themselves in response to their own innovations. The evolution of human modularity thus reveals both the creative and destabilizing aspects of our collective intelligence: it is what allows civilization to flourish and what ensures it can never stand still.

Solidarity

The social embeddedness of economic activity can be understood in terms of "solidarity," i.e., the felt and enacted commitment to participate in the wellbeing and destiny of collective bodies. Solidarity is present in a variety of domains. (i) *Interpersonal solidarity* involves caring for others, particularly in times of need, and participating in each other's wellbeing. It involves psychological motives such as affiliation, compassion, empathy and perspective-sharing (e.g., Gould, 2007). (ii) *Social solidarity* is a sense of interconnectedness and mutual support within a community or civil society. It involves bringing people together to support members of their social groups (e.g, Gofman, 2014). (iii) *Political solidarity* is a force that brings citizens together in the pursuit of common political objectives. It involves adhering to an agreed structure of power relationships to facilitate civic engagement and collective action (e.g., Tobin, Jaggar, 2013). (iv) *Economic solidarity* refers to collaborative economic relationships and practices, involving economic mutual aid and economic coordination beyond enlightened self-interest (e.g., Bowles, 2017; Mathei & Roux-Alezais, 2014). (v) *Environmental solidarity* promotes a sense of belonging to the natural world and a consequent sense of responsibility of individuals and social groups to protect and preserve the natural environment (e.g., Pelenc & Dedeurwaerdere, 2016).

All these types of solidarity involve participating in the wellbeing and destiny of collective bodies, enabling them to collaborate in achieving common goals toward addressing shared challenges. Interpersonal and social solidarity pertain to the social foundations of the economy;

political solidarity pertains to the domain of polity; environmental solidarity sustains the embeddedness of the economy in nature; and economic solidarity refers to collaborative economic relationships that arise from and influence the social, political and environmental relationships.

Since humans are social creatures, everyone – except for psychopaths – is capable of living both as an individual (promoting one's own objectives) and as a member of social groups (promoting collective objectives). These two aspects of human existence are intertwined, with one's membership of social groups shaping one's understanding of one's individuality and vice versa. This is the psycho-social basis for the social, political and environmental embeddedness of economic activity.

It is useful to distinguish between (a) "internal solidarity" (intragroup solidarity), involving a sense of belonging, shared values and mutual support within a social group and (b) "external solidarity" (intergroup solidarity), which pertains to the willingness of people and groups to collaborate beyond internal group boundaries. While internal solidarity reflects a sense of social identification and participation in a community, external solidarity involves respect for identities beyond one's own group within civil society. The former contributes to "bonding social capital" (characterized by strong social ties among people sharing a common affiliation) and the latter contributes to "bridging social capital," which fosters trust and cooperation among people with different perspectives and identities.

Internal solidarity is essential for building *community*, characterized by a strong sense of social connection, shared values and a feeling of mutual responsibility among members. External solidarity is vital for *civil society*, denoting the space for collective action and voluntary associations, based on acceptance of basic social norms and legal practices, existing not only within a state but also beyond it. Whereas communities are based on shared identity and sense of belonging, civil society is structure around specific goals, causes or issues, open to individuals with diverse backgrounds and interests. Communities are often smaller and

more localized, usually existing within civil society.[4] The care- and affiliation-based internal solidarity thus differs in both scale, scope and purpose from the respect-based external solidarity.

The presence or absence of solidarity has far-reaching implications for economic activity, as illustrated in Figure 2.

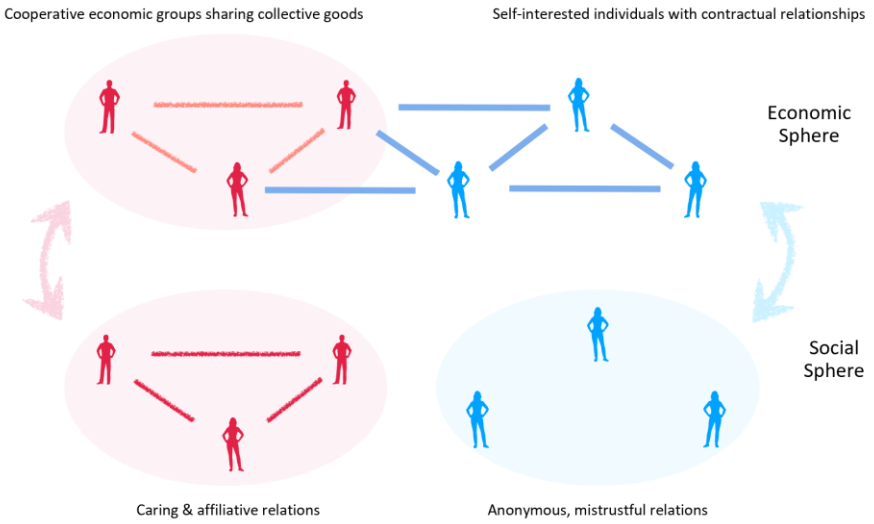


Figure 2: Social Foundations of Economic Activity

The social sphere (in the bottom half of the figure) describes social relations: the three people in the red circle have trusting relations, whereas the three people in the blue circle have anonymous interactions that are not trust-based. The economic sphere (in the top half of the figure) pictures economic transactions among all these people. Obviously, people in the trusting group are more likely to engage in mutually beneficial exchanges than in the non-trusting group. Individuals in the former group characteristically invests in long-term economic relationships yielding sustained benefits over time, whereas those in the latter group prioritize immediate gains and lack the commitment for lengthy ventures. Trusting communities are often conducive to risk-taking and innovation, while mistrustful individuals

[4] Communities and civil societies are obviously narrower in scope that the domain of "society" in Figure 1, since that domain also includes economic and political interactions that are anonymous or conflictual.

tend to be hesitant to take on new challenges. Trusting communities develop social institutions that facilitate economic exchanges, whereas anonymous economic relations are more fragmented, since they must rely on legal mechanisms for contract enforcement. There are also feedback effects from the economy to society, since long-term economic relations upheld by trust often strengthen the underlying social relations.

Solidarity makes possible the multilevel cooperation on which human survival and flourishing depends—in families, kin groups, communities, firms, nations, and now global networks. Solidarity provides the psychological and moral glue that binds together functionally differentiated and modular social systems.

Solidarity is the integrative counterpart to modularity. In both biological and social systems, modularity enables adaptability: different subsystems (cells, organs, organizations, communities) can innovate or adjust locally without destabilizing the entire system (Simon, 1962; Baldwin & Clark, 2000). Yet modularity also risks fragmentation. To maintain coherence, systems need integrative mechanisms that coordinate modules toward shared purposes. In human societies, solidarity performs this integrative function—it aligns the motives of individuals and groups with the wellbeing of the larger collective.

Solidarity thus complements modularity:

- Modularity provides structural flexibility—allowing diverse social units to specialize and experiment.
- Solidarity provides moral coherence—sustaining mutual trust, reciprocity, and willingness to contribute to shared goals.

Without solidarity, modular systems tend toward disintegration; without modularity, solidaristic systems become rigid and unable to adapt. Functionally resilient societies balance both principles.

Furthermore, solidarity is the product of nested functional organization. In particular, solidarity arises from the nesting of functionally organized, semi-autonomous modules with

interdependent functions, since individuals identify with and internalize the goals of the groups they belong to. Through shared norms, symbols, and narratives, societies cultivate a sense of belonging that motivates cooperative behavior even when individual incentives diverge (Ostrom, 2010; Bowles & Gintis, 2011). This nesting reflects the principle of multilevel selection in evolutionary theory (Wilson & Wilson, 2007; Richerson & Boyd, 2005): groups that sustain solidarity-driven coordination can outcompete those that fail to coordinate.

Beyond that, solidarity is an enabler of collective intelligence and innovation. From an extended-Darwinian perspective, social modularity supports exploration and innovation by enabling multiple social "modules" (teams, firms, institutions) to experiment. Solidarity enables knowledge sharing, trust, and coordinated recombination of successful innovations. High-trust societies can disseminate and scale successful ideas more efficiently because actors perceive themselves as participating in a shared collective enterprise (Arrow, 1974; Beinhocker, 2006).

Thus, solidarity is not a sentimental ideal but a functional precondition for collective problem-solving under uncertainty. It lowers transaction costs, fosters inclusive deliberation, and sustains cooperation during crises. This makes solidarity essential to the governance of complex adaptive systems—whether in climate cooperation, digital governance, or economic resilience.

Institutions—laws, norms, welfare systems, education—embody solidarity by structuring interdependence and reciprocity (Polanyi, 1944; North, 1990). These institutional modules define how cooperation is enacted and rewarded. Cultural narratives of shared fate (e.g., national, professional, or planetary identities) provide symbolic scaffolding for solidarity, aligning diverse functional roles toward collective purposes (Tomasello, 2014; Turchin, 2016).

When institutions fragment and collective narratives erode, modular systems lose coherence: actors pursue local interests at the expense of systemic wellbeing. Conversely, when solidarity becomes exclusive or rigid, systems lose modular flexibility and adaptability. Effective governance thus requires a dynamic equilibrium—solidarity that integrates diversity without suppressing it.

In sum, solidarity and social modularity are two sides of the same adaptive coin: Social modularity allows for functional differentiation. Solidarity ensures integration and shared direction. Together they enable societies to balance autonomy and cohesion, fostering resilience, cooperation, and collective flourishing.

Agency

As we have seen in article III of this series, "agency" is another concept that is essential for understanding the embedded economy. The exercise of agency, working through solidarity-shaped networks, are the proximate sources of functional organization that shape the embedded economy, as illustrated in Figure 3.

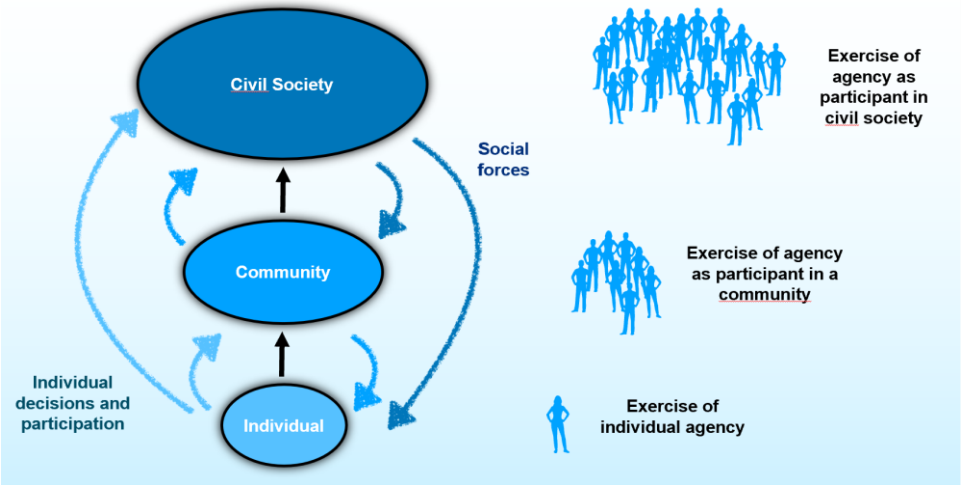


Figure 3: Exercise of Agency at Different Levels of Functional Organization

The individual (at the bottom of the figure) exercises personal agency by pursuing her own individual objectives, but also exercises collective agency as a participant in her community and in her broader civil society. The individual's contributions to these collectives is represented by the left-side arrows extending upward from the individual to the community and civil society. The agency exercised by the community is generated through the agentic participation of its members. The resulting moral values, social norms, narratives, and social identities of the community influence the individual's goals and setting (the right-side downward arrow from the community to the individual in the figure). Along analogous lines, the agency exercised by civil society arises from the agentic participation of individuals and communities (represented by the right-side upward arrows to civil society) and shapes the goals of the community and the individual (the right-side downward arrows from civil society). In short, agency is *distributed*. It does not reside wholly within an individual, but also in the emergent social entities that individuals form when they participate in the purposes of their groups.

