

Review Article

The Elements of Economics

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This paper is about the elements of economics, and addresses some challenging aspects of choice, theory, value, science and rationality. Choice is an invisibly projective necessity; we do not choose among known outcomes but only imagined projections thereof. We choose based on theories about how the world works; all of theory is selective, and therefore restrictively blind and silent on what is omitted. Choice is also an assertion of value, which concept has evolved through the years; the context of value responds to three questions: of value to whom, for what purpose, in what situation? The difference of things from goods is a matter of value. There are three notions of science: deductivism; empiricism; and realism. This paper rejects the first two for realism in a view of science as a personal process of search. Rationality in economics, as in *homo oeconomicus*, too often avoids the related roles of time and dynamics, not to mention the interdependence of all phenomena. Each of these challenging aspects of choice are worth our close attention.

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1. The Dilemma of Choice

Textbooks define economics in terms such as: tradeoffs, scarcity, supply and demand, ends vs. means, deduction, prices, products, markets, income, growth, employment, inflation, etc. Choice is sometimes included, tied to scarcity, tradeoffs, and substitution. One rarely finds a serious treatment of the real dilemmas of choice (but cf. the writings of Shackle, Boulding, Simon, Arrow, Hogarth, and Kahneman). Economics shuns its basics: Georgescu-Roegen^[1] said: “the elementary is the hotbed of the errors that count most.” There are relevant questions to be posed here on the challenging nature of choice.

It is surprising how little is said about the problems of choice (but cf. ^[2]). Do we set aside the frustrating aspects for friendlier realms here? Whatever the motive, decisions are always ‘well-behaved’ in neoclassical economics. Students might deem acts simple, in how they are addressed. But the process of

choice warrants further examination. First, choices are unavoidable. Second, choices are unobserved. Third, interdependent choices are hard to untangle. Fourth, choices are projective. Each aspect is central, causing confusion at times.

(a) The Necessity of Choice

The hard truth is that we have no real choice about choice itself; choice is not chosen. For instance, we have no option about *whether* we are located somewhere unique at any particular moment in time: we can only select the details, within strict temporal limits. That our positions are heterogeneous makes them momentous as well. The cost to me of a pencil is less downtown, while its value is more at my desk. Where I am matters, with ‘opportunity costs’ in all we do. Knowing this is of value too.

All we do is at the expense of infinite possible goals. If a greater reward could have been had in another action, what we did will show a loss. A claim that we always profit (so never reject our best choice) claims a problem is solved that “is our main task to explain” (cf. ^[3]). Most orthodox models sidestep this problem.

The perplexing issue of interdependence raises additional concerns. Even alone on an island, we must deal with temporal linkages. Acting in one direction excludes other options and their future rewards. “First-mover advantages” are universal in human endeavor (cf. ^[4]). Choices supply no unconfined tallies of unexplored tracks; we live along singular routes of commitment. We must know what we do and what we omit, if the value of what we do is scored by the worth of whatever we shunned. Options are unknown in advance, a fact ignored in economists’ training. This is one of the opportunity costs of orthodox views (cf. ^[5]).

Our focus on what is sought discounts such unpursued actions. We treat choice as simple, ignoring that what we avoid is always unseen. If unexplored tracks are only imagined, tradeoffs are subjective. How we think is central (e.g., cf. ^{[6][7][8][9]}). Any approach to choice must include cognitive framing; a model of humans abstracted from real people is senseless (cf. ^{[10][11][12]}). Theories should be self-inclusive to seek consistency. Fantasy is essential in human engagement, if imagination opens options. We need to understand the issues of visual limits and rational bounds (cf. ^[13]).

(b) The Problem of Invisibility

Another issue is what I call “The Problem of the Invisibility of Unexplored Alternatives.” We only observe what occurs; we cannot see what we leave undone. Relevant truths are hiding in this apparently innocent

theme. Choices show a role for imagination too often ignored. Simplification to capture essentials sidesteps other important dimensions shaping applicability, omission of which may risk irrelevance. A lack of imagination will limit our ranges of choice.

But the problem is worse than that. At moments of choice, we lack information on options shunned, but also on those we elect. Only *ex post* do we learn if our prior images were correct. The options seen *ex ante* are nothing more than conjectures. Once decided, they are displaced by other demands. We never know what our outcomes will be before their actualization; forsaken choices stay evanescent, understood only in theory. If frameworks subsume fantastic conditions, we lack reliable guidance. This is the failure of Friedman's^[14] unrealism.

Even this is understated. One might claim we observe what we do. This is also false. If we can never contrast what we did against some alternate track, our representations stay invisible and untestable. No such comparisons work in an interdependent world whose unexplored options are unseen.

(c) Interdependence and Invisibility

Interdependence has our endeavors joined in time and space, so causality extends ever outward, beyond any ascertainable bounds. If true, our actions spill effects everywhere, well beyond any grasp. Human awareness attenuates as it reaches beyond the immediate. Anticipations stretch to a point, before they yield to other priorities. We do our best to parse our attention to relevant matters, ignoring further extensions stretching into the unknown.

There is no complete knowledge. Unexplored tracks are infinite. Once we add others' reactions, exact projections stray out of reach. Even three-body problems in physics are not tractable here (e.g., cf. ^[15]). We must face indeterminacy. Precise prediction is beyond us; economics is not physics.

No individual contemplates more than exiguous options. With limited wits (cf. ^{[16][17]}), the broader our vision the less far-reaching it is. But too selective, we miss a lot. "Surprises" (cf. ^[18]), if encountered, turn into 'learning experiences' when not just denied. Daily endeavors suggest a range of awareness and, thus, our planning horizons, which emerge from interdependence. Orthodox statements split up entities into closed system models. Partial analyses skip by our environs. Spillovers, importations and feedbacks are mostly ignored (cf. ^[1]). Embracing unbounded domains calls for revisions in economics in line with Simon's^[13] bounded rationality.

Admitting subjectivity over rigid deductive formalization opens some meaningful lessons about choice in a complex world. A bounded awareness must structure representations onto novel paths. How we frame outcomes with planning horizons warrants scrutiny here.

(d) The Projective Nature of Choice

If we act in unbounded domains, decisions are not just incomplete but also innately projective. Subjective intentions shape their results. Any impersonal limning of outcomes suffers a loss of essentials, lacking cognitive views (e.g., cf. Hogarth and Reder 1986). The primary pitfalls in choice stem from *wrong* causality, *positive vs. normative* issues, and a focus on *single or social* milieux.

First, we assume our knowledge is right, though we can never be sure that the world works as we surmise. Further, even with theory correct, aspects may be improperly weighted with regard to their relevance. Objectivity is hard to achieve; vantages are selective, and we rationalize what we want to believe (cf. [19]), with openness our only protection against self-amaurosis. One should be skeptical of any view in which one has an interest. “Cognitive dissonance leads to denial; denial destroys open trust” [20]. Both are antipathetic to learning, placing commitments ahead of facts. No one can know whether relevant tendencies are embraced in a choice; with interdependence, they surely are not. There is no way for us to ascertain when our images show realism or right emphasis, especially if we are overwrought and distracted by needs and demands.

Even if understanding is true and emphatically right in depicting outcomes, this is not sufficient for choice. We also need to project what our options would feel like to wear. We may like the looks of a coat until learning of animals slaughtered to make it. Decisions can be inscrutable in their emotional landscape; accessing empathic content too often gets understated. We also can be ambivalent, thinking our choices subjectively are ‘for the best’ at the moment we engage them, and then changing our mind (cf. [19][21]).

We also forget that our environments are not just of physical things. We live among active volitional fellows, whose deeds are indeterminate. Planning my own activities involves projecting others’ reactions, which are not so easily forecast. The further ahead or around me I reach, the less I can see of my impact. This is not due to unforeseen choices; my own next steps are also contingent. Social encounters suggest an unstable environment for choice. All these sundry assumptions – showing causes lack sure reactions – suggest some concerns about the nature of choice. Objective formalizations steer us away from basic aspects of conduct in social communities.

(e) Conclusions about Choice

Decisions are inductive; choice is 'a normative process of multidimensional causal projection' in its central attributes. First, choices occur in time. Second, they involve valuation. Third, they embrace complex causality, based on prior experience untailed to novel events. Fourth, actions presuppose some meaningful image of how the world works. Much can go wrong with these simulations or in their application; claiming unbounded foresight is silly. Attentional limits strive for an epistemological focus. How we frame options in choice is not just empirical but theoretical. Theory entails enigmas skirting mental lacunae. Orthodox standards should be more thoughtful.

2. The Focus of Theory

(a) Introduction

Calling choice 'a normative process of multidimensional causal projection' makes it theoretical, with complex epistemological roots. Our images of options frame their essentials. Others infer how we think from our actions. Emerging from our own narrow window entails alternative views, calling for openness and flexibility, which must be nurtured for cultures to flourish, or they will likely ossify.

If choices impose interpretive frames, with shunned options never revealed, our representations shape behavior. Theory aspires to capture real linkages set on true essentials. If views stick to realistic conditions and relevant attributes, they guide us well. Assumptions should fit to applications. In an age of contempt for realism, models may misdirect practice, steering our choices awry.

Several points need clarification. While theory infuses choice, its implicit description is always incomplete, selective and metaphorical. In an openly infinite world, deductive models and arbitrary assumptions are insufficient. Essential linkages should fully embrace our unbounded interdependence for reliable guidance.

