Commentary

The Challenge of Economics

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This essay argues that contemporary economics is constrained by a theoretical framework that systematically obscures dynamic, interdependent, and long-run processes. Central to this limitation is the neglect of planning horizons—the bounded, evolving scope of agents' foresight and knowledge—which are implicitly treated as fixed in neoclassical theory. By assuming ubiquitous substitution, decreasing returns, and equilibrium determinacy, mainstream economics misrepresents the fundamentally complementary, path-dependent, and organizational nature of economic activity. Revisiting long-standing debates over increasing returns, uncertainty, interdependence, and knowledge, the paper critiques key orthodox assumptions, including the methodological defense of unrealistic premises and the evasion of time, learning, and institutional structure. It proposes a horizonal framework in which planning horizons shape prices, incentives, organizational forms, and the balance between competition and cooperation. In this view, horizon effects are socially contagious, altering economic relations from conflict toward complementarity as foresight expands. The essay concludes that many persistent economic, educational, and institutional failures stem from applying competitive models to inherently complementary systems. A reorientation toward horizonal economics is therefore essential for understanding growth, coordination, learning, and social welfare in complex, evolving economies.

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1. Introduction

This essay will introduce the need for a new framework for economics, with 'planning horizons' in a central role. Horizonal concepts range across economics, but are seldom made explicit. In neoclassical theory, they are usually treated as fixed, such that no 'horizon effects' – namely, horizonal changes – occur. An effort to place them in better focus resonates with J.M. Clark's notion that to describe a

"dynamic process" calls for "not a model but a framework within which many models may find their places, including equilibrium models as limiting hypothetical cases"[1]. Such is an ambitious task, not to be taken lightly. It entails an effort the value of which is too often dismissed out of hand – even scorned – by 'mainstream' economists. Such a response – and perception of threat – I will show as simply unfounded, and too inviting to self-induced blindness in an improperly-competitive academic context of complementarity, which itself is the source of many educational ills.

The challenge of economics lies, not so much in its practice, as secreted within its theoretical lens. Economic observations, both day-to-day and of vast historical trends, are often very well-grounded. We understand much about how economies truly work and perform. It is in projecting *alternatives* to what transpires that economics falls short. The aim of policy-making is to engineer change for improvement. If 'advances' are poorly conceived, they guide our choices for ill, and not toward the better. How can we know what we miss? We surely never observe it. This is what I call "The Problem of the Invisibility of Unexplored Alternatives."

Here lies the point and the purpose of theory, in the imagined projection of unexplored options prior to their ready pursuit. If our constructions are biased, too abstract, or ignore relevant tradeoffs, we risk costs in diverted decisions and excess resources spent upon ends (where our intentions may also be unachievable). We have no choice about whether all action is guided by some sort of theory. The only choice we have is on how well our theories are fit to their realms of application. This is no simple matter; it is a point that this essay will develop in much more detail.

Furthermore, theories are always selectively focused on certain self-chosen essentials. As we learn, we develop habits of thought committed to mental structures excluding alternative views. There is a very hard tradeoff here between insight and flexibility. In order to penetrate deeply, we must use some particular mode of thought, though each entails a narrowing often unconsciously blind to its own limitations. We see more readily what we find than the ranges beyond our incomplete vision (e.g., cf. [2]). The history of every science attests to a latent tension between old commitments and the need for new models. Such stresses in economics have been exploding in the last century, within a process of birth and renewal too often deterred or aborted. The growth of what is called "heterodox economics" offers a good example. To see all this takes some perspective.

Economic analysis started with Adam Smith[3], though one can trace it to earlier writers as well (such as Hume or the Physiocrats). Smith is held to have set us on a steady course to our modern world. Most subsequent theories add (often elaborate) justifications of Smith's original themes. Despite their radically

altered context, to this day Smith's basic contentions endure, though some modern critics object at times, often in well-disguised garb. As one might say: "Plus ça change, plus la même chose."

This is not to say two centuries of economic debate have been fruitless. We know far better than Smith what his arguments mean and the premises on which they rest (e.g., cf. [4][5][6]). We also enjoy a wide array of alternative views inaccessible – as undeveloped – during his time. Smith's significance stems from his successful linkage of views with far-reaching social importance, much like Alfred Marshall[7] a century later. The forms set down are still with us, although radically transformed.

Some people argue that this is the problem: Smith's stipulations cemented a mold of opinion we are too bound by today. There may be truth in this claim, as frameworks – once set – do not only free but confine us. Any commitment to one scheme of action or model of thought only builds to new options at the expense of others excluded and thus left undivulged. We never may see what we miss if our theories shall curb our imagination. Diversity yields our only access to invisible, unexplored options. Perhaps this simply endorses an openminded approach to ideas[8].

2. An Analytic Perspective

I start on a negative note, discussing the current state of the field. The overall tone of this essay, however, is anything but destructive. Indeed – to the contrary – it is ferment that makes for a healthy discourse. When new ideas and approaches are not in emergence, science stagnates under a dulling conformity all too typical of hegemonic control (e.g., cf. [9]). Without entertaining alternatives, choice has no meaning and neither does personal growth. Although revision may yield an uncertain and difficult challenge, it can unshackle invisible bonds. One cannot know without trying.

Learning invites a freedom from limits unseen in advance. It calls for releasing control, and for an embrace of variant options. Learning is anarchistic (cf. [10]); it strays beyond any preconceived norms. But honest discovery also entails a discipline trained in devotion to fact. Its secret is a transcension of unconscious habits and tacit assumptions through a venture onto unknown terrains.

The issue relies on awareness and questions. Do we endlessly try to examine our methods of thought and construction, or do we take them as given, defend them and divert all attempts to explore other realms? These are opposite tensions: one is for science and knowledge; the other, protection of what has been done and its internal limits. A *true* curiosity ought to hold open to question every belief, and most especially one's own convictions: self-doubt is a virtue here. Stagnation, blindness, insensitivity are the

results of closure. The essence of humanness stands or falls with our adaptive intelligence and our flexible mental acuities. These are tools of human survival.

The nemesis of any organization – mental, managerial, social – is an increasing ossification, once its routines are established (cf. [11]). Habit formation is wonderful in economizing attention: we learn to take things for granted to free our awareness for other pursuits. But programmed reactions are unthinking, unconscious and thus can become maladaptive in a shifting context. Defensive protection of vested interests, in evolving environs, steers us away from a fit of internal systems to external needs. Such is the source of our crisis. Some models on which we base our decisions are radically unfit to their realms of application. This is the opportunity cost of unrealistic conditions, which Friedman[12] duly ignored.

Organizations adapt to survive in dynamic milieux or grow rigid, eventually collapsing in conflict instead of achieving new growth. Self-renewal is the key to maintaining efficient direction of effort (cf. [13]). We either relieve our stress in change, or resist and deny its significance. The first calls for learning and open minds; the latter involves a defensive void. These are opposite tensions: one cannot engage them both at one time. We have but one choice, to think or deny (cf. [14]).

The history of intellectual effort – or of practical entrepreneurship – attests to an impassioned resistance against innovative ideas or investments that needs scant confirmation. The question is why we remain self-destructive, forcing – often out of existence – our most creative endeavors, when they are readily seen (in theory) as sources of economic improvement. Academic environs should reward challenge and unexplored options. In my experience, such is not at all the case: the guise of scientific critique conceals an intolerance to new ideas, amazing to those of us seeking alternative views of established conventions. Most junior professors would attest to a widely-expressed importuning against rocking boats or challenging seniors, if one seeks tenure in an academic department (e.g., cf. [15]). Thus, does science grow rigid, discouraging innovative ideas. No one 'in their right mind' would risk a career asking unworthy questions (in the esteem of mentors and colleagues). So has a tenure process, set to protect, served to undermine freedom of inquiry in academics. The origin of this pattern is institutional, rising from rivalrous systems imposed in complementary settings of information exchange, where they have no rightful place. More will be said on this subject; it arises from a deeply profound and tragic competitive failure applicable to many areas of economics.

Though what I have said thus far appears unduly hostile, that is not my intent. This essay will attest to a range of astonishing oversights and omissions in our widely-accepted paradigm of neoclassical

economic constructions. Such lacunae are not well-explained on their intellectual merits alone; they call for another reason arising from wrongly-structured academic incentives and – perhaps – political interests. Such is the point of addressing a fear of adjustment right at the outset. We must learn to adapt...