These interlocking flows of agency between the individual and the social collectives highlight an important difference between the neoclassical and the multilevel paradigms, as pictured in Figure 4.

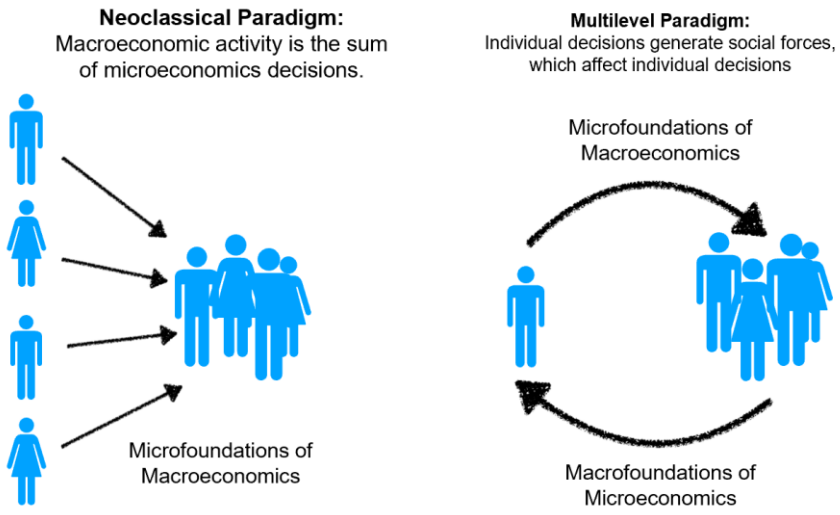


Figure 4: Decision-making in the Neoclassical and Multilevel Paradigms

In the neoclassical paradigm, all decision-making is individuated, i.e., either made by individuals or collectives that act just like individuals. Consequently, macroeconomic activity is merely the sum of microeconomic decisions: macroeconomics has microfoundations. In the multilevel paradigm, by contrast, individual participation in social groups generates social forces that affect individual decision-making. The social groups are networks of solidarity, exercising agency on their individual members and on other social groups. These groups constitute the meso level, lying between micro- and macroeconomics, so that macroeconomic activity may be understood as the outcome of the reflexive interaction between individuals and their higher levels of functional organization. The economy may thus be conceived as the interaction between the microfoundations of macroeconomics and the macrofoundations of microeconomics.

In short, (i) both individuals and collectives can exercise agency, (ii) the exercise of collective agency arises through the participation of individuals in their collectives, and (iii) this exercise of collective agency gives rise to emergent levels of functional organization above the individual level.

These levels of functional organization extend across all four domains of the embedded economy. Thus, individual and collective agency is exercised across the economy, polity, society and the environment, in accordance with people's individual and collective purposes. Collective agency is mobilized to address people's collective challenges – from micro challenges such as family security to macro challenges such as climate change. In general, these challenges need to be tackled through a combination of economic, political and social means, with implications for the human interactions with the natural world, which shape and constrain human activities in the other domains. It is this combination that makes an economy "embedded."

For analytical purposes, it may be convenient to consider the workings of the economy independently of the polity, society and the environment, but this is merely artificial disciplinary lens. In practice, people use their capacities in all domains to achieve their purposes – mobilizing economic resources, influencing power relations, shaping their social interactions and constructing their environmental niches. We exercise socially adaptive agency across multiple domains because human survival and flourishing have always depended on *coordinated problem-solving within complex social and ecological systems*. This agency operates through economic, political, social, and environmental institutions that co-evolve to sustain the conditions for collective life.

Individuals survive by participating in shared systems of meaning, production, and governance. These systems enable collective responses to environmental and social challenges—ranging from securing food and shelter to managing common resources and maintaining social order. In the economy, adaptive agency manifests through innovation, exchange, and collective organization of production. In the polity, it manifests through the creation of rules, rights, and institutions that coordinate behavior and resolve conflicts. In society, it manifests through shared values, norms, and networks of trust that sustain cooperation. In the environment, it manifests through stewardship and resource management that ensure long-term viability. Each domain represents a dimension of human adaptation to interdependent challenges. No domain can sustain itself without the others: political institutions require economic resources; economic systems require social trust; and all depend on environmental stability (Polanyi, 1944; Ostrom, 1990; Daly & Farley, 2011).

Economic behavior is not autonomous—it is institutionally and culturally embedded (Granovetter, 1985; North, 1990). The economy depends on political systems to provide legal frameworks, social systems to generate trust and reciprocity, and ecosystems to supply energy and materials. Attempts to model economic activity as a self-contained sphere—governed purely by market logic—ignore the social and ecological foundations upon which it rests. For

example, political structures define property rights, taxation, and redistribution, shaping incentives and market outcomes; social relations influence labor motivation, consumer preferences, and cooperation within firms and communities; and environmental systems set physical limits to growth and provide the biophysical basis for production and consumption. The economy's performance, stability, and legitimacy depend on the health of the political, social, and ecological systems in which it is situated. The economy is therefore embedded in the polity, society, and the environment.

This interdependence of agency across domains calls for a reconsideration of the meaning of "agents" in economic models.

Agents

The concept of economic agents is foundational in microeconomics, indicating how different parts of the economy interact with each other. The flexible, multiple levels of functional organization in the multilevel paradigm suggest a different concept.

In neoclassical and behavioral economic models, economic agents are typically categorized into three primary roles: households, firms, and government. Each of these agents has distinct functions and objectives within the economy.

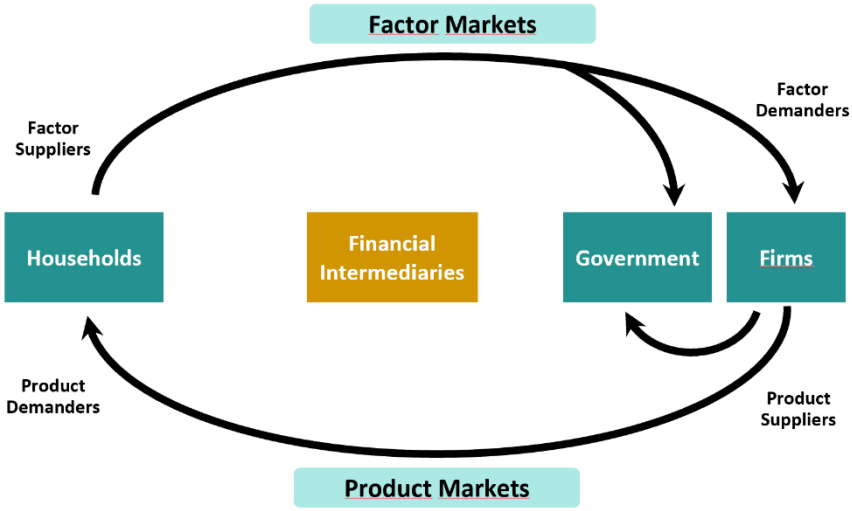
- **Households** are consumers and factor owners, owning their own labor and (their ownership of firms), also owning other factors of production, in particular capital and land. They supply factors to the firms and the government and receive income in return (wages, rent, interest, profits). They use this income to consume goods and services provided by firms and (via their taxes) the government. Each household maximizes its utility. In national accounts, a household is defined as a group of people who share living accommodations and pool some or all of their income and wealth.
- **Firms** are producers of goods and services. They demand factors of production from households, use these resources to produce goods or services, and supply them to the

households. Each firm maximizes its profit. In national accounts, firms are divided into non-financial corporations and financial corporations. Non-financial corporations are entities that produce goods or non-financial services, while financial corporations are entities engaged in financial intermediation or related activities.

- The **government** supplies public goods and services that are not typically provided by the market, redistributes income, regulates economic activities, and stabilizes the economy through fiscal and monetary policies. The government is funded through taxation and other revenues. In national accounts, the government sector includes all government units and all non-market, non-profit institutions that are controlled and mainly financed by government units.

The factor suppliers and demanders transact in factor markets and the product suppliers and demanders transact in product markets. The government is commonly depicted as providing public goods, which are used by households and firms but do not go through markets; the government is also a demander of labor and capital.

The relations between these agents are given by the circular flow of factors and goods, depicted in Fig. 5a.[5]



[5] For simplicity, the figure depicts only flows of factors and products, not the flows of money in the opposite direction.

Figure 5a: The conventional circular flow

To be considered an economic agent, an entity must have the following bundle of features:

- *pursuit of economic goals*: objectives that are internally consistent and temporally stable;
- *decision-making ability*: the capacity to make choices based on preferences, resources and available information;
- *control over resources*: ownership or access to capital, labor, resources, intermediate goods, technologies and financial assets; and
- *transacting ability*: the ability to participate in economic markets by buying, selling or other exchange.

The multilevel paradigm has a different conception of agency. Whereas agency is individuated in conventional economic analysis (i.e., located either in a rational individual with internally consistent, temporally stable preferences or in a group that behaves like an individual), the multilevel paradigm recognizes distributed agency, as noted above. The pursuit of goals cannot be ascribed uniquely to individuals, since individuals pursue not only their individual goals, but also the goals of their social and political groups, specified in terms of collective rules, norms and moral values. The collective goals influence the decision-making ability of the group members. This does not necessarily mean that the agency of group members is reduced by collective goals, since the group members may have voluntarily chosen to participate in the groups to which they belong. On this account, decision-making ability, like the pursuit of goals, is distributed, arising from the reflexive interaction between individuals and their groups – as described, for example, in Ostrom's notion of polycentric governance (Ostrom, 1990).

Furthermore, the pursuit of economic goals does not always lie in the same hands as the control over resources. Consider, for example, a group of college students who share living accommodations and pool some or all of their financial resources. This group is considered a "household" in national accounts, but each student may pursue quite different economic goals (due to differing interests and courses of study) and their pooling of financial resources may be incomplete (applying only to particular expenditures, such as rent and food) and ill-defined (giving rise to disagreements about who pays for what). Each student has substantial independence in the ability to transact but is constrained by the pooling of financial resources.