(b) The Necessity of Theory

We often take theory for granted. Theories shape ideas; if we think trouble cannot be avoided, we never escape bad situations. Adventurous souls frame prospects with self-fulfilling convictions. Events may show us wrong, but openness offers some protection. Untracked domains have no roadmaps and no guarantees of good tidings. All choices impose some framework: 'If I do this, then that will occur.' We

have no choice about choosing and no escape from theory, though we do control our representations. We always have reasons for what we do.

Our intelligence swings into play with these justifications, though we are trapped within our own views and ranges of awareness. How we avoid their restrictions is to venture beyond their realms of enclosure (cf. [22][23]). Such exploration is often discouraged, to our great disservice. Doctrine is hostile to freedom and learning. We also never know in advance their limitations on what we might do, at least if we stay within their confines; such boxes shall contain us and restrict our vision, until and unless we emerge from them.

Causal assertions shape behavior. Every decision confronts tradeoffs. To hold theories ill leads to educational failure. As Keynes^[24] said, “the world is ruled by little else.” None escape the power of thought, though ideas should fit to the evidence. Despite that all awareness is bounded, our radiant impacts are not. Theories select and favor their own essentials, silent on what they ignore.

(c) The Selective Focus of Theory

With unbounded events, sights scarce and often too well-honed, intelligence stays selective. Theory asserts key aspects central to every endeavor. With theory always selective and its selection guided by theory, a commitment to primary attributes stands at the core of our understanding (cf. [25][26][27][28][29][23]). Such assertions are made prior to any consequent implications.

Why does selection matter? Effects are not as uncertain as our representations thereof. Choices start a series of outcomes stretching outward forever, while our prior awareness is energetically bound. This applies as much to alternative views as to actions. No one sees what we opt to forego. Theory yields a stingy awareness of forces, with real events uncontained. Theory is ‘*an active process of selective focus on essential features of observed reality.*’ These four elements should be explained.

First, theory is a *process*. The ‘*active*’ fixes on dynamics; you and I are verbs: when we stop, we die. The same holds for ideas. Theory untied to reality has no grasp. Theory is used for decisions; every endeavor relies on futures seen in advance. Theory is for action; relevance counts for a lot. Without theories to guide us, we fly blind.

Thought is always *selectively focused*, incomplete, restrictively blind, exclusively trained and extensively bound. Any idea is implacably silent on all left out of frame, regardless of importance. We try to cipher each situation, with unpursued options hidden and our foci always self-centered. Only a freshly-hatched

outlook grants us some perspective, though each entails special lacunae. An open mind is key; the more ways we examine a problem, the better our chance to absorb its specifics.

All situations are new and unique; conceptions assert their own *essentials* and ignore the rest. But we have no ready access to 'right fundamentals' (cf. [30]). Had we two simultaneous worlds to test out our diversions, causes would be identifiable. Restricted to one perspective will leave others stillborn, where we cannot divine their relevant attributes (cf. [31]). With acts committed to fundamentals, any perspective vaunts some details at the cost of all else; asserting their own essentials is all of theories' identity. Our restrictive focus leaves us blind to alternative views. We need diversity in our frames.

Ideas stand on *observed reality* (cf. [30]). Authority cannot replace experience; no professors, parents or texts substitute for one's own choice on how we should act, while all of us stand on our role models' shoulders (cf. [32]). When we blindly act on lessons, we discredit ourselves. We must develop our own convictions, or become sheep prepared for slaughter. Freedom means nothing if we are unable to think for ourselves, and march to the sound of our own drums.

Theory is a flashlight, training its shine on deliberate targets at the cost of all else. If the dark conceals nothing important, we proceed without danger. With lions and tigers about, we may regret our restrictive view. We need multiple lenses: some make a tight beam, while others spread their light broadly, but with little detail. All lend to each, as every insight is specialized. We must not be overwhelmed by our beastly penumbrae. With open minds, we can dodge surprises.

(d) The Open Nature of Theory

We should favor diverse outlooks. Structure is central, where rigid designs are weak. The point is not to be uncommitted, open to any odd thought. We need an array of views, since each is specifically ignorant. An agoraphobic cultural fear of infinite options may make orthodox standards seem to be safe, although intolerance is always self-defeating. The narrowness in our education calls out for reform.

With everything intertwined, disciplinary academics enshrines selective amaurosis; territorial specialists scorn diverse views, dismissing jacks of all trades as masters of none, defending their status from alien views. Resistance is warranted, if a critique calls one's own work irrelevant (cf. [33]; but also, [34]). Such protective venues are a part of our cultural landscape, to which we are mostly too blind.

A broader regard diverts such threats. A passion for learning embraces novelty. If our aim is understanding, why resist the unfamiliar? This is a matter of life or death in the progress of thought. If

theories lead to action, then novel ideas spur revision in the engines of economic growth. The impact of frozen defenses is catastrophic for any advance; so may we lose momentum.

Most deem our receptivity as a personal matter, as if learning is mostly for exhibition at social events. If one looks at what occurs, ignoring invisible options, expertise may specialize in too narrow realms. To venture unknown options spreads out into an infinite domain of novel destinations in diverse settings. Shunning such opportunities shows a protective fragility in us, a confession our framework is not sufficiently well-grounded to defend. Denial and learning cannot coexist; they involve opposite tensions. We either do one or the other.

What does all this have to do with theory and education? First, theories guide choice, showing imagined effects. Second, if choices face infinite options, we should map out our blindness. Third, ideas show invisible limits: “Fish discover water last”^[35]. This is a universal dilemma, calling for multiple outlooks: if we do not know why openness counts, we may find ourselves in a box without any obvious exit. Our only protection from traps is tolerance, along with trust and patience: social incentives against dissent are never conducive to learning (e.g., cf. ^[22]^[36]).

Our institutions of education encourage competition. We have failed to explore cooperation (but cf. ^[37]). We should advocate sharing of information; rivalry undermines its spread. Division of fields, with territorial arguments and turf-related debates, exhibits mutually-cancelling ends. Fads sweep through intermittently, yielding a few refinements, but little of lasting importance (e.g., cf. ^[38]^[39]^[40]). Any honest addressing of issues – especially if interdisciplinary – is seldom encouraged in these settings (but cf. ^[41]). Originalities suffer under a pressure to publish premature thoughts; here only conformists thrive in stressful environs. And when an academic gets tenure, even if once with novel thoughts, such ideas will likely have faded into orthodox forms, in a well-established pattern.

Junior faculty, urged to publish, are directed to well-trod paths and dominant themes. Once one ascends to a tenured position, most of one’s habits are formed. Some original thinkers can redirect their endeavors, but most are reluctant to depart from mainstream models that served them well (cf. ^[42]^[43]). This is how an established paradigm becomes an aprioristic cocoon by opposing alien views. Defensiveness extends the dilemma, closing out dissonant signals. An open receptivity ought to be a first principle; its status should be axiomatic. With questions closed to debate, there is no discussion thereof. We must be amenable to doubt, if we would learn new ideas and approaches.

Designing educational institutions on competitive frames stifles openness and resilience. Such should be no surprise, were we not so stolidly committed to substitution. Models of complementarity are indeterminate; they do not resolve to stable outcomes, so are seldom attended due to an emphasis on prediction (but cf. [\[44\]\[11\]\[41\]\[45\]\[46\]](#)). But even nonlinear physical systems subvert all forecasting efforts; their outcomes confound our anticipations (cf. [\[15\]\[47\]](#)). If this applies to simple dynamics, why not to human behavior? Orthodox standards deny this imbroglio, insisting on prediction.

We live in a complex, volatile world of interdependent transactions. If every human system is open, circular flows of variables circumvent our understanding (cf. [\[48\]\[49\]](#)). No unrealistic conditions or rigorous strictures should support any image of fanciful predestination. We must start with what is, sift common elements out of experience, center ideas on real-world continua, and so assess our radiant options. Deduction and one-dimensional causes shall lead us sadly astray (cf. [\[50\]\[30\]](#)). All must be faced in our research. Otherwise, we cannot know what we do, and none may ever forgive us.

(e) Conclusions on Theory

Theory cannot be avoided; we omit more than we see. Representation matters; we cannot dodge incomplete outlooks (cf. [\[21\]\[51\]](#)). All thought is ‘an active process of selective focus on essential features of observed reality’; we should be open to multiple views. Decisions emerge from images seen through a theoretical lens. How we think colors outcomes; we never may see what we miss. Such shuns arrogant, dogmatic science. As Hicks^[25] said: “One could learn a little humility.” Real choices call for intellectual flexibility and an assertion of normative value, as our next topic.

3. The Concept of Value

(a) Introduction

Value is central to economics. All acts are aimed to ends, based on their worth. Values structure resources, income and institutions. All we do is scored on merit. What does worth mean? All of us act upon notions of value, regardless of its source or impacts. Economists have fought over values since our beginnings; they bear on every endeavor. Value will be presented as follows, starting with elementary aspects, followed by a brief history. Next, some questions are raised about the design of our institutions. I close with transactions and two fundamental Laws of Economics. My goal is to limn a concept of value.

(b) 'Positive' vs. 'Normative' Science

Many economists think – à la Friedman^[14] (but cf. Myrdal 1954, chapter 1) – that science should stick to measured descriptions of 'objective' facts. Values invite subjective assertions of personal views that cannot be tested. This is why people are exiled from models, or treated as identical units instead of volitional agents, with scant discussion of social malaise^[20]. 'Positive facts' ignore invisible options, projections and judgments, that are all outlawed by 'objectivity' with a conservative bias. How do we test any other regime except by trying it out? We get but one world at a time, and description adheres to 'given' conditions. Global departures are not derivable from the *status quo*; one must leap beyond observation into open, unexplored domains to get any view beyond what is. Such adventures are neither endorsed nor encouraged by orthodox science.