3. The Crisis in Economics

Many have argued that economics is in a state of crisis (cf., e.g., [16][17][18]). Their reasons are widely varied, and its causes differently traced. The late Lord Nicholas Kaldor[19] contended that economics "went astray ... in the middle of the fourth chapter of Volume I of the *Wealth of Nations*" by Adam Smith[3]. Others assign blame elsewhere: to Walras, Robbins, Friedman, etc. Indeed, a common defense of convention nicely attests to the problem: the claim goes, the mainstream approach is not justified, but is the best we can do[20] (cf. Hart 1984, p. 189). Such sounds a beat to which many economists stride, and thus is the search for improvement directly delayed, diverted, denied. We can do much better than this, if introduced to alternative views, such as those of heterodox economists.

A major theme of this essay is that the strategic defensive protection of orthodox standards sticks to a pattern embedded in much of economists' research and practice. Indeed, it is a part of the culture of our scientific establishment (if not of our whole society). People like Kuhn[21] and Lakatos[22] have explored the process of paradigm shifts (also, cf. [9]), attesting to Carnap's view that doubts about any system of thought amount to a practical issue of whether to use it (cf. [23]). Utilization of mainstream methods – in spite of increasing criticism from many professional quarters – survives unmolested for most economists. This is a part of the story of how our systems support their own patterns and internal enforcement procedures, be they social, political, cultural or academic in nature[24] (cf., e.g., Katz and Kahn 1966, in Emery 1969, p. 97). A basic characteristic of organizations is that they act to protect themselves from any disruption or change, through either resistance or cooptation.

The thoughts set forth here entertain some alternative orientations. Such arise from a complex of philosophical, intellectual and psychological explorations over more than sixty years by the author of this essay. Their roots stretch from methodological inquiries, steeped in historical lore, into economics and issues of personal growth. I simply ask of the reader – and profess for myself – an open mind. The central concerns of this essay emerge from a cultural loss of perspective in our private and social pursuits, and in economics itself. Our dangerously myopic culture is a virulent cause of crisis: only with foresight and planning ahead can trouble be spied in time to avert its threatened dangers. But that calls

for stronger incentives for horizonal growth to be crafted into our social systems, along with an institutional nurturing in us of a strong passion for learning.

The current malaise in economics stems from a pattern of thought established, and then repeatedly reinforced throughout the past many years, arising out of philosophical arguments stretching back to the Greeks (e.g., cf. [25][26]). Were my primary goal here an exegesis of how economics arrived at its current state of affairs, such an embrace would be fitting. But I must cede to the expertise of others, since that is not my intent. I seek instead to provide a foundation on which our established beliefs and procedures show weaknesses solvable with other assumptions. Such an ambitious undertaking calls for patience and planning. One must ready one's ground in advance, for seedlings to root and bear fruit. This is especially so when accepted assumptions stand in our way. We must transcend our habits of thought, to see what they fail to encompass. Such involves stretching limits, thinking in unfamiliar terms, and projecting unexplored options.

An embrace of ventures severing oft-worn threads is our first challenge. It would be easier to proceed on the basis of what has been done before, and surely far less risky! One may not map profound breakthroughs that way, but the comforting presence of others' similar efforts sustains one at times of frustration or failure to reach some intended goal. Whereas to grope beyond *terra cognita*, resting on premises spurned as unfruitful, leaning on nothing more than a hunch and the flaws seen in others' positions, entails setting and testing one's sights against those of one's mentors again and again. There is no sustenance here among colleagues engaged in 'normal' pursuits, when their research rests upon premises that one needs to challenge. To break away from the pact takes self-confidence sprinkled with arrogance seasoned in fear (cf. [27][28][29]). One may, after all, learn nothing but that these seniors' advice was correct, to avoid those particular paths. Asking a reader to join with this search is in part requesting your trust, to follow my story of personal search and discovery, while staying open to wherever it leads.

But what is all learning experience, if not a flight upon wings of venturesome hope into realms whose treacheries cannot be known in advance of incurring their risks? One of the secrets of teaching success is inflaming students with one's own excitement over the subject at hand (cf. [30]). We cannot know what lies over a hill we must scale, before we attempt it. Without motivation, we never find out: this is a danger in teaching detachment in science or research[31][32] (cf. Polanyi 1958, pp. 139-42). A sense of *engagement* is central to human endeavor and aspiration. Its absence brings stagnation; a process of personal growth should always be enthralling. Systems supporting alienation risk a loss in advancement, relative to their

full potential. Organizations stay young through their resilience and self-renewal (cf. [13]), which calls for a fully-intentional effort.

Part of the crisis in economics shows in our view of abstraction. Not only is orthodox science impersonal; scientists should not impose *values* into their research endeavors: one must look at *what is*, describing worldly causal relations. Prescribing *what should be* is seen as 'unscientific'; such asserts simple opinion. One of the manifestations of this sadly ablative view is that economists may not make claims on what people 'should' desire. We must take wants as 'given', designing the system with minimal judgment on acceptable human needs, beyond describing their social linkages. We may portray what transpires, but to limn an alternative vision of how we ought to conduct our public affairs, unless such accords with our current assumptions, simply is ruled out of bounds. As a result, the *status quo* is not challenged by many economists. But what is that *status quo*? Here we must turn to established conventions, and look at their unexplored options, as the focus of our next section.

4. Some Economic Conventions

For these economic conventions, eight points seem essential. I start with the case for unrealistic assumptions in part (a). The next, part (b), examines materialistic concepts, and the third, part (c), addresses interdependence. Fourth and fifth are time and knowledge, in parts (d) and (e), respectively. Sixth and seventh involve increasing returns and substitution, in parts (f) and (g). Last, in part (h), are issues of organizational and institutional theory.

(a) The 'Realism' of Assumptions

In the hard core of our research program – to use Kuhn's[21] and Lakatos'[22] language – is an array of assumptions in need of rejection as wildly against the facts. Such unrealistic conditions are introduced with Friedman's defense thereof, which Samuelson labeled the "F-Twist" (cf. [33]). Friedman justified "unrealistic" theory, claiming that: "To be important ... a hypothesis must be descriptively false in its assumptions"[12]. Friedman's peculiar 'twist' lay in his defining 'realism' as *descriptive completeness* (cf. [34][35]). Placing realism out of the picture, he ousted baby and bathwater both! No theory can be complete; taking that as a standard of judgment distills to an utter rejection of theory. What theories strive to embrace are *essentials*, based on personal judgment. This is what Friedman denies: that theories involve any acts of choice that include normative values (but cf. [36]). Yet Friedman's views are widely accepted in orthodox economics, according to Lawrence Boland (cf. [37]).

A proper critique of Friedman, and of logical positivism, however, would be premature and lies beyond the scope of this short essay. Here I only aim to open the relevant question of why economics has mired itself in a crisis. Assumptions are crucial to theory; they define a model's realm of proper and reliable application. Assumptions state the "ifs" surrounding and defining the inferential "thens" of any theory. Friedman's F-Twist – unless severely restricted – endorses irrelevant ideation, if guiding choice is the primary goal and value of thought. Should this economic crisis surprise us, with theories so cavalier in construction? Lest one deem my concerns absurd – that due to its silly claims, a Chicago approach is simply a straw man – the close of Melvin Reder's 1987 essay about "The Chicago School" in *The New Palgrave Dictionary* dispels this sort of illusion:

> *...Continuity ... is a distinctive feature of ... the Chicago School. ... In the mid-1980s the vitality of this tradition is threatened more by the growing acceptance of many of its key ideas than by resistance to them. ... Arguably, in 1985, these views and their extensions have become mainstream economics...*

So this is where economics has gone, if mostly by default: into a fantasyland of falsity, at the cost of a world that has learned to ignore economists' teachings as only tenuously related to the reality in which we all live. Such a portrayal is somewhat unjust, though. Many economists are apologetic about assumptions severely at odds with extant market conditions. Friedman's paper is still attacked more often than it is defended (but cf. [38]). But even here a belief is accepted that theories cannot adhere to facts and deliver usefully abstract conclusions. Again, we encounter a radically Friedmanesque conception of 'realism' as *descriptive completeness*, implying that abstractions cannot be realistic, almost by definition. Instead, the truth is that all theory, by necessity, is selective; there is no way to avoid this problem of singling out the most relevant factors in any situation.

We commit to essentials in every investigation. Choices stand on personal judgments: we have no ready access to the 'right fundamentals' of any decision. If so, our acts engender dilemmas that we have to face. Regardless, no such uncertain conditions give a green light to assumptions of any old kind, based on confirmed predictions, despite Friedman's seductive verbiage. For example, surely asserting a long cord from the Earth to its moon – though 'explaining' the facts – should not be granted the status of knowledge! As Bain averred a long time ago: "Some difference in aspiration levels seems to be involved here, or some disagreement about the character of our surroundings"[39]. Theories should be realistic in their essential conditions, to escape from myopic concerns. The legacy of Friedman's views, and their

effect on economics, has led us severely astray, and away from a clear understanding of how the world truly works.