Along analogous lines, a company may be divided into independent profit centers, each of which pursues its own economic goals, constrained by the rules, practices and processes used to direct and manage the company as a whole. Decision-making ability may be decentralized to some degree, for example, with profit centers deciding on product prices and the parent company deciding on product development. Profit centers may have substantial control over their financial resources but may be bailed out when they hit a liquidity constraint. The ability to engage in transactions may also be distributed between the parent company and the profit centers. In addition, the company may enter into strategic alliances, such as joint ventures and equity or non-equity strategic alliances for the purpose of designing, manufacturing or distributing goods or services. Then the pursuit of economic goals, decision-making ability, control over resources and transacting ability become interconnected across company boundaries. The same blurring of boundaries of course also occurs among governmental bodies.

Consequently, treating "households," "firms" and "government" as decision-making economic agents is problematic. The alternative approach of the multilevel paradigm is summarized in Figure 5b.

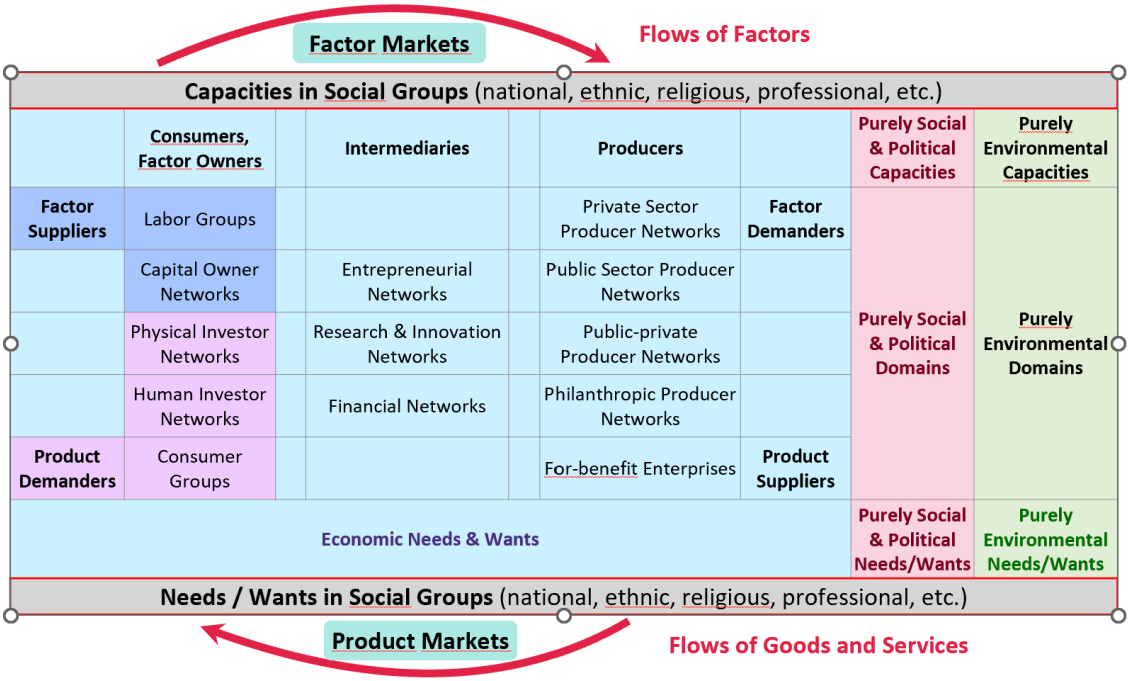


Figure 5b: The Multilevel Circular Flow

Along the same lines as in the conventional circular flow diagram, factor owners supply factors to producers in factor markets and producers supply products. Figure 5b, however, avoids any suggestion that the consumers and factor owners can be grouped together in a category called "households," which have well-defined goals and decision-making abilities. Furthermore, the agents are not assumed to be individuated. Since most of the challenges that people face in the economy are collective challenges, to be addressed through collective action that often requires acting beyond one's enlightened self-interest, most economic goals are, in effect, formulated at higher levels of functional organization than the individual level. Much decision-making ability also resides at these higher levels, meaning that individuals make decisions with regard not only to their own individual payoff, but also to the success of the groups to which they belong. In other words, while agency is distributed across individuals and groups, much of it lies at the group level, in order to mobilize collective action in response to collective challenges. In recognition of the importance of the collective goals and collective decision-making ability, the agents identified as "factor

suppliers" in Figure 5b are listed as labor groups and capital owner networks, and those identified as "product demanders" are given as consumer groups and networks of investors in physical and human capital. The goals of these groups and networks depend on their social identities, namely, the identities shaped by their families, firms, professions, nations, ethnicities, religions, and so on. Which of these social identities is salient and to what degree depends on individual dispositions along with the social, political and environmental contexts in which people make their economic decisions.

Along the same lines, producers are identified as private- and public sector producer networks, public-private partnerships ("long term agreements between the government and a private partner whereby the private partner delivers and funds public services using a capital asset, sharing the associated risks"[6]), for-benefit producer networks (comprising "enterprises that use profit-based approaches and private capital to address social and environmental problems"[7]), and philanthropic producer networks. Note that the goals of these networks depend on their purposes, which play an analogous role to social identities in this depiction of the economy. These goals can extend across the lines of for-profit companies, the public and private sectors, and the market and philanthropic sectors. The decision-making ability of these networks lies in part at the level of the network, insofar as the decisions are made by the network participants with a view to the success of the network as a whole.

In the factor markets, the factor owners are the suppliers and producers are the demanders, whereas in the product markets, the producers are the suppliers and the consumers and factor owners are the demanders, as shown in the figure. The circular flow of factors and products takes place through these two markets. Between the factor owners and consumers (on the one hand) and the producers (on the other) lie the intermediaries, which are also specified in terms of networks, namely, financial, entrepreneurial, research and innovation

[6] OECD Principles for Public Governance of Public-Private Partnerships - OECD
[7] What is The Fourth Sector?

networks. Insofar as these intermediaries also pursue collective goals and participate in collective decision-making ability, they can also be understood as agents.

As shown in Figure 5b, the aim of collective agents is to match their collective capacities with the collective needs and wants of social groups (represented by the top and bottom rows of the figure, respectively). Collective capacities can be mobilized along diverse identity-shaping lines, such as national, ethnic, religious, professional and much more. The aptness of these collectivities depends on how well they are aligned with the collective needs and wants.

The salience of these collectivities – arising from the salience of the underlying identities – varies from one geographic region to another. In European countries, social identities are often shaped by nationality, language and historical experiences (e.g., Anderson, 1991; Smith, 1991). In the United States, with its broad cultural diversity, identities often revolve around ethnicity, race, religion and regional affiliations (e.g., Glazer & Maynihan, 1970; Hochschild & Powell, 2008). Asian countries have different identity generators, including cultural and religious practices, caste and class, as well as language, nationality and ethnicity (e.g., Khilnani, 1997; Anderson, 1991). African identities are often influenced by tribal, ethnic, linguistic and national affiliations (e.g., Mamdani, 1996; Ranger 1983). In Latin America, identities often revolve around a mix of indigenous, European and African influences; ethnicity, race and socio-economic factors contribute to the formation of social groups (e.g., Wade, 1997; Vasconcelos, 1997). This means that, for the purpose of identifying the most salient economic agents responsible for the circular flow of factors and products, it makes little sense to use the one-size-fits-all classification of households, firms, government and financial intermediaries that underlies conventional neoclassical and behavioral economic models. Different regions and countries require different agent classifications.

The composition of collective economic agents also depends on educational attainment, since the latter often has a strong influence on identity formation (e.g., Erikson, 1968; Bourdieu & Passeron, 1977; Arnett, 2000; Oyserman, Bybee & Terry, 2006). Higher education often leads to specialized knowledge and skills, contributing to the formation of professional identities. Highly educated individuals may identify with cultural and intellectual communities that share similar appreciation for arts, literature and intellectual pursuits. Since higher education, by exposing individuals to diverse perspectives, may contribute to the formation of identities that transcend national or regional boundaries. By contrast, in the absence of higher education, individuals often place greater emphasis on local and community ties. In some regions, less educated individuals may draw on ethnic or religious identities as primary sources of social belonging.

Beyond this, the composition of collective economic agents also depends on religious affiliation, since religious identities often play a significant role in shaping beliefs, values and practices, thereby contributing to a sense of community and shared purpose. Religious groups and institutions can pursue economic goals, have decision-making ability, control resources and are able to transact – all criteria for identifying agents. The same can be true of ethnic affiliation, where the sense of belonging may be generated by shared language, traditions, ancestry and cultural traits. It also holds for class affiliation (which can influence lifestyles, opportunities and perceptions of social status), ideological affiliation (including political parties, social movements and philosophical affinities), and gender affiliation (related to societal expectations related to masculinity and femininity).

These affiliations all indicate the important role that agency in the social sphere can play regarding economic agency. Clearly, collective agency is closely linked to solidarity. Inward solidarity of a social group, combined with a sense of common purpose, leads to collective agency in the sense of community. Outward solidarity engenders collective agency in the sense of civil society.

Conventional economic models recognize that economic institutions can behave as agents. Institutions such as banks, firms and regulatory bodies set the rules, norms and frameworks within which economic transactions occur. Political economy models recognize that political institutions, such as political parties as well as executive, legislative and judicial bodies, determine the structure of governance within which economic interactions take place. Social institutions, such as family, education systems and religious organizations, propagate norms and values, which influence consumer behavior, work ethics, skills and attitudes toward innovation and entrepreneurship. (See, for example, Coase, 1937; North 1990; and Acemoglou and Robinson, 2012.)

Institutional economics sheds light on the role and impact of institutional agency on economic behavior and performance (Hodgson, 2004, provides an overview). Institutional economics examines how both formal institutions (like those that generate laws and regulations) and informal institutions (like those that shape norms and values) impact economic outcomes. Key insights from this field include the analysis of path dependency (suggesting that institutions can have long-lasting effects on economic development), transactions costs (which efficient institutions can reduce, leading to more efficient markets) and property rights and contracts (whose enforcement promotes investment and economic exchange). Path dependency, transactions costs, property rights and contracts are all important features of economic agents. In highlighting the nature of agents in economic models, the multilevel paradigm brings institutional economics from the periphery of neoclassical economics into the core of economic analysis.

Whereas the specification of economic agents is fixed in conventional economics, the identity of agents is variable in the multilevel paradigm. The composition of collective agents – as well as the perceptions, beliefs and objectives of these agents – can change in response to incentives at the relevant levels of collectivity. This implies that economic activity is driven significantly by the evolution of agents in response to changes in the collective challenges that

human face, changes in the rewards and sanctions generated at different levels of collectivity in response to these challenges, along with the resources and technologies required for collective action at the various levels.

3. Radical Uncertainty

The multilevel paradigm starts from the presumption that history generally does not repeat itself. The evolution of human affairs produces ever-novel problems demanding ever-novel solutions. Our lives may be understood as an ongoing quest for such solutions. Consequently, as is well-known, it is important to distinguish between situations of *risk* (where it is possible to calculate a probability by some method) and *uncertainty* (in the sense of Knight (1921), where it is impossible to calculate a probability).