Simon advocated design, and noted the resistance to activist training (cf. ^[51]^[52]). He favored induction to engineer change. A passive view of research is inadequate to any science of social construction. *Vertfrei* science (cf. ^[53]^[54]^[55]) is senseless. With no escape from ideas, with theories standing behind all we do, and with vantages always incomplete, our focal awareness (cf. ^[10]^[56]) embraces value when normatively asserting essentials. With reason bounded, no view is 'objective'. Standards should be explicit, in the presence of value-relevant choice. Objectivity is a pretense, screening covert assertions of value behind our limited knowledge. Aside from bounded awareness, we show worth through all that we do. Valuation is an inescapable aspect of any action.

However, the omnipresence of values should not vex us. A recognition of what we hold dear releases us to welcome it all: detachment dehumanizes science, and traps us in disillusioning chaos. Taking all learning and knowledge as personal (cf. ^[10]) liberates us from these shackles. Seeing people as automatons stems from positivism. Social arrangements treat us, not just as pawns but as the primary aim of our systems! Values center on us – as sovereign, volitional agents.

(c) The Individualistic Basis of Economic Welfare

So, we are the point; not growth, power, money, or anything else: the source of value resides *in us*. Desires are fluid (unlike in neoclassical theory, where they are rigidly fixed); they direct our endeavors. Welfare refers to individuals' sense of satisfaction. Some might reject this claim as individualistic cant. What of social entities, or our reactions to each other? We show an interpersonal linkage: all our endeavors are intertwined. But there is an individual locus of feeling in each of us that is not shared. We bear emotions

alone, while we are also joined through empathic connection across an unbridgeable gap (cf. [57]). An occasional glimpse into others should not distract us from our intractable loneliness.

Aggregate welfare reduces to that of individual agents, who are not to be treated as instruments of any higher authority. Democracy serves autonomous citizens. Costs mean nothing apart from choice: coercion has no place in valuation. Freedom is part of value-assessment (cf. [58]), for two reasons. First, force subverts intention; duress overrules judgment. Second, regulation of choice voids our ratiocinative efforts, ruling results irrelevant to their actual impact and value. Coercion neutralizes value; it cancels awareness and decisional relevance. Worthiness, if not condoned – duly revealed through free choice – carries no real meaning.

Valuation insists on engagement, for revelation and measure, requiring thoughtful action for its reflection in an ethical life. People underlie social process; value is humanistic. Suasion occurs by force or consent. Economics savors civilized discourse. As Arrow^[59] averred: “An economist thinks of himself by training as the guardian of rationality...” Economics stands on freedom as a deeply-ingrained dedication, described most clearly by Adam Smith in his early reflections on value.

(d) A Short History of Value Theory in Economics

A justification of market processes (over command and tradition) opened with Smith’s rejection of mercantile wealth as value held as gold in state treasuries. Until late-18th-century Europe, trade was restricted by guilds and governments. Smith found “the wealth of nations” in the production of goods, where individuals were led by an “invisible hand” to public benefits, while regulations impeded this process (cf. [60]).

Smith’s ideas were egalitarian. Markets, left alone (“*laissez faire*”), lead us toward the ‘common weal’, with no inherent conflict across social relations. Smith framed his case on value as measured in labor hours. He saw a thing’s ‘value in use’ as separate from its ‘value in trade’, with prices tied to labor (cf. [61]). Smith’s approach to worth was dynamic, not based on physical stocks, shifting attention to owners of labor from nationalistic concerns, supporting democratic ideals. Ricardo extended Smith’s focus on labor to capital, land, etc., boosting the case for a market economy.

Once Marx spoiled the party, this view eroded. Marx extended the argument into its logical implications. With labor the source of value, why do rewards flow elsewhere? Marx said all social systems structure power relations alike: the propertied classes control institutions to dominate the proletariat in an endless

struggle for power. He saw Smith's invisible hand as apologetics, showing masters swaying the masses to favor their own oppression. Marx cited the history of mercantilism as marking peasants' escape from their feudal lords. Merchants' success opened new options, that were then eventually lost to emerging social controls. Capitalism moved from managing trade to owning production, with its short moment of flowering, until these power relations shifted again, with no ultimate relief from the exploitation on which profits rest.

Marx saw workers as victims, snared in a web of fruitless struggle limiting understanding. No system is free of authority, when members seek control over others. Marx's seductive view of cooperation offers no means for reform, misrepresenting repression as freedom. How we organize social institutions for satisfaction remains still unanswered. Most economists, exposed to Marx's labor theory of value, went elsewhere. A few remarks are worth making, however, on this idea.

A labor theory of value poses an egalitarian notion of worth, in terms of sweat or personal labor. Rational agents put their time to best use, out of their daily hours. This idea of worth is both objective and seems to be fair. In barter economies, labor input explains how goods exchange; no one is specialized and hours are uniform: time is a primary input in an economy based on hunting and gathering. A use of cash and machines sunders any direct linkage of value to labor, by inserting a temporal wedge between inputs and consumption: money allows and capital legislates a delay in rewards. Both unhitch an attribution to labor of value redeemed. Uncertainty opens another issue: who will bear the risks with expectations awry and unmet demands? Labor alone is not the full source of any productive worth. What is meant by 'productive' here? Economists sought some answers to this question a century after Smith's work, with three steps.

The first abandoned objectivity: Bentham and both Mills posed a utilitarian notion of value, with 'good' tied to use. Focus shifted from prices to items' utility, seen as subjective and unobserved. A second point, later refined, also arose: early utilitarians weighed value in cardinal terms (cf. [\[62\]\[63\]](#)). This image of welfare relies on physical goods, beyond its subjectivist stock (cf. [\[64\]](#)). Ordinality opened discussion to relative values, sufficient for choice, based on comparisons: better over best. Ranking options work for decisions, with no further restriction needed.

The third developed marginalism. Ordinality meant that only aspects shifted in choice should count. Ignored totals yield increments needed for 'marginal' tradeoffs, since the rest stays unaffected. Marginalism mainstreamed the analysis of economics, setting the scene for Marshall's synthesis. His significance shows in the water-diamond paradox; aren't things with more utility dearer than those with

less? Were this claim valid, it would quell much opposition to markets. Economists strove for a century (cf. ^[63]^[65]) to show why water, essential to life, was free, yet trivial baubles like diamonds were dear. This was no academic quibble. Imagine a market with conflicts over price, seemingly riven with strife. Such struggles call for regulatory control with a venomous implication: “If prices do not reflect value, free markets lack any rationale.” With precious water cheap, while frivolous trinkets stay high, prices seem irrational. Marshall answered this question at the end of the 19th century, against some hostile political winds.

Marshall argued rates of exchange or prices arise from two interacting conditions: production (with labor cost theories) and consumption (based on subjective utility). Marshall’s supply and demand curves scissored this Gordian knot to show prices and sales set together. His solution has endured as economists’ central tool of analysis. Smith fathered the basic ideas, but Marshall begot current techniques by gathering threads into one concoction. Both masters focused attention on essential phenomena, though selective focus also appears as a restrictive ignorance. Discussions of value continue today; economics, as all science, comprises an ongoing contention about the foci of thought. Trapped in a boundedly rational world, we must stay open to many outlooks: all shed light on each other. Such is the road we travel.

(e) Some Thoughts on the Nature of Value

Value and choice fit with theory. Even descriptions pull figures from grounds (cf. ^[66]). Ranking their worth weighs goods’ importance. Value inheres in person, purpose and place, asking ‘of value to whom, for what aims, and in which situation?’ Values serve individuals seeking goals in specific contexts. Any claim of worth includes these three elements. If any part of persons, purposes or places shift, then value will too.

The banter of value-laden terms will often warp perceptions. Nothing is ever intrinsically good, other – perhaps – than life itself. One person’s pearls may be poison to others. Values specify individual goals in some setting. This usage reminds us that time and change are also important in choice, that conflicts arise from vantages and not just disparate ends. A better awareness of values might stop people imposing their own upon others, and so give better support to more humanistic concerns.

(f) The Transaction in Economics

Economics stresses transactions; acts trade unexplored deeds for goods. Social exchanges stand and thrive on a process of value-projection. If so, institutions serve well-being through their learning incentives. With omniscience, knowledge is easy. But economics deals with uncertainty in the search for gains. So, we will examine exchange. Systems of thought depend on relations. Early on in my courses, I posed “The First Law of Economics”; later I added a “Second Law,” to express some meaningful patterns in economics.

(g) The First Law of Economics

‘The First Law of Economics’ states an aspect of transactions: “Voluntary exchange is always to ‘mutual gain’, at least (a) in the eyes of each active participant and (b) at the time of agreement.” What the law includes and excludes is central to its meaning. On its surface, it says the obvious: every willing association leads to mutual gain, within a positive sum process. Without coercion, there is no conflict. To better ourselves, we improve others, for which they will likely reward us. This is Smith’s invisible hand.

The First Law adds two conditions: its gains apply to active agents, while deeds spill effects on passive victims. Market failure rises from uncaptured gains or unprovoked harm. In connexive venues, how ready are we to accept control? The free choices of *laissez-faire* theory assume all fate is self-directed. The second condition notes that our knowledge is never complete; some commitments we later regret. The First Law will not promise success, but only the option to try. It admits fraudulent disinformation can undermine satisfaction (e.g., cf. ^[67]).