(b) The Subjective Dimensions of Economics

A problem for economists is that established theory abstracts away from human consciousness in a strange perversion of 'being objective'. There are two reasons subjective elements are shunned in academics. One is due to claims about the importance of *prediction*; a proper view of choice shows volitional acts are indeterminate, putting a limit on foresight. The other rises from the notion that valuation of *physical* goods involves materialistic concerns. Each affects how we do economics.

i. Prediction

The flight from realism in economics stems from Popper's insistence that *explanation* cannot cleave science from nonsense (cf. [40]). Successful *prediction* is solely useful as our basis for theory acceptance; Friedman describes a 'blindfold test' to verify causal relations (cf. [12]). But there are two problems here. The first is that this standard of prediction demands too much of economic analysis, more than it can deliver. Second, a single proposition – apart from its systemic context – is not testable in isolation, known as the Duhem-Quine thesis (cf. [41], as discussed in [42]; [43]; and [44], in [45]). Each is part of a much more general interdependence problem.

Here we confront an important difference between social and natural science. Most studies – in philosophy or history – indicate an advancing process of generalization, by embracing prior views into a broader framework. But these scientific analyses underemphasize volitional choice and the problem of human cognition. Assessing social theories on models in natural science (e.g., cf. [46][47]) means economists' normative standards do not fit their subject matter, having been uncritically based on nonbehavioral sources. Once admitting human consciousness into the realm of theory, we lose all semblance of situational determinism.

'Scientific' hypotheses strive to frame effects ahead of their occurrence (or of our knowledge thereof, as in Friedman's 'blindfold test'). In natural science – especially physics – such is a feasible goal, though in biology or thermodynamics, some might debate this claim (e.g., cf. [48][49]). Laboratory experiments simulate two worlds side by side to estimate likeness and difference, in a controlled environment. In economics, we cannot so manage our settings: psychic conditions are not perceivable in overt choices and actions. Even revelations of preference – as Samuelson named the enigma (cf. [50]) – requires that

the options of agents are rightly appraised. This attempt exceeds whatever experimentation allows. Even with agents fitted with convenient 'utility meters' (to read off states of well-being directly) – and if we could run two parallel worlds to show the effects of policy options – simple prediction would still lie beyond us. There are two reasons for this, due to choice and learning.

Economics is not concerned with inanimate actions of things. Successful prediction insists upon knowledge of agents' subjective intentions. Such calls for an estimation of utility functions and the relevant tradeoffs seen by each agent. None of this information is stable or available to observers; it is not often even known by agents. Accurate anticipation of decisional outcomes is not just impossible; it diverts attention from matters of more importance, such as incentive designs and institutions (cf. [51], in [52]; and [53]). So, we cannot act as if physical laws structure all behavior, in predicting outcomes of volitional choice. Human efforts consciously aim at projected ends imagined invisibly, hidden away in our minds. Consciousness entails free agents choosing interlinked goals and means across complex spaces and times.

The essence of choice is always and by necessity intangible and indeterminate. No individual outcomes can be foreseen if they are really choices, and not just physical moves like rocks rolling downhill. Until a volitional action is taken, expectations about its direction are unavoidably guesses. Social scientific conceptions are unlike constructs in physics (cf. [54][55]); they are reflections of agents exhibiting will. Were reactions stably tied to circumstantial constraints, social prediction would be easy. But situational determinism (cf. [56]) evades the essence of choice; subjective assessments are part of behavior (cf. [57]). To ignore self-motivation negates our distinctive volitional feature as *homo sapiens*. Intelligence is adaptive; it unfolds selectively and uncertainly as we live our lives in and through time and space, facing an uncertain future that is in no way determined.

Our key attribute is that we learn; reactions evolve through time (cf. [58][59]). Environs and contexts shift without notice. With processes in continual flux, there is no obvious stable point to use as a basis for theory. *Ceteris paribus* statements stray from original grounds; such should be understood. That we can never anticipate outcomes of choice should not deter us from what we are able to do.

Prediction – as economists' standard of theoretic acceptance – denies our essential nature as subjective, volitional agents. Such impersonal outlooks obscure, rather than open new doors to insight and understanding. Evading cognitive elements shall warp our representations. How we frame decisions shapes their outcomes. Too many economists seek a release from crisis in such views, upholding a social

science devoid of real people. A more realistic cognitive view is emerging, however (cf., e.g., [60][61][62][63][64][15][43][44][45][65][66][67]). Real life frustrates any accurate anticipation of future events.

(ii) Materialism

A peculiar resistance to subjectivity appears in our notion of wealth. In orthodox theory, utility comes from material things, not social arrangements or cultural aspirations. It may be 'convenient' to organize systems around the consumption of physical goods, but this ignores a field of value far more important to civilization. Any process of growth entails a transformation of human desires away from material wants in favor of far less tangible feelings and dreams (e.g., cf. [68][69]). This elemental lesson is studied by organizational psychologists and business management theorists (e.g., cf. [70][71]).

Economists give little weight to nonphysical aspects of social designs and decisions. Thus, society is held back; a disregard of self-actualization yields a passion for trinkets as compensation for need deprivation (cf. [68][69][70][30][72][73][74][75]). Is it surprising concerns for community, fairness and pride are so often ignored due to our reflexive neglect of intangible goods? Such arise not from myopic goals, but from much broader collective ventures stretching beyond ourselves. Cooperation demands more of us than does competition, in its need for social cohesion and trust, and for mutual understanding. Without trustworthy behavior, rewards of fellowship pass beyond our grasp (cf. [76]); communal links are important (cf. [77]). Specialization turns on an adherence to shared designs and agreements; honor and ethics are thus integral to economic advance. That orthodox models ignore such important concerns suggests a crippling blindness.

(c) The Problem of Interdependence

Perhaps the most serious problem economists face is interdependence. If all links to all else, i.e., if our world is a "seamless Whole" (cf. [78]), then no act is apart from all others (though time's arrow is unidirectional). Partial models are incomplete, ignoring much more than they include. Joan Robinson put it so well: "In order to know anything, it is necessary to know everything, but in order to talk about anything it is necessary to neglect a great deal"[79]. Theory is always selective; we ought to embrace a greater recognition of that difficult fact and its broad implications.

A sense of the range of neglect in a model is supremely important. Hutchison noted: "No kind of ignorance can be more dangerous than ignorance regarding the limits and limitations of one's

knowledge"[80][81]. Myrdal averred that accepting interdependence was a milestone in his intellectual growth (cf. [82]). If an awareness of limits suggests we should welcome alternative views – each shedding light on all others, with every vantage specialized differently – any resistance against such flexible outlooks states a confession of failure (e.g., cf. [83][8]). Academic departments should be 'learning communities' striving to welcome new ideas. Instead, in most of them, unexplored departures are aggressively resisted, at the high cost of advances in knowledge.

A full embrace of interdependence opens to a systems approach, where organizational issues stand at the center of focus. Institutional processes are absent from most orthodox schemes. Firms are reduced to a transformation of input to output, without specifying the means (e.g., cf. [84]). Social process is external, with incentives offstage (cf. [85]). Economists keep their analyses separate, against the advice of philosophers (e.g., cf. [41][23]). Agents are treated as independent; buyers do not affect others' desires, so 'markets' are simple linear sums of existing consumers' wants. No fads, snobs or bandwagons spoil our well-mannered groups (cf. [86][87]). Sellers are treated as sole monopolists or identical rivals in industries, with no relations between them. The dilemma of oligopoly – due to its interdependent ties – was deemed by one Nobel Laureate to be "the permanent and ineradicable scandal of economic theory"[88][89]. My own work on the British canals thrust me into this problem (cf. [90][91][92]). Network contexts are radically different from market domains in economics.

Interactions straying beyond these formal lines are denoted as 'externalities', abnormal cases of market failure falling outside the rules (cf. [93]). So do our models divert attention from real-world phenomena. However, interconnectedness actually signifies standard conditions. As Scitovsky said, orthodoxy ignores interactivity in diverse ways (cf. [94]). Another dilemma is our individualistic casting of social phenomena (e.g., cf. [77]). We aggregate units (as if additive) into compositional groups of insular, unallied parts, while all agents are interdependent (or heterogeneous), both in nature and in the real world. If firms step to rivals' tunes, market decisions do not arise directly from managerial acts (cf. [95][96][97]). Oligopolistic outcomes are relentlessly indeterminate. Monopolistic competition is even more perplexing as an example of fallacious conclusions (cf., e.g., [98]).