Probabilities and Their Relevance to Economics

The concept of probability has several distinct meanings, which we may recall here in order to set the set the stage for an assessment of the prevalence of uncertainty in economic decision making. According to the *axiomatic interpretation* (Kolgomorov, 1933), probability can be defined as a measure on a set of events in a sample space that satisfies three primary axioms: non-negativity (the probability is a non-negative number), additivity (for any finite number of mutually exclusive events, the probability of the union of these events is equal to the sum of their individual probabilities), and normalization (the probability of the entire sample space is unity). In the *frequency interpretation* (von Mises, 1957), probability is defined as the limit of its relative frequency in an infinite series of trials. According to the *propensity interpretation* (Popper, 1959), probabilities are objective properties of certain kinds of physical systems to produce particular outcomes. Propensity probabilities are often associated with laws of nature. Finally, in the *subjective interpretation* (Savage, 1954), probability is a measure of a person's degree of belief or confidence that an event will occur.

This summary of the meanings of probability should suggest that probabilistic events must be vanishingly rare in the multilevel conception of economic activity. The reasons are straightforward. For most if not all economic events, aside from manmade games of chance, we do not know the entire sample space, i.e., it is virtually always possible that surprising things could happen. Without a full understanding of the sample space, probabilities cannot be assigned. In the frequency interpretation, probabilities are the outcomes of endlessly repeated experiments. But economic activities (again, aside from manmade games of chance) are not repeated experiments, because people are continually learning and continually innovating. New insights are inherently non-repeatable. The propensity interpretation requires that we fully understand all the social, psychological, political and environmental forces driving economic activities, which is a ludicrously ambitious assumption. The subjective interpretation presupposes that one's degree of belief of confidence corresponds to phenomena that are infinitely repeatable or the outcome of fully understood propensities, which is usually not the case.

Probabilities are relevant in human-made games of chance (such as dice) because these games have been constructed so that the stochastic process is well-defined and understood, the process remains constant through time and the process is independent of our actions or beliefs about it. For a probabilistic process that is belief-dependent, we must fully understand how our beliefs arise and how they affect the process. None of these conditions are satisfied in real-life situations, whether economic, social, political or environmental.

Consider a simple example: You go to buy a bar of soap in the store across the road. What is the probability that you will be successful? On the way, you might be hit by a car. The probability of that happening depends on many more circumstances than you can attend to (or even comprehend). This probability is not constant through time; for instance, it depends on the weather, whose features regarding this road are unrepeated. It also depends on your belief about being hit by a car, since fear of being hit is likely to make you more careful.

Your beliefs will depend, in part, on your mood and what happens to have crossed your mind at the time. Once you reach the store, what is the probability that your desired brand of soap is available? That depends on factors such as the delivery truck's state of repair and the traffic on the truck's road trajectory – all unknown and time-variable. It also depends on whether the shop assistant would check the store's inventory when the soap is not on the shelves, which in turn depends on my social relationship with the assistant.

While this example is admittedly trivial, it is easy to recognize that the most significant economic and social decisions in our lives – such as getting married, buying a house, having children, choosing a career, preparing for retirement – are "wicked problems."[8] These problems have several features in common: they are unique (not the result of repeated experiments), complex (comprising multiple, interdependent factors), with no clear-cut solution (no point at which the problem is conclusively solved, at best amenable to experiments whose outcomes might be considered better or worse than we expected), diverse perspectives from which the outcomes can be assessed, and context-dependent costs and benefits (affecting our evaluations of these decisions through time). Wicked problems are clearly not amenable to probabilistic analysis.

For most of our economic and social decisions, we do not have a full understanding of the connection between our actions and their outcomes. Nor can we predict the options available to us in the future, even when our current decisions depend on our future predictions. Many of the economic choices that confront us nowadays were unimaginable some time ago. No one could conceive of the internet or smartphones as practical, life-transforming phenomena before they were invented; to calculate the probability of their invention would require that they already be invented.

[8] Madhavan (2024) provides an excellent survey, indicating how these problems can be addressed through an engineering approach.

It is perfectly obvious that we do not, and cannot, consider every unlikely possibility when we make our decisions, but quite often the unlikely possibilities that we have ignored have long-lasting consequences: a buzzing fly that distracted the driver, who then had an accident; a chance encounter that led to marriage; a missed intelligence that lead to war. The reason why our decision making is so vulnerable to unlikely possibilities is that our decisions are context- and path-dependent. In particular, most economic decisions depend on the social contexts in which the decisions are made (e.g., the cost of repairing the car depended on the severity of the accident, which depended on the sleep deprivation of the driver, occasioned by an unexpected argument with the spouse) and social exchanges are emergent phenomena that the participants cannot predict (e.g., the argument with the spouse arose from an unfortunate chance remark). Many events are also irreversible. An accident cannot be undone.

The implications of the nexus between uncertainty, context- and path-dependence and irreversibilities is is highlighted in “Sliding Doors,” a film that switches between two storylines: In the first storyline, Helen boards a train, where she has a conversation with James (a stranger), before returning home to find Gerry (her boyfriend) with his ex-girlfriend. She then leaves Gerry and begins a relationship with James. In the other storyline, Helen is delayed by a child who accidentally crossed her path and thus misses the train, whereupon she gets mugged, must visit the hospital and thus arrives home after Gerry’s girlfriend has left. She remains with Gerry. Thereafter, two different life paths unfold. This dependence of important events on happenstance is an experience that we all recognize from our everyday lives.

The upshot of these considerations is simple: Economic activity, embedded in social activity, does not follow the unchanging scientific laws of Newtonian mechanics. Most of our socio-economic challenges are unique events arising from complex interactions among interdependent factors. They are certainly not indefinitely repeatable events for which probabilities can be derived. Consequently, humans spend most of their lives adapting to

uncertain environments. Such adaptation is particularly effective when humans collaborate, taking advantage of their social intelligence to interpret the possible mechanisms underlying the phenomena that they cannot fully understand.

Uncertainty in Economic Decision-Making

The multilevel paradigm highlights the distinction between probabilistic risk and uncertainty since risk tends to arise from nonliving processes (such as games of chance) whereas uncertainty tends to arise from living processes. The appropriate response to risk is to maximize the expected value of net returns. The appropriate response to uncertainty is to adapt. Neoclassical paradigm treats economies as domains populated by machines, to which probabilities apply. The multilevel paradigm treats economies as domains populated by living things, where probabilities often do not apply. It is no accident that it is possible to predict the trajectory of a thrown ball using probabilities, but it is not possible to predict the trajectory of a pigeon in flight. The reason is that the pigeon is continually adapting to its environment whereas the ball is not.

In sum, uncertainty arises because evolutionary processes are frequently non-stationary (changing in unpredictable ways) and because our actions often have unpredictable consequences, such as in the case of innovations arising by accident (Beckert, 2016; Knight, 1921; Ridley, 2020). Uncertainty can also arise due to our epistemic limitations: our minds have limited capacities for attention, memory and inference (Murphy and Ross, 1994); our imagination is limited, constraining the types of hypotheses that we generate, we cannot list all possible outcomes or we do not know the data-generating process (Kay and King, 2020, and Volz and Gigerenzer, 2012).

Applying Probabilities

In neoclassical economics, households make their consumption decisions by maximizing their utility functions subject to their budget constraints, firms make their

production decisions by maximizing their profit subject to their production functions, and governments decide on their expenditures and taxes by maximizing their social welfare functions subject to their production possibility frontier. In practice, of course, none of these decision makers does any of these things.[9]

Milton Friedman famously argued that this does not matter, since economic agents act 'as if' they were maximizing agents, much as an expert billiard player acts 'as if' he or she had solved the differential equations describing the optimal shot. All that allegedly matters is whether the predictions of the economic analysis are falsified.

But it is now widely recognized that this argument is misguided. The predictions of the analysis can only be falsified if it can be shown that all the assumptions underlying the analysis actually hold. In practice, however, it is always possible to argue that all the assumptions have not been fulfilled, for the simple reason that the full set of assumptions is unmanageably large and the relation between the assumptions and the conclusions are not well understood.

When we assign probabilities to the outcomes of economic actions, we implicitly assume that a particular event is representative of a class of events. When a neoclassical firm hires a neoclassical worker, the worker is assumed to be taken from a known distribution of individual abilities and that ability is all that matters for the worker's productivity in response to the firm's incentives. In practice, however, it is impossible to determine the ability distribution relevant to a newly hired worker, since abilities depend on an endless list of interconnected factors, whose relevance to the worker is unknown. Furthermore, productivity cannot be exclusively located in individual workers, since it is the outcome of the worker's interaction with others, in and out of work. Consequently, it is impossible to establish whether a particular worker is representative of a specified class of workers. This "representativeness

[9] Kay and King (2020) provide a superb overview over what economic participants actually do and the pervasiveness of uncertainty in economic decision making.

problem" occurs invariably in complex systems with emergent phenomena, unique or unprecedented events taking place in unique or unprecedented contexts, and ill-defined boundaries between classes of events.

Conviction Narratives

All this does not mean that we know nothing about the economic future. Instead, it means that the economic future generally cannot be fathomed by assigning probabilities to outcomes of economic decisions. From time immemorial, humans have fathomed their future through conviction narratives (described in Part 3 of this series), which are narratives that we find sufficiently convincing to provide the justification for action (Tuckett & Nikolic, 2017; Johnson, Bilovich and Tuckett, 2022). They are the stories individuals and groups tell themselves to justify beliefs, coordinate expectations, and sustain confidence in the face of radical uncertainty—conditions under which future outcomes cannot be predicted or quantified (Knight, 1921). In particular, conviction narratives induce us to make conditional predictions about the outcomes of our actions and to hold these beliefs firmly enough to permit decision making.

Human brains are adapted to recognizing patterns, making connections between events, communicating the resulting interpretations to others, comparing these with the interpretations of others, assessing how robust their conditional predictions are with respect to alternative interpretations, and assessing the likelihood that their interpretations would survive disconfirming evidence. This is done through narratives. Conviction narratives are narratives whose conditional predictions are sufficiently plausible, robust and resilient to give us the confidence necessary for action.

Under conditions of radical uncertainty people cannot rely solely on data or logic to make decisions. Instead, they construct narratives that link past experience with imagined futures, allowing them to form convictions about what is likely to happen and what actions to take. These conviction narratives combine cognitive, emotional, and social elements:

Cognitively, they provide a causal story that explains how events fit together. Emotionally, they generate confidence and commitment to act despite incomplete information. Socially, they enable coordination by aligning the expectations and motivations of others (Akerlof & Shiller, 2009; Shiller, 2019). Conviction narratives thus help individuals and groups move from uncertainty to action. They do not eliminate uncertainty but render it *psychologically manageable*. In doing so, they allow economic, political, and social systems to function in the absence of perfect knowledge.

In economic contexts, conviction narratives are central to decision-making. Investors, entrepreneurs, and policymakers act on expectations about the future that cannot be derived from statistical inference. As Robert Shiller (2019) shows, economic outcomes are powerfully shaped by the spread of persuasive narratives—stories about innovation, crisis, or opportunity that build shared conviction. David Tuckett (2011) formalizes this insight, arguing that financial markets operate as "narrative systems" in which actors sustain emotionally charged convictions that justify risk-taking or restraint. When collective narratives shift—say, from optimism to fear—confidence collapses and markets move dramatically.