The First Law wields a libertarian view, ignoring interdependence and knowledge (or sees them as best resolved through markets). Here regulation devalues choice or others’ effects on us. This First Law embraces many views that turn on what is essential. There came a time when it fell a bit short. Students saw it as for *laissez-faire*. So emerged a Second Law to re-establish perspective.

(h) The Second Law of Economics

The Second Law warrants the darker side of freedom: “It is always in the interests of a conscience-less individual (a) to expropriate anyone else’s gains and (b) to avoid or dump one’s own costs on others. So do we need social rules.” Here, in contrast to Smith, we find the scowling spectre of Marx. The key word is ‘conscience-less’: if I do not give a fig about others, I will crush skulls for some minor reward. Such a

degree of disengagement exemplifies people who use others unlawfully for their own needs. Societies without internal ethics simply cannot thrive or survive (e.g., cf. [68]).

Legal enforcement can never restrain people lacking self-control (e.g., cf. [69][70][71]). I will kill you for a nickel, unfeared of sanctions and wanting money. Freedom brings *options* to do harm, prevented by inner moral limits, supposing they exist and have sufficient power over us. If we must be deemed innocent until proven guilty, criminals are unstoppable. Trust is an adhesive glue that holds our social systems together. Without ethics, societies fail (cf. [17][72]). Economics should emphasize ethics.

(i) Values and Institutions

Organization needs common goals. Egocentrism messes a team. An economics of competition treats collusion as anti-consumer (e.g., cf. [73]; also, [60]). So we discourage working together. Despite the evidence showing its harmful effects, economists like competition, ignoring critiques like Kohn's [37][74]. Thus has a self-imposed deductive framework closed itself off from reform.

In standard economics, an orthodox notion of markets is a source of serious trouble given “that old textbook theory” (cf. [75]). Mainstream approaches are deemed ‘the best we can do’ (cf. [76][77]). To reject certain claims on political grounds, without regard to their justification, assumes an answer before any questions at all are really and truly imposed. Any defense of liberty based on unrealism is self-defeating; the case for free markets, with these Chicago ‘friends’, hardly need additional enemies! Freedom must be justified and defended by more realistic appeals to reason.

Yet economics cannot be divorced from political judgment. What we aspire to accomplish should steer our reasoning efforts. Any organization is designed toward and for some end: decisions are directed; they are not devoid of value. Institutions stand on intentions that should be made explicit. Plans state goals. Purposes shape actions. The relation of aspirations to thought is also extremely important. Extensionality ought to be questioned (cf. [21][78]). As awareness is always selective: framing matters. Values are present in every endeavor.

So, what is value? How does satisfaction emerge from material things? How will worth affect economics? Why not focus on visible goods? Subjective fancies should turn science into anarchy (e.g., cf. [79]). Fantasy undermines theory. These issues are better resolved by distinguishing goods from things.

(j) The 'Thing' vs. the 'Good'

We live in a world of 'things' that we try to fit to our needs, giving them value as 'goods'. Worth lies in the value-relation of objects to aims in some context. Goods are not directly observed; they are wrought from choices. Subjective elements can be illustrated. Lecture Three of my principles course always included an auction. At the start, I stood a rose on the table, announcing "goods" as my topic. I offered several rounds of bidding, each after making a point.

I opened with the problem. "Here is a single rose, with many eager recipients." (Students snickered, not so thrilled.) "We must devise a means to maximize the worth of this rose. Whoever values it most should end up with the rose. That is the goal of an economic system." I first asked what the high bidder would win. "A rose" or maybe (in a fit of abstraction) "a flower" was their response. Students seldom bid much for that. I spoke of value and purpose, then opened the bidding again. If they saw the rose as a gift, a statement of love, apology or appreciation, the bids increased. If this rose were just for themselves, the rose would bring a smile or good feelings. The bidding picked up, with roses presented and thus perceived as symbols of joy, expression or regret.

Now I began to stir hope. "What if, as you exit our class, a new person asks you: 'Where did you get that lovely rose?' and a delightful conversation about your professor's crazy antics ensues? Perhaps a friendship or romance shall emerge from buying this rose! One never knows what might occur in this savory venture of life. Seize such moments of promise!" So, the rose became a potential experience, the only one of its kind... The price would always take off; the chance for a new companion or lover is surely nothing to scorn or dismiss.

By then the bidding for my one rose would have exceeded its cost to me, which would move me to challenge at least one of their hidden assumptions. I would declare that I was now willing to sell the three flowers I bought for my spouse! The students' bidding would lose some steam, so I would ask them why, and then discuss the First Law, worth and product uniqueness. Then I uttered my kicker. I teasingly reminded them my grades for the course were based on their performance, effort and interest, adding that most group endeavors succeed or fail on the basis of active participation. "So," I would ask, "what is this good? Do I hear any bids?!" I spoke of the First and Second Laws, and of fairness and trust in these processes.

I told them that the value to them will best be defined by their own creative vitality. "If you just see the thing, you are blind; you must discover (or create) the good!" What are the substitutes for a rose? Will they

include Hallmark cards, Baby Ruths, wall posters, moonlight dances, movies or bowling (or are these complements)? What about other flowers, like chrysanthemums, carnations, or cacti? The point is, seeing only material substitutes misrepresents the nature of markets, along with their role in promoting or reducing human well-being.

(k) Concluding Comments on Value

Value is seldom straightforward and never observed. Ignoring subjective purposes here may usher us into a loss. Choices express value. If theory is always selective, value is never objective and we should not be detached. Personal knowledge infuses science, as our very next topic (cf. ^[10][80]).

4. The Process of Science

(a) Introduction

What is science for? When choices are made among imagined projections, they reflect our beliefs, values and goals. Science strives to offer a mental picture of how things work.

At birth, we enter a world of unorganized stimulation. As we process sensations, patterns show: “This one is ‘Mommy,’ that one is ‘Daddy,’ and this? ‘ $E = mc^2$ ’? That is ‘relativity!’” Advancing, regularities (cf. ^[81]) slowly unfold into a rational frame. ‘The Problem of the Invisibility of Unexplored Alternatives’ still limits awareness, since we cannot know how things might be different. Science disciplines thought, tying it to experience, within the rational limits of human awareness.

Knowledge emerges from induction, with essentials revealed by a randomized search. There are no inductive formulae; serendipity calls for an open, inquiring mind. Most attempts are rejected; a few warrant testing for their ramifications. New perspectives should explain a broader range of phenomena.

Inductive flashes are first inspired (cf. ^[82]), then assessed on whether they can be integrated with one’s personal experience. This last is an analytical and deductive process, with new ideas compared to the rest. Inference and analysis are asymmetric; inductive leaps cannot be foreseen, where ramification is seldom mysterious (cf. ^[83]). Meaning emerges from preparation. Scientific analysis is both personal and contextual in how it contributes to what we know.

But science should also be seen in action. Some define economics as “what economists do” (cf. ^[84][85][17][86]). This stresses engagement: in science, we do research. But knowledge is also based on fact, or – at

the very least – should be. We find meaning in common grounds, or discussion is futile. Real communication is a two-way process.

Science should be open to issues. Caldwell^{[87][84]}, Boland^[31] and others (cf. ^{[88][89][46][90][91][92][93]}) speak on how we apprehend truth; their insights undermine any and all established conventions. Stories, such as about an economist dropping his keys in the darkness, while searching under the light, are apocryphal. Why do economists so often opt to sidestep procedural limits?

Such denials risk crisis; any evasion of methodological lessons invites self-delusion. Knowledge is intentional, if drawn from experience. We should treasure its tacit dimensions. Shunning context tears ideas away from foundational instantiations (cf. ^[56]). Economics is more than deduction; analyses stand on inductive assertion (cf. ^[82]). Both human organization and entrepreneurial learning have an epistemological lineage that should not be ignored.

(b) Three Notions of Science

Three ways to see science are: (a) as *deductive*, with premises set for convenience; (b) *empirical*, based on statistical inference; and (c) *realistic*, using essentials selectively posed and carefully chosen within our bounded awareness (cf. ^{[78][21][51]}). Each is summarized: Simon's and Boland's work is stressed, while a discussion of Friedman will be deferred.

i. Deductivism

A deductive science is impersonal (but cf. ^[10]). With all of our terms defined by rules, we may never go wrong (but cf. ^[94])! With their utilization and applications ignored, our theories need no basis in fact (cf. ^[94]) or any honest diversity in what truly occurs. The primary goals of deduction are consistency and rigorous simplification. Theory offers a logical lattice of thoughts, without ties to reality. Ideas are not used for practice, and application does not guide design (but cf. ^[30]). Taxonomies shape every case, without seeking guidance for real-world choice. This Laplacean dream boils a “vast” intelligence down into “one formula” for all events (cf. ^[95], in ^[96]; also, ^{[10][97]}). The notion has led to empty debates that “extend [this] subject matter indefinitely..” (cf. ^[10]).

ii. Empiricism

Against pure logic comes a view that science involves empirical tests to identify trends in rigid domains. When true essentials are measured or ranked, the approach may be insightful. But events serve intentions, so we cannot just tally things – scoring roses only as flowers – we must consider their nature as goods (cf. [94][30]). Statistics simply counts numbers, not relations or meanings. An isolated view alone will not engender real learning. Subjective value relates some individual to a purpose in a specific context. Arithmomorphic conceptualization tears symbols from meaning (cf., e.g., [27]). Orthodoxy applauds such purges, in its elision of flavors and echoes (e.g., cf. [98][94]). Without a fully clear view of figures against their relational ground (cf. [66]), theory is shorn from experience (e.g., cf. [78]). An ideal Laplacean knowledge sheds sense along with discovery (cf. [83]), yielding a threat to our cultures and science (cf. [10]). “The ... knower ... is now recognized as the ... master of our cognitive powers” (Polanyi 1959, p. 26; also cf. [80]). If so, disengagement is as much of a danger as vested bias in theory. We must develop a better sense of balance and more respect for others’ efforts (e.g., cf. [25]).

iii. Realism

All thought is selective and we are boundedly rational (cf. [99][100][101]); science is also personal in committing to essentials (cf. [78]). Simon^{[99][100][13][101]} distinguishes “substantive” from “bounded” rationality; Arrow^[21] and Hogarth and Reder (1986) attend to issues of framing: awareness is not a free good. With theories selectively trained, how we frame images and choose essentials shapes all choice. Self-formed blinders surround us, so multiple outlooks should be encouraged. Any use of ideas must demand open agendas. There is a dire risk in neglecting our intellectual limits (e.g., cf. [89]).