Aggregation and quantification are curbed by interdependence. If all hinges on everything else, every act is uniquely intertwined with other events. Abstraction by isolation and qualitative extraction, sets some aspects as central at the cost of all others, with units bundled into categories (cf. [99]). Concepts scrub out differences in an exclusive focus on attributes (cf. [100]). Summing quantities slices away qualitative

distinctions (cf. [31]). The higher the abstraction, the less substance survives. Such assertions of homogeneity ignore a lot; more details are lost than retained at every remove from primary experience. We forget each occasion is special when everything interacts. Formalization tears essentials away from their raw context (cf. [101]). The cost of abstraction is mostly invisible; theories stay silent on all they ignore. Accepting interdependent phenomena means everything matters, especially having an open mind attuned to multiple models.

What does a proper recognition of interdependence mean? First, it suggests simple summation is not a reliable tool; items' additivity and independence must be assumed to sum them up as discrete units. Second, composition is key; how we frame matters. Third, 'externalities' are normal; everything impacts all else. Fourth, linkages shape our behavior: some reinforce, others confound, all across space and time. We must frame all this sufficiently; otherwise, we risk missing effects and factors that take resources. The five following issues identify aspects of this pervasive enigma: time; knowledge; increasing returns; economic connections; and organization.

(d) The Unidirectional Flow of Time

In an irreversible world of forever-flowing time, every decision we make affects all ensuing endeavors. We become what we do, in habits and commitments. Each achievement – or disaster – rises from what came before. Aspirations always involve farsighted planning. Those who ignore the past relive it, according to Santayana (cf. [102]). Those who neglect the future will likely fall short of their potential. Captives in time, we only transcend it through mindful endeavor. To see beyond time entails its embrace, not an avoidance thereof. Either we use our lot well or waste it; we need to live within time…

Economists tend to assume away time, ignoring its endless flow. Thus do our theoretic conventions elide their historical legacies; lifeless simulations seek stable outcomes, frozen outside time. Supply and demand are treated as static, composed of frictionless options we can undo as we wish. Production (or utility) functions show inputs (or goods) as smoothly mutable, as if variation were costless. There is no temporal process here. We act as if aging is absent and death never darkens our door.

Some might deem this unfair. Representations of interest on durable goods are rife with time. Yet established doctrines in economics stand outside time. Capital offers a flow of value reaching beyond the present, in its main distinction from labor, while labor retains human capital just as machines entail labor (e.g., cf. [30]). Reality always has people immersed in irreversible time.

Only from managers' outlooks is labor readily altered. With input costs more properly borne by employers, such asymmetries should resolve. Temporal linkages are as important to workers as to machines. We ignore the former; their costs stay invisible. This is one of our failures. Assets' future returns are pulled to the present by rates of discount, collapsing future flows of value into current worth. The device avoids unsure expectations; any account of income through time predicts eventual losses and gains in current dollar terms. The notion that all yet-realized options unfold into indeterminate worlds is alien to this approach, which amounts to a ready escape from time (cf., e.g., [103][57]). Embracing time brings interdependencies.

Every act is mired in time, moving from initial commitments to projections of future rewards. Costs are better known than gains, with time always unidirectional. Humans dream and dance to outcomes unseen in advance, that too often differ from what we foresaw when we set them in motion (cf. [45]). Each step proceeds from those before, in chains of interlinked actions. We make choices, slaved to our past, unfolding into inducements or nightmares. The closer reasons stick to fact – the more they fit to reality – the better energies serve our needs. Ignoring truth endangers us, shunting awareness from operant cause. We squander resources, whenever our agendas skew our sight. This is a horizonal case for realistic constructions that Friedman ignored; he acted like theory was just for decoration, not as a vital aspect of life.

Might the evasion of time be due to a fear of death? We ought to face the fact that our instants tick away irreversibly. Time marks each of us; all of our images (cf. [27]) should include entropy (cf. [54]; or his essay in [104]; also cf. [105]). Ignoring time falls short of the problem. Every act reveals inertial linkages to its past, while embracing a future relentlessly open to imagination in all our dreams and aspirations. Action never looks backward to any immovable past. Marginalism manages only arrangeable links. Imagination looks mostly to incipient changes, with time bound to knowledge.

(e) The Place of Knowledge in Economics

Every decision is first imagined. "If I do *this*, *that* will occur" states a causal connection. All action is guided by *theory*, which may be unproven or wrong. Scientists test their beliefs. The issue is *how* we use theory. Actions are based on beliefs; the question is how well they stand on facts (e.g., cf. [58]; also cf. [27]; [53]). Most economists see attention unbounded and outcomes known (cf. [106][107]; and [88]; also [57]), with predictions secure. No issues of framing arise, with full rationality guiding action (but

cf. [60]; [61]). Subjective factors are not germane, without bounded awareness (cf. [2]). Once we admit planning horizons, economics gains a cognitive face (e.g., cf. [108]).

Knowledge is the center of economic and social analysis (cf. [58]). Arrow called attention to a need to model "the ignorance of the economic agent" (cf. [109]). Prior to those developments, issues raised by Austrians and others (like Boulding, Simon, and Shackle) were largely ignored. Cognitive views seem more acceptable now, thanks to people like Arrow[109][60] and Tversky and Kahneman[61].

These epistemological issues can be resolved by research on knowledge and expert systems (cf. [110]; [62]; also, [111][112][113]). Orthodox economics has become more receptive as well (e.g., cf. [114]; [115][20]). The primary economic concerns during the 1970s were about stagnation and externalities. Conventions were being challenged (e.g., cf. [89]; [116]; [29]; [49]; [19][117]; [118]). The problem was not that work was inept; the trouble lay with its guiding questions that left us helpless to understand socio-economic processes. Friedman's endorsement of unrealistic conceptions has endowed economics with mostly irrelevant tools.

A model of man ignoring epistemological limits (cf. [119]; [60]) subverts its proper intent. How we project our outcomes is central to all human action. A science of choice involves framing. When mainstream economists shun these three dimensions of understanding: *methodology* as our means to predict behavior (cf. [63][64]; [43]; [45]); *history* as a means to test out and verify our theories (cf. the exchanges between [120][121][122][123][124]; also, [125]; [126][127]; and [90][128][91][92]); and the very origins of *economics* show how it has evolved (e.g., cf. [129]; [130]), because these shunned subjects show how rational acts embrace vaulting ambitions, then we have lost our perspective. Intellectual legacies shed light on research. Unexplored options stay ever invisible, when not fertilized by imagination.

Many enduring conundra arise from excuses for the avoidance of these three important domains. Falling supply curves in long run theory illustrate this situation. Substitution is a realm beyond which neoclassical economists shall not stray. Institutions and organizations were seen with suspicion until Williamson, Simon and others made them more respectable (cf. [99][51][107]; [131][132][133][134][135]). All of these issues shall be pertinent to our unfolding agenda.

(f) 'Increasing Returns' and Their Implications

Scale economies are an embarrassment to orthodox economics. Supply curves must slope upward, despite their unsure ramifications (cf. [92][136]). When larger firms have reduced unit costs, this failure requires state intervention (cf. [93]; [137]; [138] or in [139]). Natural monopolies show a suboptimal output;

this is where falling costs sweep into attention, diverted to public utility pricing or rate regulation. Orthodox **AC** curves are U-shaped; they simply must turn upward.

However, the accepted view during the 1930s held increasing returns as a universal truth. How did economics shift from increasing returns to avoidance thereof (from [140] to [141])? Suffice it to say increasing returns were seen as a threat to the free market. World War Two interrupted debate, so instead of resolving issues stemming from increasing returns, economists sought to redesign economics in equilibrium modes. These unexplored tracks should now be reopened to offer revisionist routes around many current dilemmas.

Increasing returns will loosen the locks on a Pandora's Box. Arrow said a theory of "imperfectly competitive equilibrium" is "forcibly needed in the presence of increasing returns ... and ... is superfluous in its absence." He went on to add: "whatever a monopolistic competitive equilibrium means, it must imply inefficiency in the Pareto sense if there are substantial increasing returns"[142]. So, do we give up Pareto efficiency as a guiding concept, or admit to a general failure of markets (cf. [143])?

Or can we evade the problem, as most economists do? Avoidance of fundamental lacunae has costs of its own, given unbounded interdependence. Nothing stands alone in any organization, be it social or intellectual. A restive falsity taints all thought. We see these corrosive faults in dishonesty, when expedience supersedes principle, or if paradigms fail to incorporate truthful lessons. Integrity must encompass the Whole, if fallacy cannot be yarded, just as cancer – untended – destroys its host (e.g., cf. [144]; [145]).