Beyond markets, conviction narratives underpin political movements, technological innovation, and social reform. They allow communities to imagine collective futures—for instance, the narrative of progress that fueled industrialization, or the narrative of sustainability shaping climate policy today (Hajer, 1995). Through such narratives, people define what is possible, desirable, and legitimate.

A conviction narrative is analogous to a medical diagnosis: it generates conviction when it is credible (consonant with our experience)), coherent (internally consistent), accepted (especially by prestigious proponents or members of our social groups), plausible (congruent with our thinking), and satisfying (such as capable of allaying our fears). Each narrative highlights particular causal connections and overlooks others. Conviction narratives elicit emotions (enabling us to imagine the impact of the threats and opportunities) and are

influenced by our values (since conviction often requires that we act in accord with our values).

Of course, our convictions are usually not absolute. We can hold our convictions with varying degrees of confidence. This notion is related to the Keynesian concept of "weight of argument" (Keynes, 2021), which assesses the amount and quality of evidence in favor of a particular interpretation, though the Keynesian concept focuses primarily on bodies of evidence rather than narratives and their psychological assessment. Our notion of confidence is also related to Shackle's concept of "potential surprise" associated with various outcomes, which emphasizes the subjective nature of expectations. Shackle also argued that people imagine various possible scenarios and assess these scenarios subjectively when making decisions. Scenarios are built on narratives.

Conviction Narratives and Sense-making

Conviction narratives arise from the fundamental human drive to make sense of the world—to interpret uncertainty, construct meaning, and guide action in situations where objective knowledge is limited. Humans are not passive observers of reality; they are meaning-making organisms. Cognitive and evolutionary research shows that people continuously interpret sensory and social information to construct coherent narratives about their environment (Bruner, 1990; Damasio, 2010). This interpretive capacity evolved as a survival mechanism: by connecting cause and effect, individuals could anticipate dangers, plan actions, and cooperate with others.

But the drive to make sense extends beyond instrumental reasoning. It is a deep psychological need. As philosopher Charles Taylor (1989) argues, humans live within "frameworks of meaning" that make experience intelligible and purposeful. Neuroscientific studies similarly show that uncertainty and ambiguity generate discomfort, prompting the brain to impose narrative structure even when information is incomplete (Frith, 2007; Gazzaniga, 2011).

Cognitive psychology and neuroscience suggest that the sense-making drive—to find meaning, coherence, and causality—is fundamental to human well-being (Damasio, 2010; Frith, 2007). We are not passive receivers of information but *active interpreters* of the world, motivated by curiosity and the pleasure of discovery. Problem-solving, in this sense, is both instrumental and expressive. It aims at solving concrete challenges (e.g., securing food, stability, or justice) but also satisfies deeper needs for agency and mastery (Deci & Ryan, 2000; Csikszentmihalyi, 1990). The experience of overcoming obstacles, learning new skills, and expanding understanding produces intrinsic satisfaction—often as great as or greater than the material benefits of the solution itself. Human flourishing thus depends not only on achieving outcomes but on participating in the creative process of problem-solving.

Because human cognition and resources are limited, much of our adaptive problem-solving takes place within social networks and institutions. These include families, communities, markets, firms, governments, and scientific organizations. Within these collaborative systems, humans engage in specialization and division of labor in both the *creation* and *use* of knowledge (Hayek, 1945; Hutchins, 1995). In economic systems, specialization allows people to innovate and exchange knowledge embedded in goods and services. In political systems, collective deliberation and governance coordinate knowledge about rules, justice, and collective priorities. In social systems, cultural norms and networks transmit experiential knowledge about cooperation and moral expectations. In the environmental domain, ecological knowledge guides stewardship and adaptation to changing natural conditions.

Each domain thus becomes an arena for collective intelligence—where individuals contribute to, and draw upon, shared stocks of knowledge (Ostrom, 2010). The boundaries between these domains are porous: scientific innovation affects politics and the economy; social values shape environmental behavior; ecological limits constrain political and economic choices.

Because adaptive learning and problem-solving are universal features of human life, the economy, polity, society, and environment can all be understood as interconnected knowledge systems. The economy is not merely an exchange of goods and services but a process of discovering, applying, and diffusing knowledge—about technologies, preferences, and opportunities (Arrow, 1962; Nelson, 2005). The polity is a domain of institutional learning, where societies experiment with laws, governance systems, and collective decision-making (North, 1990; Ostrom, 2010). Society functions as a repository of cultural and moral knowledge, transmitted through language, education, and shared norms (Durkheim, 1912; Wilson, 2019). The environment is both a source of ecological knowledge and a system that humans must learn to understand and respect in order to sustain life (Berkes, 2017).

Together, these domains form an adaptive learning ecosystem, within which humans co-create and co-evolve their material, social, and ecological conditions. The capacity for meaning-making, cooperation, and knowledge generation enables humanity to navigate radical uncertainty—and constitutes the foundation of civilization itself.

Through sense-making, conviction narratives serve an adaptive function in human evolution and social organization. They enable coordinated behavior when knowledge is incomplete and the future is unpredictable. In this sense, they are not merely biases or illusions—they are tools for collective learning and adaptation (Mercier & Sperber, 2017).

Narratives allow humans to share experiences, test interpretations, and align expectations across social networks. Over time, some narratives prove resilient and become institutionalized—as ideologies, scientific paradigms, or cultural myths—while others fade. The evolution of conviction narratives thus mirrors the adaptive learning processes of human societies: through storytelling, reflection, and feedback, communities update their collective understanding of the world.

Models as Narratives

In the multilevel paradigm, economic models are identified as narratives. Like narratives, they focus on particular phenomena and causal relations and overlook others. Like narratives, they are held with varying degrees of confidence. What makes economic models distinctive is that they are usually specified in mathematical terms, often specified in terms of probabilities (unless they are deterministic). It is important to keep in mind, however, that the probabilities are features of the models, but not of the living world that they purport to describe. When so-called "experts" mistake their probabilistic models for reality, the vulnerability of their predictions – such as those in advance of the last financial crisis – may lead lay people to seek to dispense with experts.

In economic models, risk is defined as the dispersion of the probability distribution around a known average value. In finance theory, it is the dispersion around a known average return. This, naturally, is not to be confused with uncertainty. In common parlance, risk is the possibility of something going wrong. This is akin to uncertainty, as it could be interpreted as the possibility that a conviction narrative fails to manifest itself in the events that actually unfold.

An interesting, but overlooked, bridge between risk and uncertainty is to be found in the portfolio frontier model of Harry Markowitz. This model shows that the risk of an investment portfolio (defined in accordance with finance theory) lies not in the risk associated with individual assets, but rather in the relationship between the returns of all the assets in the portfolio. By extension, the variability associated with any economic decision lies not in the dispersion of possible returns from that decision, but in the relationship between that decision and the returns from all the socioeconomic activities related to that decision. Since these socioeconomic activities are often unprecedented events with emergent properties that are not amenable to probabilistic analysis, the economic decision is not amenable either.

Reinterpreting Insurance

This conception of economic activity is at variance with the standard neoclassical portrayal of what insurance companies do. In insurance markets, the insurer receives a fee in return for compensating the insured in the event of a loss and probabilities are commonly used to calculate the expected value of the loss. But if we accept that losses in actual economies cannot be characterized by probabilities, then what are the insurance companies doing?

The answer is simple: "risk-like uncertainty pooling." By combining the uncertain outcomes of multiple individuals into a single pool, the variability of returns for each insured party can often be reduced. Insurance markets are deemed to be functioning well when (1) the insurer is confident that returns from individual insured parties are not related to one another, (2) economic conditions are deemed stable and the data on the insured group is sufficiently good, so that the insurer can infer the average insurance payouts if conditions remain stable, and (3) the insured group is sufficiently large, so that the prospects of risk pooling are attractive to the insured parties. For condition (2), the insurer must have good information about the group as a whole and, for condition (3), the insurer must not have good information about individuals within each group (for otherwise the groups could be subdivided and adverse selection would kill the insurance markets).

When insured parties face different uncertainties on account of their different economic roles – employers versus employees, school leavers versus pensioners, citizens versus government – then risk pooling can yield favorable returns for all parties. The same is true (at least ex ante) when different insured parties follow different conviction narratives.

Relation to the Economic Literature on Uncertainty

Much of behavioral economics is concerned with probablistic phenomena, not uncertainty. Prospect theory, a major branch of behavioral economics, is no exception. The "biases" identified in the heuristics-and-biases literature of behavioral economics are systematic errors in assessing risk, not uncertainty.

However, behavioral economists have also suggested various ways of framing decision-making under uncertainty. For example, Bell (1982) and Sugden (1982) extended the traditional utility framework to include regret aversion, whereby individuals anticipate the psychological pain of their regret if their decision turns out to be inferior to an alternative. In finance theory, regret aversion has been used to explain the disposition effect, the tendency of investors to hold loising investments too long and sell winning investments too soon (Shefrin and Statman, 1985). In health economics, regret aversion has been used to design preventative health strategies (Chapman and Coups, 1999). In related game-theory literature, Gilboa and Schmeidler (1989) present models for decision-making under uncertainty using "maximim expected utility," which reflects a player's preference for strategies that maximize the minimum possible payoff.

As noted, heuristics (such as the representativeness, availability and anchoring heuristics) can simplify complex decision-making under uncertainty (Tversky and Kahneman, 1974). Loasby (1976) examined how individuals use rules of thumb, routines and institutions to make choices under uncertain conditions. There is also a literature on decision making under ambiguity (e.g., Ellsberg, 1961; Arend, 2020). Studies in neuroscience have found distinct neural circuits involved in decision-making under ambiguity (Hsu et al, 2005), with implications for decision-making rules. Camerer (2003) examines how behavior under uncertainty deviates from the rational-actor model. Evolutionary game theory explores how agents learn in uncertain environments, and simulations and adaptive algorithms are used to predict behavior (Fudenberg and Levine, 1998).

In the presence of uncertainty, the means-end rationality that lies at the core of neoclassical and behavioral economics loses relevance, since the connection between means and ends is no longer known, even probabilistically. Gerd Gigerenzer defines ecological rationality as "the study of how cognitive strategies exploit the representation and structure of information in the environment to make reasonable judgments and decisions" (Gigerenzer,

2000, 57). In contrast to the multilevel paradigm, Gigerenzer's focus is on the individual and on the capacities that underlie the heuristics-and-biases literature. In Gigerenzer's analysis, heuristics are the outcome of people's attempts to function predictably in their environment, so that ecological rationality "means functionality, not veridicality" (Chater et al, 2018, p. 800). This is the core idea underlying the "fast and frugal heuristics" of Gigerenzer and Todd (1999).

By contrast, Vernon Smith defines ecological rationality as "an undesigned ecological system that emerges out of cultural and biological evolutionary processes: home grown principles of action, norms, traditions and 'morality' (Smith, 2003). Through the emphasis on the systemic properties of ecological rationality, Smith's view comes closer to the multilevel paradigm than Gigerenzer's. Smith's approach is to be understood as subjective rationality, in the context of Herbert Simon's distinction between objective rationality (from the experimenter's point of view) and subjective rationality, "given the perceptual and evaluational premises of the subject" (Simon, 1956, p. 271). However, Smith's approach differs from the multilevel approach in its focus on "undesigned" selection, in contrast to the multilevel paradigm's interpretation of economic policy as artificial selection.