Why deny our rational bounds? Does value-free science demand it? All of our representations are structured through our methods of thought (cf. [6][7][8][43][9][102][103][31][104]), challenging equifinality (cf. [30][94][50]). Incompleteness slows all learning, carving away our givens (cf. [50][16][30]). Predictive value also excludes cognitive volition and determinism from explanation. When models ignore uncertainties, sensible action is slighted. Simon is right that our uncontained knowledge calls for reform. Stiglitz^[105] scored brittle assumptions; finitude opens insight (cf. [72][4][30][51][13][106][43][9][78]).

Simon’s view unfolds into an as yet insufficiently explored economics of personal learning, while economists are not trained to understand or embrace such cognitive issues. Boulding^{[36][17]} connected

education to organization, another neglected domain in neoclassical theory. Established data are rare in models of search, with too many contingencies still unknown (e.g., cf. [107]). Worse, Boland^[31] discounts any notion of ‘best’ as supposing “impossible” inductive proofs. A lack of verification, however, does not lead to anarchy (e.g., cf. [108][23]), but only shows truth as unconfirmed (cf. [31]): how we react to error reveals our view of learning, if methods of thought define responses. How we learn is a dynamic key into economic behavior^[109].

Learning will frame regularities (cf. [81][30]). We isolate essentials in order to fit theory into experience (cf. [36][51]); the effort demands contextual links (cf. [30]) with these grounds, or meaning gets lost (cf. [10][83]). With nothing assured ahead of commitment, motivation drives our sundry attempts to order our lives. Early conceptions stamp all later refinements through the growth of our brains (cf. [78]): software rounds into hardware as our mental acuities spread: first steps shape one’s last in a sequence of fixative actualization. We grow from what we do and learn, into the habits we form. This is a point worth stressing.

Science is not mathematics, statistics or even formalization; it trains our imagination to see relevant tradeoffs in choice through realistic causal links. To know what we do, our models must depict the world as it is. With all of our beliefs incomplete, we must try to base such essentials on inductive faith. The realism advocated here conflicts with Friedman’s defense of fallacious inference.

(c) A Critique of Friedman’s Unrealism

Friedman deems unrealism necessary and even advantageous. He opposes Robbins^[110] support of “postulates” stating “simple and undisputable facts of experience.” Friedman^[14] inverted the normal link “between the significance of a theory and the ‘realism’ of its ‘assumptions’”:

A hypothesis is important if it “explains” much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances surrounding the phenomena to be explained and permits valid predictions on the basis of them alone. To be important ... a hypothesis must be descriptively false in its assumptions; it takes account of, and accounts for, none of the many other attendant circumstances, since its very success shows them to be irrelevant for the phenomena to be explained.

So, according to Friedman^[14], “a theory cannot be tested by the ‘realism’ of its ‘assumptions.’” Friedman’s claim fails, however, due to its straw-man definition of realism as ‘descriptive completeness’, which

framing obscures any distinction of fundamentals from hypothetical constructs. For him, the only way to choose among “infinite” theories “consistent with the available evidence” is predictive power^[14].

Friedman’s dilemma over “infinite” but equally plausible theories arises from his equation of ‘plausible’ with ‘consistent’. Syllogistic consistency is simpler than defining relevance. As Robbins^[110] said about theory: “*applicability* ... depends on the extent to which its concepts actually reflect the forces operating in that situation.” But hypotheses cannot be treated discretely; they operate in networks of interrelation (cf. ^[30]). Once ideas are systematized, the range of feasible explanations is greatly reduced.

A more vital lacuna hides in another aspect of Friedman’s view. Once he throws our essential baby out with the incidental bathwater by defining realism as descriptive completeness, anything goes for acceptable theory if it is self-consistent. The claim makes any coherent thought depend on warranting tests or predictive validity, such as a cord from the earth to its moon. Lacking any inductive method to wring generalities out of particular observations, Friedman elevates ignorance into a form of uncertain belief. His “contradictory” evidence implies that clashes of fact may yield meaningful linkages somehow in conflict with real events. However, while raw data may be incomplete, only theoretical interpretations can be “contradictory.” Friedman, declaring all knowledge uncertain, awards any cohesive fantasy a licentious allowance. The issue of “infinite” theories says more on what Friedman deems evidentiary and consistent than any real lessons about science.

Lacking *ex ante* standards, any theory is credibly entertained: nothing can be excluded unless its predictions fail. Even this offers sere protection: we economists are trained to guard our theories from easy disproof, by finding new variables, shifting equational forms, with exogenous changes in data, etc. (cf. ^{[111][112]}). Friedman’s scientific claims are reflections of an old puzzle. Unwittingly yielding his grip on a boundless sea of data, Friedman ignores firm methodological limits set to prevent any incipient drowning of *terra cognita*.

To be fair, unrealism may be useful in ascertaining conditions. If findings stand up after relaxing assumptions, such are not essential (e.g., cf. ^{[113][114][115]}). Restrictive functions can divulge inferential limits, with comparative tests (cf. ^{[116][112]}). The irony is that any unrealistic conditions must be tested against more realistic conceptions!

To measure the impact of fanciful artifacts, we need a frame consistent with what truly occurs. Only by realism may we decode distortions in Friedmanesque constructs. Every insightful lens is selective; the art lies in choosing essentials. Stepping into fiction may enlighten us somewhat, but reliable guidance must

stand on realism. Fantasy opens insight at the cost of value in use, unless supported by actual facts. Accurate theories show the bounds of artifice, where realism overrules rigor. Otherwise, 'science' will lead us astray. Friedman's view has wrought destruction by sanctioning methodological license (e.g., cf. Reder 1987, in Palgrave 1987, Vol. I, p. 417).

(d) Science as Personal Search

Decisions are based on a ratiocinative valuation of fanciful images of future events. A view of action as *search* is offered by many insightful economists (e.g., cf. [43][9][102][103][41][31][117][118][45]). Kelly's^{[6][7]} [8] "central idea" treats "people as scientists"; a "utility seeker" is an "inquiring person." Earl^[9] sees our "patterns of choice ... [as] determined by patterns of thought." Loasby^[103] shares Kelly's view that "personality breakdown" occurs "when events are changing at a rate beyond the individual's willingness to adjust, or in ways that seem impossible to fit into any acceptable pattern." He applies this to paradigm shifts, where people limit their ranges of vision: "there does seem ... a need for alternative programmes that are substantially different." Earl^[43], looking at academics, surmises: "If a mature scientist is to undergo a personal scientific revolution ... such a transition, if made, would entail ... a scientific nervous breakdown." Organizational theory indicates that all systems – intellectual, psychological, institutional – behave in similar ways: firms, societies, individuals, even academic outlooks strive against change. Flexibility peaks with initial designs, before routines are imprinted, so openness is a survival necessity. Rigidity is inefficient.

We are born wanting to learn. There are two ways to greet the unknown: denial or welcome. Those eager for knowledge seek to learn novel events, while those upholding established structures spurn any intrusion. How we cope with novelty says a lot about us. Economists' defense against theoretical change shows this stubborn tenacity of paradigms, institutions and organizations. Models of economic advance should not dismiss all learning along with any novel (or different) perspectives; a greater intellectual latitude encourages and accepts economic development, while our resistance to unfamiliar and unexplored ideas impedes any growth in disciplinary knowledge. The matter may resolve around the notion of planning horizons.

(e) Conclusions on Science

Choices are made among options first seen with theory, then evaluated through the methods of science. With all unexplored options invisible, how we project them matters. Decisions show priorities, even

among models, making science inherently personal; learning calls for openness in theoretical systems and in academic behavior: induction is just as important here as deductive logic. Concepts shunning realism will lead our actions astray.

5. Homo Oeconomicus (Rational Economic Man)

(a) Introduction

Economics is complex; it is also one approach among many. Multiple outlooks invite us to judge the limits of each against all the others. The blinders on any particular vantage cannot be seen from inside: theories are silent on what they ignore. This is our 'Problem of Invisibility' again.

Here I limn some dominant themes in orthodox economics, from within and beyond their restrictions. Part of research involves selecting meaningful aspects from unbounded domains. Such commitments strive to balance the virtues and faults in a theory, ahead of its specifications. A fully informed decision is also impossible: laying out essential grounds stands prior to any analysis. We take up positions without knowing all of their ramifications: initially our ideas are implicit, taught by examples more than results. Once our habits of thought are imprinted, premises sink into tacit awareness. Such is how we slowly develop personal patterns of inquiry.