The crisis in economics occurred when the analysis sought to divert development into equilibrium models. 'The Hicksian Getaway' into rising cost – "to save ... equilibrium theory" (cf. [146]; [32][136]) – was followed by Samuelson, Arrow, Debreu and others (cf. [147]; [148]; [114]). It took almost 40 years and a 1972 Nobel Prize for Hicks to renounce his 'getaway' claim as "nonsense" and "an indefensible trick" (cf. [149]).

The trouble lies not with cost curves alone but also with market theory. An avoidance of methodological inquiries, studies of past events or of the economics of organizations, institutions and diverse systems shows an insistent dogmatism protecting established beliefs (cf. [31]). In Chicago, to stray from the orthodox standards of the Hicksian neoclassical model, seen as "the *only* valid propositions of economic theory," is "penalized as evincing failure to absorb training" (cf. [83]). This unbending approach, not limited to Chicago, reminded Leontief of "methods ... employed by the Marines to maintain discipline on

Parris Island" (cf. [150]). These sanctions may work to quell dissent, but will lead to a more restrictive conformism than any open spirit of inquiry (e.g., cf. [27]).

A proper endorsement of increasing returns says firms are interdependent, making monopolistic competition "forcibly needed"[142]. If so, the Chamberlin/Robinson models warrant another look (cf. [151]; but also cf. [152]). Chamberlin ultimately abandoned the use of 'industry' groups for more realistic complexities (cf. esp. [153]; also, [58]). What might have happened without equilibria? Two issues should have emerged: theories of interfirm interdependence and of industrial organization.

(g) Substitution or Complementarity?

Economics links scarcity to unbounded desire. We find tradeoffs everywhere; no one can dodge the hard fact of choice. With time and energies scarce, we never get all we want. Economics studies *substitution*. Tradeoffs, scarcity and deprivation are the focus of economics. But this is less than half of the story.

As we grow, anomalies show. In barter economies, what one owns is another's loss, implying *conflicts* of interest, though we all gain from free trades which invoke *concerts* of interest. Trades yield mutual gain; no inherent or unavoidable trade-offs occur in this setting. Exchanges sow new options with Smith's 'invisible hand'[3][4]. Freely-agreed transactions settle conflicts and concerts of value with benefits to all. Only with a fixed total do we find opposition in how a surplus is to be split. Here are some conflicts of interest, as what goes to one is lost to the other.

What are the options here? How we frame them molds our view. Assuming complete knowledge means all gains should be secured. "By whom?" is the relevant question; outcomes turn on price-setting processes. With existential uncertainty, all depends on how transactions are found and/or crafted[154][155][156][157]. None of these situations are optimal[58][155]; social designs should foster learning over bargaining strengths. The first seeks mutual gain; the second deals with distribution. Our assumptions stamp trade as either benign or contentious.

Production opens up positive sums. Smith's endorsement of increasing returns: "the division of labor is limited by the extent of the market" rules out equilibria[3][19][117][158] (Young 1928). Kaldor relates scale economies to a generalized complementarity, drawing a thread from Marshall and Chamberlin, through Myrdal and Young, to his idea of Keynesian growth and decline. Kaldor's story is wholly dynamic, castigating closed-system models. Kaldor calls for "a major act of demolition" of neoclassical economics in order for us "to make any real progress"[19].

Real-world decisions spread their effects for better or worse. A zero-sum game makes for rivalrous settings of scarcity, where rewards offset each other. Any concurrence of values strays from this scenario. Are the real linkages in our social relations opposed or aligned? Do endeavors accord or clash? Consilience means *complementarity*; conflict implies *substitution*, in two ways to frame our connections[159].

Orthodox models assert substitution. Stigler, reviewing Smith's statement, declared that firms "are rival," that disintegration will raise output, denying Young's conception[158] (Young 1928). Nelson said: "If factors are complements, growth is superadditive" and its "sources ... are not neatly separable ... It makes no sense to try dividing up the credit for a good cake to various inputs"[160]. Here the relations of factors in firms seem to be *complementary*. Richardson noted that "activities are complementary when they ... [must] be coordinated"[161][162][43][163]. Malmgren added: "...where output and productivity of various production units are closely interdependent, the firm is formed..."[97][96]. Complementarity yields a case against equilibrium as incompatible with economic interdependence.

Trade and inputs subsume but part of these substitution issues. To compose firms in industries, they get *defined* as substitutes, while complementarity is more relevant to our reality[75][108]. Scarcity rules at times, but production entails scale economies that can benefit all. Sources of value also evolve; human desires segue from physical into artistic, cultural and intellectual forms[68][69], where rivalries simply fail for intangibles due to their complementarity.

Knowledge, in economics, is treated as a public good, undersupplied through markets, with rewards not fully captured by owners. Personal goals do not align with social amenities here. Education and information need public support: complementarities sever reliance on competitive markets' efficiency. Conflicts of value call for rivalry; while concerts of interest demand collusion, where opposition suppresses common needs and creates its own drag. This is where and how competitive failures manifest themselves, when applied to complementary settings.

The tradeoff of competition for cooperation inverts with complementarity as contrasted to substitution. With goals aligned, collusion enhances output where rivalries stifle it. Opposition among complements is very much like cartelization of competitors. The issue revolves around the nature of their interdependence. Economists stress substitution, with exceptions seen as special cases due to these (so-called) imperfections. But competition in all things enhances output only in some. In the presence of complementarity[108][117], imposing orthodox standards sows more harm than good! Our rivalrous

institutional systems serve us ill in educational, artful and innovative ventures[164][165], which demand cooperative frames to flourish and to maintain their integrity and coherence.

All these issues are tied to interdependence. Substitution arises from an aggregation of firms by industry; the Chamberlinian option makes all agents simply heterogeneous. Inputs show increasing returns: a "monopolistic competitive" framework here is "forcibly needed"[142]. Entities in unbounded domains need to incorporate planning horizons, where "the relevant market structure with imperfect information is not perfect competition but rather monopolistic competition"[166][167]. We need a systems approach to analyze interdependent transactions. Such is the only good perspective for resolving these matters.

(h) Organizations and Institutions

The monopolistic competitive frame opened discussion of organization for representative firms and their rising and falling costs. That debate continues, though ignored in the mainstream. One reason neoclassical economists see no need to move from a "black box" approach to production[84] stems from a claim that institutions make no difference for rational individuals in the absence of frictions and costly transactions[168][169]. A world of substitutes needs no integration, if free of complementarities.

Coase saw firms as based on uncertain, ongoing contracts with transaction costs[168]. About two decades later, he viewed institutions arising from costly exchanges. Externalities are resolved by gainers compensating losers[169]. Arrow turned this argument toward the value of "collective action" when transaction costs block Paretian deals[109][170]. Williamson tied organizational links to opportunism, integrating Simon's rational bounds with the problem of trust, as explained by Arrow[132][88][106][107][171]. Economists link the need for organization to substitution, while ignoring complementarity. Even Alchian and Demsetz[172] saw firms as self-imposed servitude, skirting other approaches.

There are reasons economists avoid interdependence. Boulding's brilliant *The Image*[27] and Simon's *The Sciences of the Artificial*[53] – with Arrow's halting attempt in *The Limits of Organization*[171] to apply standard approaches outside their proper realms – show the failure rises from theory. Organization can be ignored under conditions of substitution, free transactions and unbounded knowledge. Orthodox standards sidestep any need for organizational structures[167].

Systems theories can lack coherence. Theories addressing complexity can sink into a morass of claims seeming irresolvable[173][174][52][175][76] (Tannenbaum et al. 1985; Sims et al. 1986; Barney et al. 1986; Vroom and Deci 1970; Morgan 1986; Meadows 2008). Organizational theory is still young, and rather

resistant to abstraction. Here homologous structures show regularities. Organizations commit to order, routines and procedures that tend to evolve into fully unconscious habits, while virtually all design takes place before its stresses are known. These systems must adapt to change, while reducing costs through automaticity. Simon saw "programmed" decisions as generally cheaper than expertise[51], where reactions run themselves. Reflexive decisions can thus offer efficiency at a cost of flexibility. Environmental shifts calling for revision can therefore go unheeded, due to a lack of alertness at low hierarchical levels. Resilience calls for awareness of environmental changes in all of firms' sectors, right from top to bottom.

Designing organizations is artful (e.g., cf. the United States Constitution). Attention is economized at the cost of a close awareness of change. Planning structures put maintenance at the bottom, freeing managers to focus on longer-range concerns, saving executives for expansive vision with smooth operations below[53]. Planning horizons extend as one ascends the corporate ladder[53].