Narratives as Social Responses to Uncertainty

As noted, the multilevel paradigm focuses on conviction narratives as the central tool for responding to uncertainty. These narratives are communicative tools, enabling people to benefit from their collective intelligence in understanding their incompletely understood environment. These narratives shape our perceptions and enable us to construct meaning out of our sense data (Lane and Maxfield, 2005). The functionality of narratives depends positively on the size and diversity of the group, allowing for opportunities to discuss the narrative from many, diverse points of view.

Conviction narratives are not immutable; instead, they evolve in response to people's insights and to changes in the environment. If people lived in a stable world of stationary

probability distributions, these narratives would converge towards the probabilistic models of neoclassical and behavioral economics. In the real world, however, narrative adaptation to unknowable futures remains the rule.

The multilevel paradigm does not single out any methodological approach (e.g., regret minimization or adaptive heuristics) a priori as the relevant framework for responding to uncertainty. Instead, it suggests that the most effective approaches are ones that happen to enable people, in the context of their social groups, to navigate their uncertain environment. As the environment changes – partially in response to their behavior – the effective approaches are likely to adapt.

A particularly important implication of the multilevel paradigm for decision-making under uncertainty is this: In many circumstances, the most effective way of addressing uncertainty is to shift to higher levels of functional organization. Uncertainties in different domains – infectious disease, water shortage, unforeseen illness, sudden disability, job loss – need to be addressed at different levels of functional organization. When collaboration is established at the appropriate level for the domain in question, uncertainties are mastered through mutual support and collective intelligence.

"Thick" and "thin" communities face uncertainties in distinctive ways. Thick communities are characterized by strong interpersonal bonds and trust; stable, long-term relationships; and shared values, norms and cultural practices. These communities can generate strong and robust social support networks, offering emotional, financial and practical support (e.g., Putnam, 2000). These networks can enhance resilient, adaptive responses to unexpected events in a wide variety of domains. They are thereby well-equipped for collective action, pooling resources to address common, unexpected challenges, such as disaster response, health crises and economic downturns (Ostrom, 1990). Thick communities provide shared identities, which can foster a sense of common purpose, helping members navigate uncertainties with a common mindset (Etzioni, 1993). Finally, the traditional

knowledge and cultural practices in thick communities can provide valuable strategies for coping with uncertainties (Scott, 2009).

Thin communities can address uncertainties in other ways, since they are characterized by high flexibility, access to diverse perspectives, specialized expertise and possibly rapid information exchange. Due to their loose and flexible structure, these communities can adapt quickly to changing circumstances (Wellman and Gulia, 1999) and the diversity of their participants can lead to a wide range of innovative responses to uncertainties, such as is often witnessed in professional networks and online communities (Granovetter, 1973). Thin communities can also provide rapid access to knowledge, which is crucial in navigating uncertain environments (Rheingold, 2000). These communities can also bring together specialized expertise, which can be critical in addressing specific uncertainties in areas such as medicine, finance and technology (Lave and Wenger, 1991).

In short, both thick and thin communities have distinctive strengths in addressing radical uncertainties. These strengths are not readily replicable through economic markets. In insurance markets, for example, the conditions under which the insurer compensates for a loss are generally well-defined. This limits their usefulness in the presence of uncertainty, for which losses often arise from unpredictable sources. To cover this wider domain of losses, higher levels of functional organization are called for, whether thick or thin. Understanding the differences between thick and thin communities helps in leveraging the appropriate type of community response depending on the nature of the uncertainty faced.

The multilevel approach to uncertainty has profound implications for economic analysis, as the following section indicates.

4. Theory Pluralism

Acknowledging uncertainty also means recognizing that economic models are always simplified abstractions of an unknowable real world. Such abstractions are useful only so long

as they enable us to navigate our environment successfully, avoiding dangers and approaching opportunities, but since the environment is uncertain, we cannot tell for sure when our models cease to be useful. Models – from closed-form analytical equation systems to complex numerical agent-based models – as well as the theories that underlie them, always pertain only to the "small worlds" for which they were conceived. This concept of a "small world" was introduced by Leonard Savage (1954, p. 15), who noted that it would be "preposterous" and utterly "ridiculous" to apply his theory of Bayesian decision making to anything outside a "small world."

It is impossible to escape from the small-world models that underlie our economic decisions. The small-world models are not the result of mental laziness, a fast-thinking short-cut to proper slow-thinking deliberations. In the presence of uncertainty, small-world models are all that we have access to – regardless of whether they are simple mental models that guide our day-to-day decision making or the complex economic models couched in mathematical and statistical language.

These considerations are not meant to undercut the overarching importance of economic models. Without these models, we are unable to understand how things work, what to expect in the world around us, and how to influence our environment through our actions. Economic models focus our attention on particular entities, phenomena and causal connections, highlighting some things and hiding others. In the presence of uncertainty, we can never be sure that our models have highlighted and hidden the right things, but without such selective perception and interpretation, we would be utterly lost in the world.

"Small" versus "large" worlds

Since economic behaviors are the outcome of decisions formulated in human brains, which are continually restructuring themselves in response to lived experiences and continually responding to an ever-changing physical and social environment, we cannot assume that there are timeless "laws of nature" governing human interactions, analogous to

laws of physics and chemistry. Under these uncertain conditions, we are not justified in applying a theory that works well in one sort of environment (e.g. stable times when such uncertainties are relatively small) to other environments (e.g. unstable times, such as in the aftermath of massive technological changes). Forecasts based on standard statistical techniques are valid only in the presence of pure probabilistic risk. In the "large world," confidence that we face only risk is misplaced.

Recognizing the presence of uncertainty in decision making helps us keep in mind that it is inevitable that we rely on mental models (schemata) to process information and interpret our physical and social environment. These mental models are conceived to enable easy cognitive access for decision making, respecting the constraints of our working memory and perceptional faculties. They are a restricted class of models pertaining to the "small worlds" whereby we make sense of the world around us. There is a reflexive relation between our mental models and our social environment: The mental models not only shape how we interpret our social environment, they also affect our behavior patterns and thereby shape our social environment.

Since the mental models are also tools whereby we coordinate our behavior, the social environment will inevitably influence the sorts of mental models we build. Consequently, it is inconceivable that our perceptions, beliefs and objectives could ever be free of social influences – just as it is inconceivable that the social forces underlying our norms, values, identities and narratives could ever be free of our perceptions, beliefs and objectives. Our economic decisions – along with our underlying understanding of the world – are inevitably embedded within our societies, both in terms of persistent identities and cultures and of our ever-varying social relationships.

To address the uncertainties of the "large world" in which we live, it is wise to entertain *theory-pluralism*, which is meant to engender *cogni-diversity*, namely, the recognition that multiple, mutually incompatible mental schemata may be relevant guides for

our decisions in an unpredictably changing world. Such cogni-diversity plays an analogous role to that of biodiversity in ecological ecosystems. The greater the diversity of mutually incompatible theories, all supported by evidence from a variety of data sets, the more open-minded we are likely to become and the more likely we are to extend our creative imagination beyond its current confines. Thereby we become more likely to adapt our thought processes to new situations.

Cogni-diversity addresses a danger of conviction. While conviction narratives enable purposeful action, they can also become sources of rigidity or collective error. When narratives are insulated from feedback or alternative perspectives, they may lead to self-reinforcing delusions, such as financial bubbles, ideological polarization, or denial of environmental risks (Akerlof & Shiller, 2009; Tuckett, 2011). Hence, the challenge for policy and governance is not to eliminate conviction narratives—an impossible task—but to foster pluralism in how they evolve. Societies that encourage open deliberation, transparency, and institutional learning can adapt their narratives to changing realities. Those that suppress dissent or critical inquiry risk becoming trapped by outdated beliefs.

In the analysis of most economic problems – particularly macroeconomic ones – theory-pluralism will embrace both small-scale analytical models (with closed-form solutions) and large-scale, numerical, complex models. On the one hand, the models applying complexity theory and evolutionary science to economics are able to trace the adaptive behavior of heterogeneous agents in the economy in ways that are beyond the reach of analytical models.[10] On the other hand, the analytical models provide a transparency and flexibility that make it easier to investigate the effects of modifications of assumptions and alternative conceptualizations of large-world situations. Thereby they may help us identify

[10] For example, the nonlinear dynamic behavior patterns of these agents do not aggregate straightforwardly into nonlinear dynamics of analytical models. Furthermore, complex systems can trace dispersed interactions among agents, mediated by legal institutions and social norms, with cross-cutting hierarchical organizations and ongoing adaptation. See, for example, Arthur, Durlauf and Lane (1997), Arthur, Beinhocker and Stanger (2020) and Beinhocker (2006).

important causal chains and parameters in the diagnosis of economic problems.[11] It is important to keep in mind that both the analytical and the complex models are both small-world attempts to understand the large world. Both have their uses and misuses. For both, theory pluralism is vitally important for navigating our world.

The establishment and maintenance of theory pluralism involves both a mindset that is open in alternative depictions of reality and a supportive governance system. Ostom's polycentric governance is useful in this regard (Ostrom, 1990).

Beyond Efficiency toward Adaptability

In the presence of uncertainty, the concept of efficiency has limited applicability. After all, in the presence of uncertainty about means to an end, it is impossible to assess how the end can be reached without waste. Waste can be eliminated only when the objective and the best means of achieving this objective have been identified. When there is uncertainty about ends – as our objectives adapt to changing circumstances – the compass for measuring efficiency is missing. When there is uncertainty about means, the criterion for efficiency is missing. Since change is unpredictable, it is not feasible to be efficient in response to change.

The concept of equilibrium (a state in which there is no tendency for changed behavior) is also of limited usefulness in the presence of uncertainty. Clearly, it is irrelevant as a description of a world that we do not fully understand, about which we are in a continuous process of learning and in reaction to which we are continually innovating and interacting with one another in new ways. At best, the concept of equilibrium is useful only regarding a hypothetical world for which we can ask whether human behavior would settle down to some stationary pattern if this environment were to remain unchanged.

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[11] The early efforts to model the spread of HIV are a good example. The complex model produced by the World Health Organization in the 1980s did not predict the severity of the epidemic as well as the simpler analytical model of May and Anderson (1987), since the latter was able to identify the number of sexual partners as a crucial factor determining the spread of the disease, whereas the WHO model was too complex, in terms of country-specific demographic data, to permit ready identification of this factor. The superiority of complex models over analytical models cannot be assumed without empirical investigation. (See, for example, Green and Armstrong (2015) for cautionary results.)