At first, assumptions are just asserted, ahead of awareness of full implications. None should skirt extant conventions: effective critiques should be informed. Unexposed to alternatives, students' doubts will be easily quelled. We study others' views to learn our own; one-trick ponies can only play in narrow realms of endeavor.

The crises splintering economics seem unreal to many economists. If we adhere to well-worn tracks, substantive faults will elude us. Selective blindness signals no warning of its silent omissions. Self-fulfilling constructions show only from outside their contents, being invisible until overcome.

'*Homo oeconomicus*' is an abstraction, not a likeness. Unrealistic constructs do a purified dance above facts and truth. If viewed against some honest counterweight, they provoke no objection. But if such models are used without testing their actual applicability to the real world, then we squander resources: this is the danger when our ideas are not held to their proper realms.

We start with Economic Man. Knowledge claims and timeless states are reviewed, along with interdependence, consumers' sovereignty, and the importance and relevance of First and Second Law

worlds. I close with a look at inductive vs. deductive models of thought.

(b) What is 'Rationality'?

Economic Man (*homo oeconomicus*) is perfectly rational, without informational limits and free of any uncertainty. How often are we blessed with Omniscience? Ignorance shrouds our every choice, if options are only imagined. When knowledge is scarce, treating it as free invites serious trouble. The issue rests on knowing our bounds, which is hard when trained to one view (e.g., cf. ^[42]). HHPeople protect commitments, if incursions threaten their worth. This is the risk of specialization: durability is not assured. To sidestep problems of knowledge does not void them; it deludes us! We have no escape from truth.

Economists should reformulate, not just these methodological laws, but theory itself. Information has welfare results and warrants horizon effects. Viewing choice as a process of 'multidimensional causal projection' nicely yields to horizontal theory. How well we frame our world determines our ranges of vision and the grounding of models in fact. Horizons also respond to priorities.

So, what is rationality? With knowledge unsure, reason becomes a matter of degree, assessed by how well our imagined projections show real outcomes. In the process of making choices, 'savvy' overcomes myopic concerns. New innovation embraces enduring effects shunned by orthodox statics (cf. ^[119]). We cannot see what we fail to explore; fixed designs under given conditions subvert any awareness of how dynamics shoves around our realms, creating a need for resilience.

(c) A Notion of Time and Dynamics

Static constructs saturate economists' education, despite a certain disfavor. Snapshot treatments shape choice. All these 'given' supply and demand curves, cost functions, possibilities, *ad nauseam*, poison our understanding. Attempts to incorporate time manifest in rapidly altering entities, that freeze slow-moving counterparts, skating across an icy glass. Institutions supply a context within which agents strive for gain. But these analyses screen their settings from view (cf. ^[120]).

Were we myopic and self-controlled, orthodox standards might work. As our ambitions span outward, however, theories supposing wants are immediate devalue enduring pursuits. Foresight describes more distant targets that lie beyond any instant view. Dedication is not just attitude; ignored, devotion dries up. Premises steer us to essentials, at the cost of all else. Seeing no value in learning and dreams, models of

thought accentuate and esteem myopic behavior. If so, they reinforce themselves in a dangerous self-feeding spiral.

We should examine our conduct (e.g., cf. [98]). Foresight ties to aspiration on subjective foundations. Approaches shunning human intentions shall never reap a deep perspective. All advances stem from good sense, especially in education. With hope, a sense of engagement and stable settings sufficient for long-term plans, society will likely improve and strengthen against stupidity. Horizon effects show in our cultural patterns of innovation, organization, and entrepreneurial learning. The role of imagination is to relax such constraints.

Thoughtlessness spreads confusion. Models without informational limits freeze our futures in now, with time mostly ignored. Directing attention away from human realities shall not open awareness. Futures left undreamed may dwindle unseen, never realized in deeds. Hope is the engine of effort, bringing trust in our visions' success. Without this assurance, novel commitments are ever left unexplored, stillborn.

What does this say about time and dynamics? Static constraints, short-term pursuits, partial analyses of some 'givens', all leave out temporal linkages and their impact on human endeavor. How we frame options shall matter. Every decision exists in time, joining now to later. Horizontal limits in choice are real, along with the costs of ignoring their role.

Intertemporal tradeoffs subsume an important part of reality. With events interdependent – and not just related as substitutes – complementarity must be embraced. Time is often neglected because sequential acts are self-reinforcing; they interact in nonrival ways. Cumulation is alien to a rivalrous frame^{[121][122]}^{[123][124][125]} (e.g., cf. Myrdal 1957). Knowledge and time must join in alliance for any realistic conception.

(d) Interdependence: Substitution and Scarcity

Homo oeconomicus is egocentric and self-sufficient, undeterred by neighbors and fully (even exclusively) aimed to personal ends. We may act in opposition, struggling over limited treasures at each other's expense, or at least that is the established view. Consumers sell labor for goods; producers seek gains over rivals; as everyone, by an invisible hand, is seen to strive for general well-being. If markets fail, we intervene to repair the imbalance.

Is this a true image of social relations? Realism matters; our actions spread their radiant impacts outward onto everyone. Substitution and scarcity are not a complete depiction of social relations. With

complementary and mutually reinforcing acts, separation fails: the integrative vitality of cooperation is sought, and competition gives way to collusion. Orthodox theory ignores all this.

Our standard conception of economics shuns critical aspects of action. “Perhaps substitution is central, as said. This suffering world is not drowning in goods, so scarcity must be endemic. How could one ever deny it?” But with complementarity, competition exacerbates scarcities solely relieved through cooperation! When teamwork contributes to effort, rivalries stifle output. In settings of mutual complementarity, competitive frames sabotage our well-being, due to false suppositions being applied where they have no rightful place.

We humans are not independent. Such claims stand on ‘economic convenience’. Summing up interdependent domains calls for rules of composition beyond simple addition (cf. [126]). If we imagine interdependencies spread across a spectrum of linkages, from complementarity to substitution, with independence set between them, our representations become more realistic than conveyed in neoclassical frames.

Social linkages offer meaningful lessons on human organization. Many argue interdependence means that treating us as separate leads to suboptimization due to misconstrued incentives. In this context, some maintain that markets cede to socialist planning (cf. [127][128][129][130]), especially if an imposition of property rights means fragmentation (e.g., cf. [131]). A proper recognition of sovereignty helps to resolve this imbroglio.

(e) Consumers’ or Individuals’ Sovereignty?

Ethical issues seldom appear in neoclassical economics. However, responsibilities secretly underlie our theory of price, setting consumers ahead of producers when their aims conflict, such as when splitting an inframarginal surplus (e.g., cf. [132]). Free competition is seen to shift value from producers to consumers by driving profits down to normal levels with firms open to entry, and thus increasing welfare for all. This is why firms dislike competition and try (especially in a Second Law world) to prevent or restrict it through entry barriers.

Also, theories should not pigeonhole agents; we all serve in diverse capacities. Wealth and fairness should shape well-being. Economists rank efficiency over equity, which is overstressed (cf. [133]). Economists’ exclusive focus on consumers stints everyone else. A failure to weigh First vs. Second Law issues is elemental. All exchange is not to advantage; predators also prowl. Ethics will matter here.

(f) A 'First' or 'Second Law' World?

How do First and Second Law conduct differ? One has rational action unfolding to mutual gains, while the latter reveals an ongoing struggle over rewards at others' expense. Which are the most dominant influences?

In an ethical world of enlightened self-interest, First Law acts should prevail. Even externalities can be curbed by conscience, so victims are not ill-served. In a trustworthy economic environment, everyone seeks to internalize spillovers, taking responsibility for what they do and for its impacts on neighbors. Institutions guard innocent parties from exploitation; none takes advantage of others: all is run by consent, so everyone gains from trade.

Such is not the case with unethical acts in a Second Law world. Seeking gain at others' expense subjugates civilization. Liberty also requires that no one chooses to use force; the option to harm is exercised at the cost of freedom, if we are to be considered innocent till proven guilty. These are hard truths. Self-control is an essential key to orderly organization (cf. ^{[17][69][71]}).

Every system moves within some sort of horizontal balance. Just as enlightened souls may act on crazy impulse, thieves show honor at times. Many collusive gains stay out of reach if agents cannot work together. All societies offer conflicting allures; though myopia undermines loftier plans, even criminals need reliable allies to prevail.

A useful way to frame the issue is with horizon effects. If foresight implies a First Law world of acts supported by trust, organizations work best with respect for each other: reputation is vital to implement long-term plans. Practical ethics also call for openness in noncoercive venues. With morals scorned as idealistic, conflicts shatter into selfishness; specialization moves out of reach, to our great disservice.

The difference of First from Second Law worlds is *horizontal*. Myopic behavior radiates impacts; this short-sightedness turns on the degree of foresight in our actions. Also, current decisions will limit future results, in the absence of any anticipation of enduring effects. Planning gives us some control over entailing constraints. The degree of our rationality lies at the core of efficient design.

These two Laws subsume many actions. In a myopic world, threats of entry can be ignored; immediate profits seem more real than long-term projected potentials. Prices are raised for rapid rewards, with ongoing future returns ignored. There are no data on such tradeoffs; we never know what we miss. When we act in the moment, we cannot see our unattained futures.

A Second Law world is myopic, captured by an insatiable license. Here, 'if everyone cheats, I'm a fool to be honest.' This self-reinforced trap can be opened by ethical lifelines. But, with morals inured to rational limits, all liberty is in danger. Only through education and longer planning horizons, might we foster a First Law world of peaceful association, while if we remain narrow, uncaring and selfish, all of these energies lost to strife could direct us better. Are we too blind to see our own role in these ethical losses?