Successful organizations stay young and adaptable, as those that cannot learn and deal with unexpected risks become outmoded as settings evolve. How institutions cope with stress is a key to their survival. How we learn affects our resilience. Epistemological limits define our "adaptive efficiency" (e.g., cf. [176]). Will competition or cooperation allow more flexible action (cf. [177])? Competition may foster resilience through the process of entry. Clark contended duplication and waste accompany entrepreneurship (over internal expansion) of firms, as assets dissipate entropically (cf. [178][1][179][180]). So, collusive endeavors save costs if they are able to unify overly specialized outputs or redundant transactions. Complements, joined, are efficient; divided, they will fail (or just fall apart).

Competition is especially weak for informational issues. Scarcity does not contain or even define knowledge. Your learning increases with mine, so sharing supports our joint understanding. Research thrives with collective inducement. Cooperation among complements spurs their abundance.

Organizational form – via markets or hierarchy (cf. [132]) – emerges from the interrelation of its sundry elements: with complementary units, competing incentives will by necessity yield disintegration; with rivalrous substitution, collusion will be counterproductive. In my opinion, substitution is mostly incidental, while very few economists take complements seriously. Real-world interdependence is always composed of both types, in a nondecomposable balance of substitution and complementarity.

Separating *concerts* from *conflicts* of value wants specificity. We lack cardinal measures of value; welfare is seen in relative terms. To assess its satisfactory outcomes will balance success against some other

vantage, in an ordinal ranking process. For example, production under monopoly is more beneficial than its absence. With a large number of firms, competition is preferred. But these static scenarios avoid dynamic issues, such as the reality of foresight and friction. What if a concentrated supplier allows a more rational use of resources, stabilization of situations or less myopic growth (e.g., cf. [181])? Knowledge and change are important.

But how do we distinguish substitutes from complements, if we cannot tell alignments from altercations of value? Experiment is impossible and joy cannot be observed. Complex systems based on interdependence should beware of implicit assumptions. The question is of incentive alignment. What are the public effects of our private endeavors? Does individual rationality yield collective insanity (cf. [182][183][75])? If we all are rational, then Smith's invisible hand should direct us well; however, any group insanity yields a situation in which externalities stop selfishness summing to social gain (e.g., cf. [96][97]). The answer relies on human relations. Incentives aligned to human needs work better than any squandering of goods on strife.

Inner consistency offers a standard of organizational health. Systems suffering chronic conflicts show stress in various ways (cf. [70], [184], in [52]; [185] in [175]). Executives send signals filtered downward onto managers that spawn collegial expectations based on reactions from prior behavior. When unwelcome messages are rebuffed, the lesson is transmitted: "Don't do that again!" Executives' choices evolve from managerial attitudes, seeping into a firm's culture. Leadership patterns become routines, shaping consequent outcomes. Organizations develop personalities that will lead to unconscious habits, soon ossifying into a potential loss of resilience.

A fluid environment calls for organizational idiosyncrasy. Adaptation conflicts with evasion: leaders savor or shun dissonant tales. Denial leads to crisis, by postponing solutions until too late (e.g., cf. [186]). Scrupulous honesty is the cure: learning calls for unsought challenge, where alternative views serve to protect us and to keep us alert. Such patterns show in our reactions to unfamiliar ideas, surroundings or ethnic diversity[8] (cf. Jennings 1983). An open mind is central to flexibility in an evolving world. Avoiding instead of confronting stress simply exacerbates the problem; this is how organizations succumb in unstable environments. Survivability offers systems a yardstick for their resilience.

Organizations, open to learning, join internal with outside ties to operate efficiently (cf. Katz and Kahn 1966, in Emery 1969, pp. 100-102); energies are not distracted by conflicts or a need for their resolution. Unified aims bring functionality. When parts interact smoothly, output and satisfaction increase.

Aligning efforts into schemes is all the point of coordination: Hayek called this the main goal of economics (cf. [58]). How cohesion emerges within management, minds or society is what Boulding saw as our unresolved task (cf. [59]; also cf. [70] and [51] in [52]; [13]).

Part of the issue involves time. Systems build on initial commitments. They also age. Even if first designed to a perfect fit of talents to need, demands shift through time. Everything changes with events. Enterprises swim in an ongoing, continual flux; programmed responses are cheap while flexibility incurs costs. Each part turns upon a firm's intelligence, with important diversions hopefully noticed without wasting attention. Awareness should be focused wherever needed, for unprogrammed decisions (cf. [51] in [52]).

Understanding indicates that alertness enhances its own supply. Honest transactions and credible leadership promote open exchanges of views. Signals should be freely shared, for accurate decision processes. Diversity and reasoned dissent are rewarded in healthy organizations. Insincerity obfuscates, spreading a fearful unease that will likely undermine coherence. How might we cipher the costs of distrust, in all its invisible losses?

This is where ethics stand in relation to interdependent demands. Denial unravels set routines, while learning embraces new data. These strategies are not compatible. Bosses resist or reward their best underlings, with relations either rivalrous or seen as collegial. The tradeoff fosters survival or death. Do we seek facts, or bury our heads? Denial leads to extinction, while creation brings new insights. Systems seed their own growth and decline.

Organizations grow rigid in time (cf. [187]), within an entrepreneurial life cycle (cf. [176]). Established domains set routines. What does this say of an urge for new knowledge? Can we keep on learning? Is originality youthful indulgence? How institutions adapt turns on our heuristic capacity. If we can alter our reactions, we are free to follow events. But if behaviors cement themselves into fixations forever, there is no hope for resilience. Our rational limits specify our adaptive vitality. This is a matter of planning horizons.

An embrace of alternative vantages supports a belief in change. Our resilience makes us human. Other animals stick with their reflexive behavior. Even people have fixed reactions; psychologists excavate outmoded tensions, to update them into their current context, demonstrating that we humans are not too rigid to change. Folks who claim otherwise just stop their own learning, while those intent on personal

growth do so by self-confrontation, and not through docile inertia. Perseverance supports success in maintaining our relevance.

When systems encourage aspiration, they will therefore thrive. If not, we will languish, spurning new options. Malleability is earned through effort. Those who stay young welcome ideas; they become 'true individuals' (cf. [188]), instead of fearing challenge. How well do we think for ourselves? My prep school motto was: "Dare to be true." Why should honesty call for courage? What does this say about us and our social culture? Resistance screens our fear; such defenses impose their own limits. Openness stifles nothing; it guards against self-fulfilling belief and all of our rationalizations.

How organizations support new ventures is a key to human development (cf. [25]). Theories assuming complete awareness – such as in neoclassical theory – also distract from personal growth. Systems shape our relations, so any approach ignoring all learning confounds and distracts from our resilience. Education needs to be valued and not dismissed. Systems sabotaging intelligence should be absent from our education.

This essay thus entertains a broader approach. Horizonal economics shows how planning and growth emerge from organizational learning incentives, suggesting a look at how well our institutions also cultivate "wits" (cf. [59], and [30]) through competition and cooperation, showing horizonal growth as central in social welfare analysis. Horizonal theory opens insights further developed below.

5. The Role of Planning Horizons in Economic Analysis

The history behind the development of horizonal theory in economics is complex and twisting. I will try to develop it in brief, by summarizing my other work on this subject with references wherever relevant. The best way to start this story is with 'The Hicksian Getaway' along with 'The Hirshleifer Rescue', which are all about defending decreasing against increasing returns. At the end of 17 years of ferocious debate in economics over how to deal with increasing returns in production as a general and universally-accepted truth[189][140][136] (e.g., cf. Young 1928; also), John Hicks[146] simply walked away from the issue, just assuming decreasing returns because it would make competitive equilibrium models work correctly. As Hicks put it: "At least, this get-away seems well worth trying." Paul Samuelson[147] built his Harvard Ph.D. dissertation on Hicks' foundation, followed by General Equilibrium (GE) models by Kenneth Arrow, Gerard Debreu and Frank Hahn, all five of whom won Nobel Prizes for this work, which pounded what I

have come to call ‘The Hicksian Getaway’ into the ‘hard core’ of the neoclassical paradigm, not to be removed or refuted.