Instead, the concept of adaptability becomes an intrinsically important property of economic decisions as well as economic policies. Applied to individuals, adaptability is the capacity to constructively regulate psycho-behavioral functions in responses to new situations (Martin, 2012). It involves both cognitive regulation (e.g. Benight and Bandura, 2004), emotional regulation (e.g. Gross (1998), and behavior regulation (e.g. Heckhausen et al., 2010). Applied to groups, it is the ability to develop the collaboration skills to meet unexpected challenges (Kozlovsky and Bell, 2008), to reconfigure the network to meet environmental contingencies (Koslovsky et al., 1997), and to shift attention in response to unpredicted events (Pulakos et al., 2000). In both individual and group contexts, adaptability pertains to the capacity to respond constructively to unexpected changes.

The most important aspect of adaptability, highlighted in the multilevel paradigm, concerns adaptation across levels of selection. When an individual faces a challenge that is appropriately addressed at the level of the family – such as the need for support due to a recently diagnosed illness – then it is important for the relevant family members to focus their efforts at the family level of selection, acting as a team to provide the requisite level of care. To achieve this collective purpose, disruptive selfish behavior will need to be suppressed. It will also be useful for the family team to learn best practices from the experiences of other family teams in their circle of acquaintance, keeping in mind the specificity of the family's socioeconomic context. On the other hand, if the family faces a higher-level challenge, such as identifying the appropriate diagnosis, then it will be important for the family to become part of a functional unit that includes health professionals. For collaboration at this higher level to be successful, disruptive selfish behavior at the level of the family or the health professionals will need to be suppressed – through internal mechanisms such as norms and values and external mechanisms such as contracts and regulations – and best practices may need to be copied from other patient-health professional teams. Diversity of diagnostic experiences will be of value for a broad-minded appraisal of the available options.

In short, adaptability across levels of selection is an important aspect of problem-solving. Under uncertainty, it may not be possible to ascertain the appropriate level of selection when the problem arises. Then experimentation is called for. In order for each experiment to be productive, it will again be necessary to identify the target of selection, choose the degree of variation around this target, suppress destructive competition at low levels of selection and replicate best practices.

Adaptability is quite distinct from efficiency,[12] since efficiency is about reaching a well-defined end through well-defined means without waste, whereas adaptability is about learning something new – ends and means – in order to rise to navigate one's novel environment.

Adaptability is also distinct from the concept of resilience, i.e., the ability to recover from adversity. Whereas resilience involves the ability to return to a previous level of functioning and performance (Windle, 2011), adaptability involves novel responses to novel situations. Adaptability also differs from robustness, "the ability of a system to resist change without adapting its initial stable configuration" (Wieland and Wallenburg, 2012)).

Adaptability is related to creativity, [13] in the sense of the ability to generate outcomes that are novel and constructive, with reference to an individual's or group's past experiences.[14] Nevertheless, adaptability may under certain circumstances preclude creativity, such as when a constructive response to a new situation requires conformity and compliance with the "wisdom of the crowd" with regard to one's social groups (Cohen, 2012). Under appropriate circumstances, adaptability can also be promoted through versatility (i.e.,

[12] See for example Conrad (1983) for the distinction between efficiency and adaptability in terms of the information entropy of the biota of an ecosystem.
[13] See Orkibi (2021) on creative adaptability.
[14] This internal frame of reference follows Runco's theory of personal creativity, where creativity " relies on the individual's own personal logic, with personal criteria for the usefulness and originality of a solution." (Runco, 1996, p. 5).

competent in many domains and able to switch easily among these competences), and antifragility, i.e. the ability to thrive in response to stressors and volatility (Taleb, 2012).

5. Multilevel sources of wellbeing

In the multilevel paradigm, wellbeing is (i) multifaceted (composed of a number of components that cannot be summarized through a single index), (ii) ubiquitously context-dependent and (iii) evolving in response to context-dependent changes in the levels of functional organization. These features stand in sharp contrast to neoclassical economics, in which wellbeing is depicted in terms of internally consistent, temporally stable utility functions.

Multifaceted, context-dependent wellbeing

In the multilevel paradigm, wellbeing is intrinsically multifaceted, comprising both individual and collective sources. Solidarity and agency drive to fundamental human needs (belonging and empowerment, respectively), whose satisfaction through our fundamental capacities (prosociality and niche construction, respectively) generates wellbeing. Thereby economies are embedded in societies, along lines discussed above. The wellbeing from solidarity involves participation in the fortunes of our social groups. The wellbeing from agency involves the exercise of our powers, both individually and collectively, to shape our prospects within our environment. Solidarity and agency are important sources of wellbeing since they are responsible for the two achievements that have made humans so successful in the evolutionary process: cooperation and innovation. Solidarity is responsible for cooperation beyond enlightened self-interest. Agency (together with elaborate solidarity-driven social feedback effects) is responsible for niche construction (Odling-Smee et al., 2003), along with its by-product in the form of innovation.

We cooperate in greater numbers than other mammals, enabling us to transmit knowledge from our innovations across time and space. Our cognitive abilities, combined

with our ability to transmit knowledge, have made us particularly adaptable to changes in our environment. Furthermore, we are able to adapt our physical and social environment to our needs, constructing niches through new technologies, institutions, norms, values and identities.

On account of the important role that cooperation has played in our evolutionary success, it is not surprising that we have not just individual needs, but also social ones. Behavioral economics has made an important contribution by highlighting the importance of "social preferences." These preferences are understood to be located in individuals. The multilevel paradigm, by contrast, examines how a sense of solidarity can induce individuals to participate in the aims of their groups, so that agency may rise above the individual level to higher levels of functional organization.

We have a deep-seated desire to belong to social groups (e.g., Walton et al., 2012) and we derive our social identities from our group memberships. Solitary confinement is painful and psychologically destabilizing. We naturally cooperate with other members of our social groups, generally deeming them to be trustworthy and well-meaning. We also have a deep-seated drive for the exercise of agency and empowerment. Since the Enlightenment, this has grown into a widespread desire to exercise creativity and innovation[15] as a process of self-realization (e.g., Phelps, 2013). These constituents of wellbeing – solidarity and agency – are not derivative from our consumption of goods and services, nor are their closely related to such consumption.

These drivers of wellbeing have two important characteristics:

(1) They are *context-dependent*. People's preferences evolve in response to their social and physical contexts. For example, the evolution of people's preferences within their evolving social groups has been studied in terms of the relative pull of cooperation versus

[15] We may distinguish creativity from innovation by considering the former to be the act of conceiving something new and the latter to be the act of putting something new into practice.

status-related competition, dependent on the social context (Bosworth & Snower, 2016; Bosworth, Singer & Snower, 2016). The salience of our relative need for personal agency and social solidarity depends on whether the prevailing social norms and values in our community favor individual or collective achievement (e.g., Nisbett, 2003, Oyserman, Coon and Kemmelmeier).

(2) Individual and collective drivers of wellbeing are "*on a par*" (Chang, 2017) in the sense that (a) each component of wellbeing is better than others in some respects, (b) none seems to be at least as good as the others overall, in all relevant respects, and (c) there is no common unit by which they can be measured with regard to overall wellbeing, though they may be comparable ordinally for decision purposes. When sources of wellbeing are on a par, they are qualitatively different in terms of overall wellbeing, but nevertheless in the same neighborhood of such overall wellbeing. This means that if, in a particular social context, when choices between two jobs in different disciplines (e.g. becoming a lawyer or a doctor) are on a par, then offering a slightly higher wage in one job will not make that job preferable. Such choices are "hard choices," because "they are comparable, but one is not better than the other, and yet nor are they equally good" (Chang, 2017, p.1).

On account of these two characteristics – context dependence and parity – it is not useful or even possible – for the purposes of decision-making – to combine all drivers of wellbeing in a single, time-invariant unit of measurement. This does not imply that people are unable to make tradeoffs between these components – on the contrary, they routinely do so – but the tradeoffs are not identifiable independently of the psychological,[16] social and physical context.[17]

[16] Chang (2017, p.16) suggests that when choices are on a par, personal commitment (e.g., to a job or marriage partner) becomes important in the choice making, since one can create will-based normative reasons for putting one option over another.

[17] Adler and Fleurbaey (2016, Part 3) provides an insightful overview of different approaches to the evaluation of wellbeing and the tradeoffs among the components of wellbeing.

Instead of a single metric for wellbeing, a dashboard of wellbeing indicators is called for. People require material sustenance, empowerment and social belonging within a stable environment, with the appropriate mix depending on the context.[18] The social welfare functions that underlie much policy analysis in economics do not take account of the ubiquitous multidimensionality of wellbeing. Wellbeing dashboards (such as the OECD Better Life Index) do address such multidimensionality, but their context-dependence is generally not confronted.

Our social needs manifest themselves proximately in a variety of psychological motives, ranging from cooperative motives such as care (seeking to promote the wellbeing of others and to alleviate the suffering of others) and affiliation (seeking to belong to social groups) to competitive and conflictual motives such as status seeking (looking for positional advantage), power (seeking influence over others), threat avoidance (felt through fear) and threat approach (felt through anger).

Our need for agency (responsible for our evolutionary success through innovation and niche construction) is manifest proximately in an achievement motive (pursuing excellence with regard to specified goals), which is usually operative within a social setting. To gain satisfaction from achievement, the underlying goals usually need to be recognized as significant by other people within one's social reference group.

The multilevel paradigm recognizes that all behavior is motivated. "Motivated decision making" is a central insight of caring economics developed by Tania Singer and Dennis Snower (Singer & Snower, 2015) and applied to economic decision making in Bosworth, Singer and Snower (2016). Many of our motives are social, enabling us to cooperate and compete with one another. Both cooperation and competition can take place at levels of functional organization higher than the individual.

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[18] These elements of wellbeing are measured explicitly in the SAGE dashboard of Lima de Miranda and Snower (2020), where S represents "Solidarity," A represents "Agency," G stands for "material Gain," and E signifies "Environmental sustainability."

Different social and physical contexts prime different motives, which are associated with different objectives, perceptions and beliefs.[19] The relevant contexts can change abruptly, giving rise to a correspondingly abrupt change of motives. This context-dependence of motives permits people to respond quickly and flexibly to their environments and thus promotes their adaptability.

Both the individualistic and collective needs of an individual must be satisfied to live a fulfilling life. Within any particular social group, individuals differ in terms of the relative importance of their individualistic and collective needs for their wellbeing. Cultures differ dramatically in terms of the weight they give to the individualistic and social determinants of wellbeing.[20]

On this account, the single-minded accumulation of material wealth may be a mixed blessing for everyone except the poor. For once people are materially secure, the quest for material things may come at the expense of other sources of wellbeing. The more we focus on the satisfaction of our material resource desires, the less opportunity we may have to fulfill our needs for connecting and giving. The more concerned we are to protect ourselves from external threats, the less latitude we have to open ourselves to others in trust and mutual reliance. We are psychologically incapable of being competitive and caring at the same time. Market transactions may crowd out non-market norms, such as duty, responsibility and faithfulness. It is important to look beyond capital and wealth in assessing the success of economies (for example, Snower, 2018).