Our problems stem from a fear of openness. We live at the end of a long legacy of moral claims subject to scorn. When nothing is known for sure, then anything goes. A flight from reason is evident in what passes for economics today. Defining realism as descriptive completeness (cf. [14]) severs ideas from sense; deductive fancies segue into unbounded taxonomies (cf. [10]). Do we have a realistic alternative?

(g) Inductive vs. Deductive Method

Inductive verification is impossible, lacking a standard of truth. We can never be sure that any belief will be confirmed by evidence, but that does not make all learning shaky! Ideals of fixed knowledge are flawed; theory is personal and contextual in an always evolving domain. To hold deduction as more reliable than induction is silly; novel ideas steer choice to new worth. Applicability is the primary source of value for any theory.

Axiomatic constructs thrive on functional logic, covering fantastic conceptions of factual license. Assumptions state the 'ifs' that define the applicable limits of findings. Spurning correct for convenient devices subverts attention from meaningful guidance onto inscrutable elegance. Coherence to truth is a standard of science, just as shunning facts spurs a range of fanciful constructs unattached to reality (cf. [30][134]). Such unbridled delights shall distract us from meaning; Friedman's unrealism has tragic costs.

What we need is to supplant deductive veracities with inductive versions. Many insights appear when normal conventions are relaxed; economists' stubborn ignorance of philosophy is a key problem! Methodological openness should be central to economics, in a wide array of diverse psychological, biological, organizational, and historical linkages. Planning horizons will serve to enlarge our ranging perspective into such matters.

(h) Conclusions on Homo Oeconomicus

Is *homo oeconomicus* still of value? Serene, unassailed by surprise, seeking clear and consistent desires in fully known environs, this form maintains a noble edifice of economic contentions. If reason were always

unbounded and contentions so easily ascertained, these suppositions should not be a problem. But, change and uncertainty are endemic, so more realistic representations of choice remain indispensable. Unrealistic constructions are not reliable guides to action. Our ranges of vision are also rigidly bounded by surprises in horizontal theory.

The proof of my claims stands with their application to reality^{[30][135]}. With no better alternative, we defend the established approach, with all critique cast out as empty. There is a path through these snares; Simon^[13] showed us the way, within the bounds of our rationality.

6. A Theory of Planning Horizons

(a) Introduction

Herbert Simon introduced us all to the notion of “bounded rationality,” though he did not develop a formalized analysis that treated these bounds as a variable; that task was left to our horizontal theory. The underlying point is that every decision we make instantiates a planning horizon, implicit in the range of outcomes taken into account prior to their implementation. We make all our choices on the basis of imagined projections of consequences, all of which have a horizontal range in the imagined projections thereof.

Those projections have a particular reach, ahead into time and about us in physical, social and ecological space. The extent of our radiant impacts can also be seen as a horizontal index of *conscience*, which makes this an ethical issue within economic analysis. The background assumption here is that everything is interdependently linked, that all we do ripples effects outward forever on everything and on all living creatures, whether and to what degree we are aware of this. Indeed, in most of our education, we are taught about independence, so we can split things apart into discrete events instead of treating them as intertwined, despite the reality of these connections.

To introduce horizon effects (as ordinal changes of horizontal range) into our theoretical framework casts some meaningful implications into a larger perspective. For example, their relation to price-setting opens several novel insights absent from neoclassical theory, that imply an unfortunate incompleteness in our established analyses. Second, the two aspects of interdependence – substitution and complementarity – always exist in some sort of balance, most clearly seen in network contexts. Third, the fact that our planning horizons interact with each other in mostly complementary ways suggests that they have an interpersonal linkage that should be included. Fourth, within this frame, it can be shown

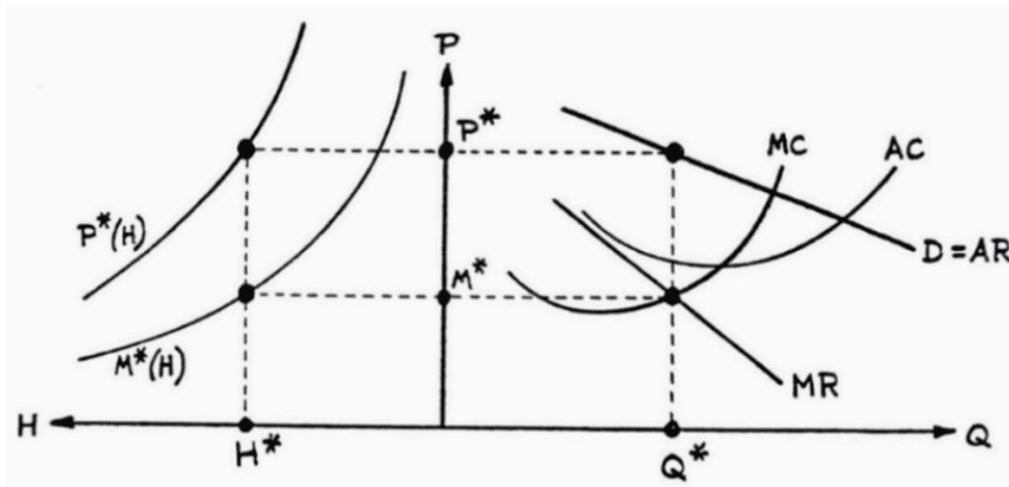
that the very nature of social relations is *horizontal*; that horizontal growth will shift our interdependence away from substitution toward complementarity, which necessitates a concurrent institutional transformation from competition in favor of a more cooperative frame to support the extension of our planning horizons; otherwise, this important development process will be stifled by myopic concerns.

(b) The Relation of Planning Horizons to Price-Setting

After I had already worked this out, I found Margolis'^[136] paper that explained it correctly:

...the greater the uncertainty, the greater will be the variable costs because of a reluctance to commit the firm to best processes and the greater will be the fixed costs because of a shortening of the planning horizon. The implications of the above are that the greater the ignorance of the market the higher will be the estimate of the costs and the more inelastic the estimate of demand.

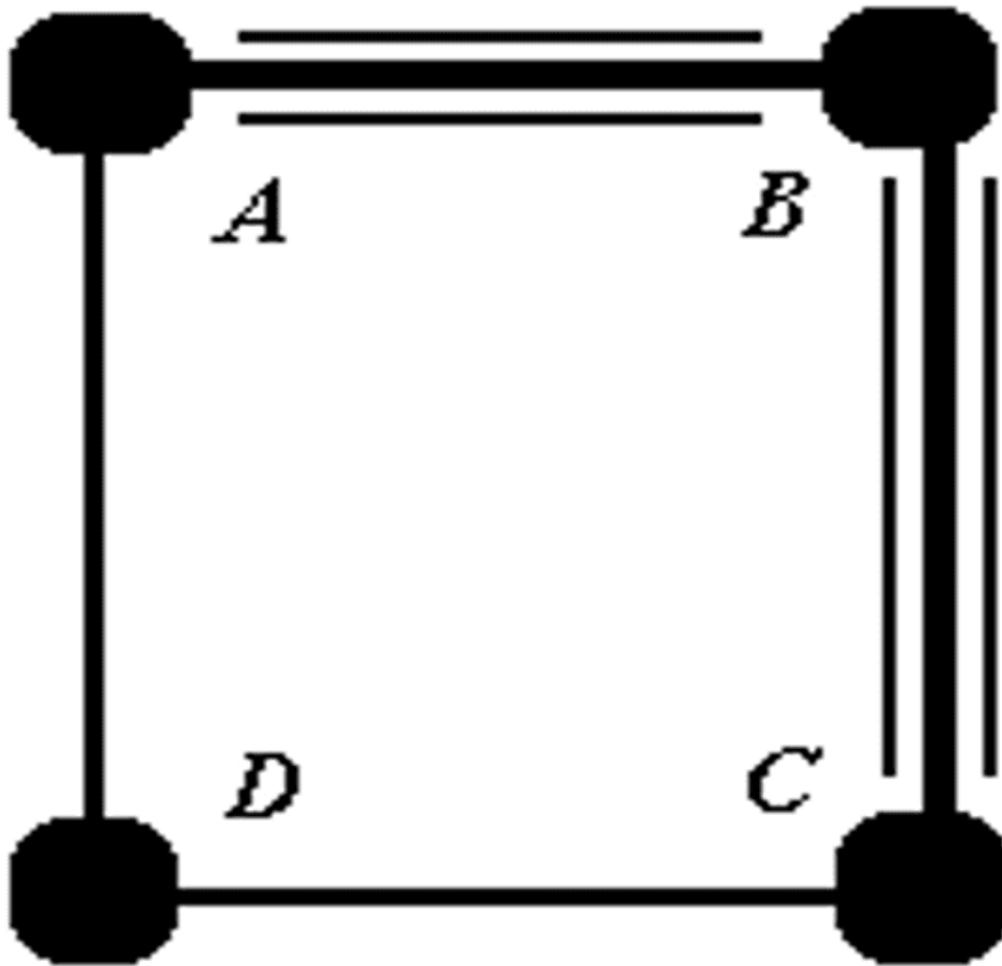
He didn't formalize the point, but that can be easily done based on the first-order conditions for the maximum-profit definition of $P^* = M^* \times E^*$, where $M^* = MC = MR$ at Q^* and $E^* = \epsilon^*/(\epsilon^*+1) > 1$ where ϵ^* is the elasticity of demand. What Margolis is saying above is that, because $dM^*/dH < 0$ and $dE^*/dH < 0$, then $dP^*/dH < 0$ also. The second-order conditions are similar: $d^2M^*/dH^2 > 0$; $d^2E^*/dH^2 > 0$; and $d^2P^*/dH^2 > 0$. Furthermore, if that is the case, the neoclassical explanation of P^* is incomplete, without specifying H^* which will change P^* . Horizontal growth (toward a larger H^*) will flatten the demand curve and therefore raise its elasticity, reducing E^* , and it will shift the slopes of both MC and AC curves downward along with M^* . Margolis did not see this explanation as revolutionary, as he and his discussant^[137] deemed it as simply a minor refinement on the successful theory of perfect competition. But this relation takes on a much more revolutionary character in the presence of increasing returns^[138] [139][121][123][124][140][141] (Jennings 1985), under which the competitive frame must fail. That is how planning horizons and horizon effects shape price-setting for an individual; they also interact directly through interhorizontal complementarity.