In 1959, Armen Alchian put forth nine propositions for integrating a concept of time into cost theory, which Jack Hirshleifer[190] saw as a threat to Hicksian neoclassical theory, stating his goal as “rescuing the orthodox cost function” with a ‘proof’ of eventually upturning cost curves, that I call ‘The Hirshleifer Rescue’ of decreasing returns. It was on this basis that Alchian[141] then declared decreasing returns a “general and universally valid law” of economics. There followed a torrent of critical work by Shubik[89], Kornai[116], Morgenstern[49], Phelps Brown[29] and Kaldor[19][157][117] castigating the notion of economic equilibria, and making a case for increasing returns and systems theory in economics. Hahn[115][20] responded defensively to these attacks, while admitting that “the citadel is not at all secure”[20]. Arrow[171] also remarked on the difficulty of retracting common beliefs, once seen as unjustified and, so, ready for revision:

> *The problem is that agreements are typically harder to change than individual decisions. When you have committed not only yourself but many others to an enterprise, the difficulty of changing becomes considerable. ... What may be hardest of all to change are unconscious agreements, agreements whose very purpose is lost to our minds. ... Even if experience has shown the unexpectedly undesirable consequences of a commitment, the past may continue to rule the present. ...This thinking ... gives rise to the greatest tragedies of history, this sense of commitment to a past purpose which reinforces the original agreement precisely at a time when experience has shown that it must be reversed.*[171]

Arrow does not reveal the specific commitment that he has in mind, but the timing of his lament is indicative that he must be referring to the case for decreasing returns, to ‘The Hicksian Getaway’ and ‘The Hirshleifer Rescue’.

However, let us take another look at these two abortive escapes from increasing returns suppositions. First, ‘The Hicksian Getaway’ was simply asserted, without any good warrant, over a general acceptance of increasing returns within the economics profession[189][140] (e.g., cf. Young 1928). What is less well-known is that Hicks strongly repudiated his ‘getaway’, five years after receiving his 1972 Nobel Prize for this work, dismissing it as “nonsense” and “an indefensible trick, which ruined the ‘dynamic’ theory of *Value and Capital*. It was this that led it back in a static, and so in a neoclassical, direction”[149][191]. In other words, even according to Hicks himself, we are not warranted in treating decreasing returns – and

its bastard offspring, substitution – as a universal, and even ubiquitous, phenomenon. Nicholas Kaldor said complementarity is "far more important" than substitution, once we accept increasing returns, and that this is the general condition throughout firms' and factors' interrelations. So, we can now dismiss 'The Hicksian Getaway' as a woeful mistake that has driven our theory of interdependence quite off the rails of good sense and justifiable claims, despite all those Nobel Laureates who might say otherwise.

But what about 'The Hirshleifer Rescue' of decreasing returns? Is Hirshleifer's claim to be trusted or relied upon, instead? Perhaps unfortunately, for neoclassical theory, that is also not the case. In my Ph.D. dissertation (cf. [90]) I presented a rather cumbersome disproof of Hirshleifer's so-called 'proof', that is more clearly explained in two subsequently published papers (cf. [32][136]). What I concluded, in my dissertation, was the following:

> *So, what indeed have we shown? Nothing less than the following fact: that Hirshleifer's 'rescue' does not really follow from Alchian's statements at all! ... Hirshleifer's argument is a non sequitur, even without the LeChatelier limit... Its status reduces to simple assertion, which flies in the face of an evident fact: unbounded increasing returns...* (cf. [90])

The bald truth is that there is no case for decreasing returns, save for short-term phenomena. The long-run claim quite unambiguously favors increasing returns, and therewith also for social relations based on complementarity. The entire case for the efficiency of competitive equilibria in economics should be discarded as founded on false suppositions of substitution, counterproductively applied in complementary settings such as occur throughout all long-run economic contexts of atoms, and with respect to all bits and wits. Consequently, the most general nature of our economic and social relations has been grossly misrepresented in neoclassical economics, which is in dire need of reform, as suggested in this short little essay.

Let us now consider what is the most essential distinction between decreasing and increasing returns – within the spirit of Alchian's original[192] propositions – which is based on *time*, as Frank Knight[193][194] had framed it, because, as he explained so cogently: "Great difficulties are met with in stating a clear and straightforward exposition of price theory because of the fact that the given conditions or data of the problem are so different according to the length of the time period which the explanation takes into account." Combining Knight's view with Pigou's[189][140] unambiguous endorsement of increasing returns as a general and universal (long-run) phenomenon, it is clear that this difference rests on the length of the time-period that is to be used in any pricing analysis. However, an agent's view ahead into

time or, namely, one's foresight, does not depend upon time-horizons alone; one's vision forward in time is achieved by a clear knowledge of all relevant aspects of causality operating in that situation, i.e., by one's planning horizon in any such decision.

The planning horizon inherent in any decision resides at the boundary of our understanding, separating all that is known, from that vast realm beyond our reach that we call the unknown. Herbert Simon[107] [2] was awarded the 1978 Nobel Prize in economics for his concept of "bounded rationality," which notion is rigorously formalized by horizonal theory, in which our ranges of awareness are denoted by **H***, an ordinal measure of our rational limits in Simon's sense of that term. Planning horizons (**H***) relate to pricing in the following way[108] (cf. Margolis 1960): because **P* = M* x E*** (where **M* > 0** appears at the intersection of **MC** with **MR**, and **E* > 1** is a markup term based on demand elasticity), and since both **M*** and **E*** are declining functions of **H***, then **dP*/dH < 0** in all pricing decisions (with $\mathbf{d^2P^*/dH^2 > 0}$). If so, our static model of pricing in neoclassical theory is woefully incomplete, as our planning horizons (**H***) are not fixed; they shift from moment to moment. However, price setting also takes place within an interdependent environment of substitution and complementarity, ever joined in some sort of indeterminate and nondecomposable balance, as suggested below in a transportation network context.

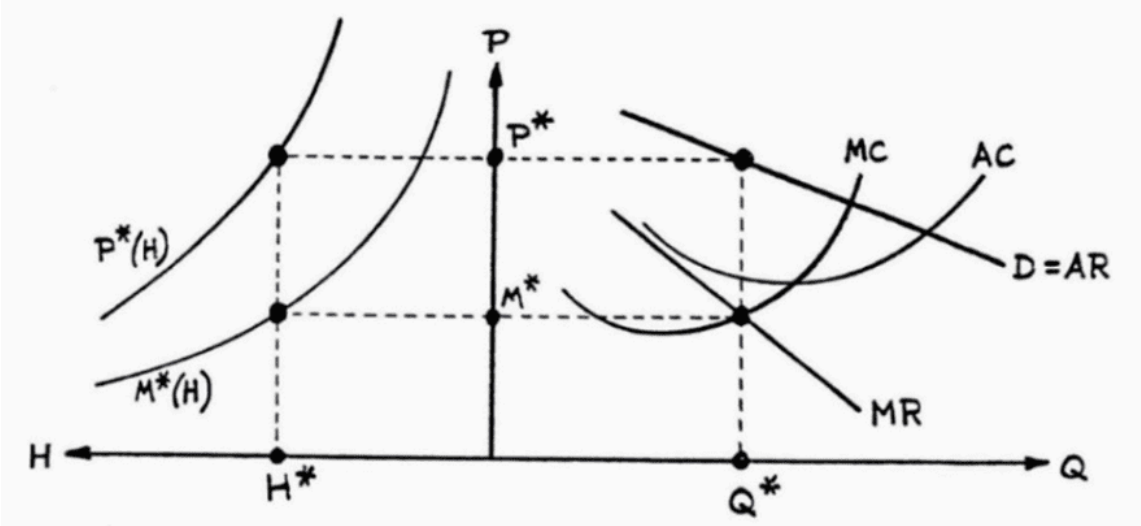

Figure 9.5 -- A Horizonal Representation of Pricing

The simplest transportation network case is imagined thus: four routes linking four towns in a square as shown in the figure on the right, where routes **AB** and **BC** are considered in terms of their relationship. Are **AB** and **BC** substitutes or complements? It turns out they are both: they are rivals for traffic going

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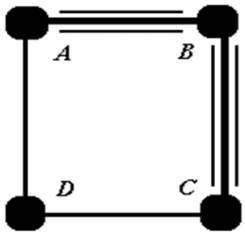
between **B** and **D**, and they are complements for travel between **A** and **C**. In any transportation network or complex economy, nondecomposable linkages of substitution and complementarity are the rule and not a special exception: **AB** is tied to all other routes in complex systems of feedback which are not readily untangled.