These considerations affect the conduct of many aspects of our lives. If we give our children cash as reward for good school performance, we may teach them more about

[19] For empirical evidence, see for example Bartke, Bosworth, Chierchia and Snower (2019) and Chierchia, Parianen-Lesemann, Vogel, Singer and Snower (2017).
[20] Henrich (2020) distinguishes between "regulated-relational worlds" (where the social determinants of wellbeing are predominant) and "individualistic worlds" (where the individualistic determinants predominate). Koreans and Japanese belong to the former; Americans, Australians and British belong to the latter. For empirical evidence, see Hofstede (2003).

accumulating cash than accumulating knowledge. If a country sells immigration quotas to foreigners, it may instill more avarice than virtues of citizenship in them. When military service is delegated to private contractors, it spreads the drive for profit maximization rather than patriotism.

Economic progress may become decoupled from encompassing social progress, for the simple reason that economic growth (and the associated rise in consumption opportunities) need not be closely related to the growth of solidarity or agency.[21] It has been argued that the forces of globalization, digital technological advance and financialization over the past four decades have weakened the link between economic and social prosperity. Shifting global supply chains, automation and the pressure to generate short-term financial returns have weakened communities and disempowered workers with routine skills (see Kelly & Sheppard, 2017; Kelly & Snower, 2021). This decoupling of economic from social progress can be identified as a source of populist discontent and social discord (Bosworth & Snower, 2021). Recoupling economic and social progress calls for new approaches to government policy, business strategy and leadership.

Regarding government policy, for example, active and passive labor market policies generally have quite different effects on agency, even after differences in material living standards, economic security, and the work-leisure balance have been taken into account. In particular, giving long-term unemployed workers incentives to become skilled and employed through hiring subsidies has a different influence on personal agency and social embeddedness than do wage subsidies (for example, Snower, 1993, 1994). Regarding business strategy, aligning economic progress with social progress calls for a redirection of the profit motive, ensuring the profits cannot be earned at the expense of society and the environment (Mayer, 2024). When the latter pursuit is combined with socially inclusive legal

[21] Lima de Miranda and Snower (2020) provide empirical evidence for a variety of countries.

obligations, targets and incentives from the government – an example of purposeful cultural evolution – business activity can deliver more social progress (Kelly & Snower, 2021). Cooperation and competition in the workplace have quite different effects on social solidarity (for example, Lindbeck & Snower, 1988). The alignment of economic prosperity with social prosperity also calls for participatory, empowering, inclusive approaches to leadership, in line with Ostrom's Core Design Principles (for example, Atkins, Wilson & Hayes, 2019; Sheppard, 2020).

Multilevel evolution as a driver of progress

In the multilevel paradigm, economic progress (the advancement of wellbeing) may be understood in terms of variation, selection and transmission in an uncertain environment. Experimentation in the economic realm, driven by the exercise of agency and creativity, give rise to variation. Selection at various levels (from individual to collective) and in various domains (economic, social and political) promote those new products, processes, ideas and institutions that are particularly effective at addressing individual and collective challenges that we face. Transmission involves imitation of the selected products, processes, ideas and institutions. Promoting progress is about encouraging sufficient variation, ensuring that selection is in the public interest (rather than merely in the interest of the most powerful), and encouraging the transmission of wellbeing-enhancing inventions and innovations.

Each of these aspects calls for cooperation at the appropriate levels of functional organization. First, creativity and innovation are promoted through cultures of "dynamism" that value originality and discovery (see Phelps, 2013). Second, the selection of beneficial ideas, institutions, products and processes requires forward-looking cultures that welcome novel pathways, submit them to rigorous empirical investigation, protect them from special interests of incumbents and bureaucratic red tape, and promote the adoption of excellence. And finally, the transmission of ideas and innovations also benefits straightforwardly from the solidarity and belonging that characterizes higher levels of functional organization.

In this context, it is important to keep in mind that complex systems of agents pursuing their respective adaptive strategies (CAS2) do not robustly self-organize into complex systems that are adaptive as systems (CAS1). The evolution of CAS1 systems requires a process of selection at the level of the whole system, which must be strong enough to prevail against disruptive selection operating at lower levels. CAS1 systems generally do not evolve as products of central planning, but rather through the exercise of agency at lower levels in pursuit of common goals.

6. The purpose of economics

The embedded economy calls for a redefinition of economics, associated with a new specification of its purpose. We propose that economics be defined as *the discipline that explores how resources, goods and services can be mobilized in the pursuit of wellbeing in thriving societies, now and in the future.* We do not claim that this definition is new, but rather that it leads to a different integrative framework of thought than the conventional definitions of economics, which is based on Robbins famous definition of economics as "the science that studies human behavior as a relationship between ends and scarce means which have alternative uses" (Robbins, 1932, p.15). The pursuit of wellbeing in our definition is to be conceived broadly, taking into account all human needs and purposes – insofar as they are relevant for the mobilization of commodities (resources, goods and services).

Though some human needs and purposes are individualistic (relevant only to the individual in isolation from other individuals), most are collective (relevant to the individual with reference to the individual's place within social groups). As noted, the motives of care, belonging, status-seeking, exercise of power, and much of achievement are associated with objectives that are inherently social. This means that the individual's decisions cannot be understood independently of the individual's position within social networks. Not only the individual's objectives, but also the group's objectives – defined in terms of its purposes,

values and norms – are relevant for behavior. Human sociality also means that wellbeing is not just an individualistic phenomenon, but a collective one as well. Thriving societies, in which people enjoy fulfilling interpersonal relations, are an important source of wellbeing.

Thus, economics is concerned not just with economic incentives (such as prices, wages and profits), but also with social and political incentives, because all these incentives are relevant to the mobilization of commodities. Thereby our definition creates new boundaries of the economics discipline vis-à-vis the other social sciences.[22]

Economics in our definition focuses on wellbeing not just for the present generation, but also for future generations as well. Accordingly, economics is meant to help us examine how commodities can be mobilized to achieve sustainability – living within sustainable economic, social, political and ecological systems (an aim of the Sustainable Development Goals). Economics must be concerned, for example, with the question of whether the allocation and distribution of resources resulting from the forces of globalization, automation and financialization lead to economic instabilities (such as financial crises), social fragmentation (such as the weakening cohesiveness of communities) and political fragmentation (such as declining trust in political institutions and declining willingness to seek compromise in the political process). Economics must also examine whether the allocation and distribution of resources is compatible with planetary boundaries.

On all these accounts, economics must be connected with other social and natural sciences, because the mobilization of commodities in the pursuit of wellbeing involves much more than economic markets. Our redefinition of economics implies that the purpose of the economy is to serve the wellbeing of people in society, where individuals derive many of their capacities and objectives through the interactions with one another and with the natural world.

[22] The boundaries among the social sciences often overlap, so that a particular set of behaviors may be analyzed in different ways by different disciplines.

Appendix: A Formal Model of Embeddedness

To provide an example of how the notion of an embedded economy may be articulated in a formal economic model, we focus on a simple type of embedding, resting on two well-known economic theories. Economic interactions are depicted through a Walrasian general equilibrium model (in which prices equate demand and supply in all markets) and social interactions are portrayed in terms of a Nash model (in which each agent is incentivized to pursue her non-market strategies, given the non-market strategies of all other agents). The agents pursuing the economic interactions are assumed to be the same as those pursuing the social interactions. Agents are individuated, i.e., they are either individuals or given collectives acting as individuals. (In other words, the levels of functional organization are inflexible.) [23]

In particular, consider the standard Walrasian general equilibrium model in which there are a finite number of agents i (where $i = 1,\ldots,n$) and $\boldsymbol{x}(i)$ is a vector of economic commodities demanded (a positive number) or supplied by agent i (a negative number). Let $\mathbf{P}$ be a vector of prices covering the vector of commodities. Let $\boldsymbol{x}$ be the vector of commodities summed over all agents i, i.e., the excess demand functions (i.e., the sum of all agents' demands for each commodity minus the sum of all agents' supplies of each commodity), in which. Then the Walrasian general equilibrium can be expressed as $\boldsymbol{x}(\boldsymbol{P}) = 0$.

To capture the economy's embeddedness, let $\boldsymbol{y}(i)$ be a vector of outcomes in the social, political and environmental spheres that are relevant for agent i. These are non-market outcomes (such as self-esteem, security, clean air) that affect each agent's wellbeing (as measured in psychological, sociological and anthropological studies). Let $\boldsymbol{s}$ (where $s = (s(1),\ldots,s(n))$ be a profile of social and political strategies in the population of agents. These strategies may include actions such as engagement in collective activities (such as cheering),

[23] Our account here rests heavily on the theoretical framework used in Fleurbaey, Kanbur and Snower (2024).

praise or blame, or changing one's position in a hierarchy of power. In addition, let ***r*** (where *r* = (*r*(1),…,*r*(*n*)) be a profile of market strategies in the population of agents, such as standing in a ticket queue at a football stadium, obeying gender norms in hiring processes, or exerting social pressure on a transaction partner. The vectors ***s*** and **r** describe the strategies the people follow in response to the social norms, habits and moral values that are analyzed in behavioral economics (e.g. Young, 2015), identity economics (Akerlof and Kranton, 2010), cultural economics (e.g. Hoff and Stigliz, 2016)) and narrative economics (e.g. Shiller, 2019)), as well as the behavior patterns shaped by the social and political structures analyzed in institutional economics (e.g. Hodgson 2004).

Then the system of excess demand functions may be expressed as

$$\boldsymbol{x}(\boldsymbol{P}, \boldsymbol{y}, \boldsymbol{r}) = 0 \qquad (1)$$

Next, let

$$\boldsymbol{y} = \boldsymbol{y}(\boldsymbol{x}, \boldsymbol{s}) \qquad (2)$$

be the vector of stable non-market outcomes for all agents, such that if all agents except agent *i* act in accordance with ***y***, then agent *i* also has an incentive to act in accordance with ***y*** (stability in the sense of Nash equilibrium). Finally, let the Nash-stable vector of market strategies be

$$\boldsymbol{r} = \boldsymbol{r}(\boldsymbol{P}, \boldsymbol{s}) \qquad (3)$$

and the Nash-stable vector of non-market strategies be

2

$$\boldsymbol{s} = \boldsymbol{s}(\boldsymbol{P}, \boldsymbol{r}) \qquad (4)$$

Then the "embedded-economy equilibrium" is the solution to the equation system (1)-(4). In this sense, the embedded economy may be understood as an extension of the Walrasian general equilibrium ($\boldsymbol{x}(\boldsymbol{P}) = 0$).

Despite its simplicity, this embedded-economy model can be shown to have far-reaching implications (Fleurbaey, Kanbur and Snower, 2024): (i) Conventional economic

models make unrealistic assumptions about society, since they implicitly assume away social interactions that can influence economic interactions. (ii) The two fundamental theorems of welfare economics no longer hold, since a perfectly competitive general equilibrium no longer leads to a Pareto efficient allocation of resources. Furthermore, it is no longer true that any Pareto optimum can be supported as a competitive equilibrium for some initial set of endowments, since the Pareto optimum depends on social relations, not just on endowments. (iii) Pareto efficiency in the socio-economic sense requires efficient economic markets, efficient social interactions and efficient coordination between the economic and social spheres. (iv) Economic inequality interacts with social inequality, so that reduced economic inequality may enhance general socio-economic efficiency.

These are dramatic implications, undermining the foundations on which the neoclassical integration of economic activities is built.

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