(c) *The Network Nature of Interdependence*

In network contexts, the nature of our interdependence comes in two flavors: substitution and complementarity. One way to understand this is by considering a simple transportation network case, with 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 between B and D, and they are complements for travel between A and C. In any transportation network or complex system within any economy, nondecomposable linkages of substitution and complementarity are the rule and not a special exception: AB is tied to all other routes in interdependent systems of feedback which are not readily untangled. The point is that we must include both types in our analysis.

In interdependent network contexts, substitution and complementarity occur together in some sort of balance, subject to external influences that we need to discover. So, not only is substitution not the sole form of social relation, as in neoclassical theory, but also the very balance of substitutional connections and complementary interactions may be sensitive to other influences, such as those from horizon effects, as shown below. Once we open our economics into a recognition of more complex relations of interdependence, and move beyond the narrow simplicity of ubiquitous substitution assumptions, our analysis shifts in interesting ways.



(d) Interhorizontal Complementarity

Private horizon effects are contagious, so they spread outward to become social horizon effects, almost always in the same direction as the initial stimulus. So, $\frac{dH_{i;j}}{dH_j} > 0$ in most cases; the sole exception that I am aware of is a jealous reaction to a friend's success, where that friend's horizontal growth is greeted with a myopic response. But other than that, one person's horizontal growth will likely yield a similar reaction in neighbors. This is a premise that underlies other important relations, such as the horizontal sensitivity of our interdependence. It also offers a novel form of interpersonal connection, through the direct impact of one person's horizon effects upon those of proximal others affected by this

change. Horizon effects shift together in a contagious way, with an array of important implications on how our social relations are influenced by horizon effects.

(e) *The Horizontal Nature of Economic Interdependence*

There is another important implication that comes out of this horizontal theory of pricing, most especially when applied in network contexts. Here, we find a nondecomposable tangle of substitution and complementarity within any group of price-setters, unlike in the ‘industry’ concept that restricts our relations to substitution. The net interdependence of any single member with respect to 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), such that we end up with $P' = P^* + S_I$. In this setting, S_I is a measure of the net interdependence within that group I with respect to one member. In this case, $S_I > 0$ implies net substitution, and $S_I < 0$ means net complementarity, which can be written as $S_I = P' - P^*$. It can be shown (cf. Jennings 2008, p. 285), with interhorizontal complementarity – that $\frac{dH_{i \neq j}^*}{dH_i^*} > 0$ where private horizon effects are socially contagious – that our economic relations are sensitive to our horizons, so that $\frac{dS_I}{dH^*} < 0$. This shows how our economic relations – and thus the balance of substitution and complementarity in any network context – are *horizontal*; in sum, longer horizons shift this balance away from conflicts toward concerts of interest. Instead of taking our interdependence as ‘given’ and therefore fixed, the nature of our economic connections is responsive to both private and social horizon effects.

(f) *Atoms, Bits and Wits*

Once we have recognized that our economic connections come in two forms, and not just one, the implications of this insight should be explored. As standard theory has taught us, substitution calls for competition in social organization, but complementarity – less well known – wants cooperation. If, as shown above, horizontal growth shifts our relations away from substitution and in favor of complementarity, then our institutional systems should also evolve from competitive to cooperative frames. Otherwise, that horizontal growth process will be stifled, due to the myopic culture that competition encourages. Competition assumes substitution in its social relations; it does not work for complements. So, the question arises as to which type of interdependence is dominant in which sorts of situation. That is an issue well addressed with three basic concepts in economics: atoms, bits and wits.

Atoms are realms of physical goods; bits are realms of intangible or informational goods; while wits are realms of planning horizons. Furthermore, the role of increasing returns^{[138][139][121][123][124][140][141]} (cf.

Jennings 1985) is also relevant here, because – as Kaldor^[124] explained – increasing returns shall make complementarity “far more important” than substitution. If so, then the neoclassical case for competitive frames should be reassessed as a special case in a more general context of complementarity, based on increasing returns. So, how are atoms, bits and wits related to our interdependence?

For atoms, short-run decreasing returns – due to cranky inputs, some of which are effectively fixed in any short run – will cede to long-run increasing returns when all inputs are variable. So, substitution only applies to short-run atoms, which become complementary in all long run contexts. As for bits and wits, they are always subject to complementarity, due to increasing returns. In other words, substitution only applies in the narrow realm of short-run atoms, while complementarities pertain everywhere else as a more general case, making the case for competition a very restricted special case with the general case being for cooperation due to complementarities.

In sum, the neoclassical case for competition is not universal; it is in reality a narrow special case that does not apply in most situations that – due to the universality of increasing returns – are characterized by complementarity, making a general case for the efficiency of cooperation. Neoclassical economics has treated substitution as a universal principle of social relations, while it only applies to short-run atoms but nowhere else. In other words, the general efficiency case is for complementarity and cooperation, not competition.

During the 1930s debates in economics on the theory of costs, increasing returns were taken as a universal truth. The debate was focused on how to incorporate this principle into economic analysis, based in large part on Pigou’s two^{[138][139]} papers along with one by Young^[121]. Curiously, subsequent to ‘The Hicksian Getaway’^[142] and ‘The Hirshleifer Rescue’^[143] along with Oi’s^[144] discussion, in 40 short years from 1928 to 1968, the main belief in economics flipped from increasing to decreasing returns as a “general and universally valid law” of economics^[145]. The problem is that the two foundations for this shift were asserted without any proper justification: ‘The Hicksian Getaway’ simply denied the reality of increasing returns, and ‘The Hirshleifer Rescue’ of decreasing returns is based on an incorrect ‘proof’ that – once reformulated sensibly – turns around to a clear justification of increasing returns^{[140][141]} (cf. Jennings 1985). If so, then neoclassical claims about substitution as a general case underlying competitive efficiency are grossly incorrect; the general case is complementarity, yielding a case for cooperative efficiency based on increasing returns.

7. Conclusions

This essay began with a series of discussions about the nature and challenges of choice, theory, value and science. First, choice is necessary and unavoidable, based on invisibly imagined projections within a context of full interdependence, all of which open up problems within the neoclassical representation of these issues. Second, theory is also a necessary aspect of choice, as an open process of selective focus on observed reality, which also entails a restrictive blindness on all that is being ignored. A third section on value involved a number of issues: a distinction of ‘positive’ from ‘normative’ science; the individualistic foundations of economic welfare, in which we are stuck within our own feelings; a review of the history of value theory from labor time to Marx’s view, and then through cardinal and ordinal utilitarianism, up into marginalism and Marshall’s supply and demand as an explanation of price; how value relates to person, purpose and place; the role of transactions as units of economic analysis; explanations of the First and Second Laws of Economics; how institutions are expressions of value; and the difference of ‘things’ vs. ‘goods’ as a creative process.

The fourth section addressed science, first in its three types – deductivism, empiricism, and realism – and then, after a critique of Friedman’s^[14] case for unrealism, looking at science as a process of personal search. A fifth section on *homo oeconomicus*, or ‘rational economic man’, started with rationality, especially in a context of time and dynamic change, not to mention full interdependence, and then turned to the notion of consumers’ sovereignty and the difference of First from Second Law worlds, based on ethics as well as planning horizons, and ending on the distinctions between inductive vs. deductive methods in economics.

Finally, in a sixth section, we turned to the notion of planning horizons as a formalization of Simon’s^[13] ‘bounded rationality’, to show how H^* relates to P^* and how our interdependence is composed of two types (substitution and complementarity) and not just the first of these, as assumed in neoclassical theory. Then we examined how our H^* s interact interpersonally to turn private into social horizon effects, and on that foundation, to show how the balance of substitution with complementarity is affected by horizontal growth (raising H^*), which shifts that balance away from substitution toward complementarity, thus away from conflicts to concerts of interest. This transformation engenders a need for our social institutions to evolve from competition to cooperation to support this process of growth and maturation. If our organizational forms do not adjust in this way, this process of horizontal growth is stifled by a dangerously myopic culture rising from competition.

The bottom line of these arguments is that, with choice seen as a process of subjective valuation and imagined projection, the whole notion of planning horizons – placed at the bounds between what is currently known and the vast, unbounded realm that ventures beyond our understanding, in the context of uncontained interdependence – appears to have an important impact on not only pricing decisions but also on social relations. Here, horizontal growth shifts the balance of substitution and complementarity in any situation away from conflicts to concerts of interest, which in turn demands that our institutions evolve from competition toward cooperation or this growth process will be stifled under a dangerously myopic culture. The horizontal case for cooperative efficiency is strong.

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