There is another important implication that comes out of this horizonal theory of pricing, applied in network contexts, where we find a nondecomposable tangle of substitution and complementarity within any group of price-setters, unlike in the 'industry' concept. The net interdependence of any single member with this group **I** can be expressed by the difference of **P*** (the individual-profit-maximizing price) and **P′** (the joint-profit-maximizing price within group **I**). Let us call that difference $\mathbf{S_I}$, where $\mathbf{S_I > 0}$ implies net substitution and $\mathbf{S_I < 0}$ means net complementarity within that group with respect to any one particular member, for $\mathbf{S_I = P' - P^*}$. It can thus be shown (cf. [108]), with 'interhorizonal complementarity' – namely, that in the most general case $\mathbf{dH_{i\neq j}^*/dH_j^* > 0}$, so private changes in **H*** (or 'horizon effects') are socially contagious – then $\mathbf{dS_I/dH^* < 0}$. This shows that the nature of economic relations – and the balance of substitution and complementarity in any network context – is *horizonal*; in sum, longer horizons shift that balance away from conflicts toward concerts of interest.

This is a radical finding. In neoclassical economics, the only economic relation recognized is substitution, because substitution and decreasing returns are considered part of the "hard core" of the neoclassical paradigm, which is to be considered "irrefutable" by the decision of its advocates (cf. [9]). However, within a network context – such as in transportation – we find an unavoidable combination of substitutes and complements that occurs in an indeterminate balance, where the 'net' interdependence of any individual price setter within any group **I** of interconnected firms is described above by the sign and relative size of $\mathbf{S_I}$. This is a more general aggregation method than the neoclassical 'industry' concept, that only allows substitution while quite ignoring complementarity. The evident fact that their balance is sensitive to our private and social planning horizons is also rather significant, as it delimits neoclassical substitution assumptions as only a very special case, within a general realm mostly characterized by complementarity (cf. [117][195]).

Indeed, if we impose three categories on economic analysis – call them "atoms" (the realm of physical goods); "bits" (that of informational and all intangible goods); and "wits" (the horizonal sphere) – we can

show that substitution *only* applies to short-run atoms, due to cranky inputs, while long-run atoms and *all* bits and wits are characterized by complementarity and increasing returns[189][140][19][117][195] (cf. Young 1928). As Kaldor's claim for a generalized complementarity (cf. [117]) implies that cooperation, not competition, is efficient, neoclassical arguments supposing substitution and favoring competition only apply to short-run material goods, and not at all more generally. Furthermore, to impose competitive frames upon complementary realms – such as in education, informational and ecological systems as well as social cultures – leads to losses of output and pathological effects that manifest themselves in human behavior through characteristic symptoms of organizational stress, such as "frustration, failure, short time perspective and conflict. ... The formal principles of organization [that treat people like children] cause [mature adult] subordinates ... to experience competition, rivalry, intersubordinate hostility and to develop a focus toward the parts rather than the whole" (cf. [70]). What Argyris is describing here are features of our social culture, and not just problems of organizational management in a business setting. Furthermore, this sort of fragmentation of effort is symptomatic of competitive frames; such disintegration is absent in cooperative systems, where maintaining these systems' integration is far more effectively protected.

Consequently, to open up planning horizons in terms of their ramifications suggests that the way economists have framed their discipline is at best incomplete and more likely incorrect, as well as grossly and dangerously misleading. Cooperation or integration is always efficient in the presence of complementary interactions, such as are found in education, ecology and throughout the economy in all long-run manifestations, while competition has spawned and is maintaining a dangerously myopic culture, effectively in self-destruct mode. There is plenty of evidence supporting this conclusion, if we care to look for it. For example, the widespread ethical and ecological losses suffered throughout the culture and environment provide ample justification for these concerns, along with the increasing level of conflicts spreading across society.

Let us simply examine one realm of the harm caused by competitive frames in our educational system, most especially at the academic level, but also within our schools. When I was teaching at Tufts University from 1979 to 1983, I developed an option, available to those students who had successfully worked within a study group for the entire term, in which they could prepare their take-home final exam together, as long as they attended the scheduled final exam period to answer two additional hour-long questions: the first was an enjoyable brain teaser about economics, just to show what they knew; and the second was to recount their organizational experiences in doing this "collusive final exam." The stunning

quality of these submitted exams was a convincing testament to what we are all missing by having students always required to work alone, although my faculty colleagues tended to see what I was doing as letting students cheat! It is such a strange world in which we all live, where people think that way... I really did not know how to deal with that particular reaction to my "collusive final exams."

A more pernicious and harmful aspect of academic competitiveness shows up in the arrant hostility from most professors toward new ideas, especially any conception that breaks away from already well-seated dogmas. What is curious and ironic is that any true 'learning community' ought to welcome novel approaches as an opportunity to learn, and thus to expand one's perspective into unfamiliar realms, but that is not what we find in most advanced economics settings or, for that matter, in many other academic contexts as well (cf. [8][55]). Instead, what we see are professional reputations being defended against any unwonted challenge represented by an alternative view, which is greeted as a dire threat to accepted doctrines. These are blatant examples of counterproductive incentives stridently working to stifle economic development, at the expense of advancing our understanding of these subjects. Competitive frames are based on assumptions of substitution; they do not belong or fit with systems of complementary interaction, so we should expect to see counterproductively pathological symptoms of organizational stress showing up in these situations, such as described above.

What is the point? The neoclassical paradigm of ubiquitous substitution assumptions, applied in every area of economics, has gravely misled us into an imposition of incorrect and destructive incentive structures in some of our most important areas of human endeavor. Complementary interrelations, such as seen across social cultures, but most especially in all educational settings and ecological systems, are undermined, disintegrated and damaged by competitive frames, to their ultimate detriment. These situations cry out for cooperative systems, which will respect their integrity rather than tearing them apart in a rabid search for profits at a cost of their cohesive vitality. This is no way to run a rodeo or any society. The way economists have framed our relations is simply inadequate.

6. Conclusions and Final Thoughts

The way our microeconomics is slavishly pursued, especially in the United States, supposes substitution in every context, despite the fact that complementarities abound throughout any economy. This is the ongoing impact of 'The Hicksian Getaway' and 'The Hirshleifer Rescue', both of which have falsely enticed economists into a fairyland of falsity in microeconomic theory, founded on neoclassical claims of

substitution and decreasing returns, that have only been asserted without any proper justification. As said in Jennings[90]:

> *The upshot of this grievous mistake is that any incorporation of learning by doing and technical change into cost and price theory has been deferred* (e.g., cf. [196]). *The point lies in fifty* [now over 80!] *long years during which we have painted a 'well-behaved' world, forestalling development of our conceptions in the direction of proper behavioral science. 'Hicksian getaways,' even redeemed, were supplanted by sanctions of rate over volume as justification for upturning cost. The limits of Hirshleifer's central contention could not have been checked very closely. The carelessness thereby implied is appalling, with how much we rest on this claim. After all, the error is not well-concealed to any skeptical eye. Its impact stretches well beyond sight, if his proof has diverted attention from learning. We cannot doubt that it has.*

An economics of generalized complementarity, in accord with Kaldor's[117] view, is a rather different domain of phenomena than is portrayed in neoclassical theory. This is how our economics would have unfolded during the 1950s and thereafter, absent 'The Hicksian Getaway' and 'The Hirshleifer Rescue', had they both been duly rejected as specious assertions without foundation or justification. My own view is that they were uncritically accepted because economists wanted the determinacy of equilibrium models more fervently than they did truth, especially in the presence of Friedman's case for unrealistic assumptions. So, what do we do with this situation?

This essay attempts to offer some insights on "the challenge of economics" in terms of its sundry difficulties, most of which are not emphasized in the training of economists in most of the dominant academic departments, at least in the United States. For example, economics is often defined as a purely deductive science. This is wrong, if models are used to guide choice. There is a place for logic, but we need a wider range of approaches (e.g., cf. Caldwell 1982). Also, induction is not just statistics. If our aim is to pull essentials from the buzzing conspiracies surrounding every endeavor, we must recall that all our emphatic commitments spawn upcoming constraints. If so, we frame our own traces: first steps shape one's last, in disciplines with hierarchic constructions. Searchers dive into basics seeking original threads of discourse (e.g., cf. [78][156][57][33]).

This essay has sought to elucidate some of the challenges involved in understanding economics and its sundry complexities, along with the manner in which its various aspects relate to each other in curious and unexpected ways. It has also represented an attempt to introduce the twin notions of planning

horizons and ‘horizon effects’ into a new ‘horizonal’ economics, along with an array of interesting and generally unexplored implications such as suggested above. The conclusive point is this: the need for reformulation of our neoclassical economics is both urgent and dire, due to its misconstrued diversion of the analytic content of this subject into destructive findings, whose consequences remain invisible and so cannot be perceived within this system of thought, due to its own restrictive blindness to such phenomena as are identified here. A new ‘horizonal’ theory will offer revised insights relevant to many diverse areas of this subject, if we were only to entertain them.

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