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Review of *Economics Imperialism versus Multidisciplinarity*

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Economics imperialism versus multidisciplinary

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Shifting Boundaries: Economics in the Crisis and the Challenge of Interdisciplinarity

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Abstract: This paper examines the implications of Chicago School economist Edward Lazear's 2000 defense of economics imperialism using standard trade theory. It associates that defense with interdisciplinarity or the idea that the sciences are relatively autonomous, but treats this defense as a mask for a more conventional imperialist strategy of promoting Chicago School neoclassicism. Lazear's argument actually created a dilemma for Chicago regarding how it could espouse interdisciplinarity while operating in a contrary way. I argue that the solution to this dilemma was for neoclassicism to rebuild economics imperialism around neoclassicism as a theory that sees the world in its own image in a performative manner. This strategy, however, suffers from a number of problems, which upon examination ultimately lead us to multidisciplinary or the idea that the sciences can have transformative effects on one another. This latter conception can be associated with a complexity economics approach as an alternative view of the relation between the sciences. The paper argues that this view provides a basis for pluralism in economics.

Keywords: economics imperialism, Lazear, Chicago School, interdisciplinarity, multidisciplinary, performative, 'science naturalism', Wittgenstein, pluralism

JEL codes: A12, A13, B20, B40

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1. Reorienting thinking about economics imperialism

Economics imperialism concerns the relationship between disciplines, particularly the social science disciplines, and was originally associated especially with Gary Becker's extension of neoclassical reasoning to non-market domains of social life investigated by other social sciences. It is a much debated subject when the status of economics as a discipline is discussed. Yet the meaning of economics imperialism has not really been discussed specifically as a direct expression and application of the economic thinking of its chief proponents, namely, the Chicago School of neoclassical economics. Nor, it follows, has what the Chicago School understanding of economics imperialism implies about the relationship between the social science disciplines really been examined. As a result, discussions of economics imperialism either address issues quite removed from what drove the Chicago School theoretically to actively defend and promote the economics imperialism idea, or they focus on the critique of neoclassical theory in defending alternative theories. The first set of discussions has thus focused on philosophy of science issues associated with whether the content from one science can be epistemically accommodated in other sciences (e.g., Mäki, 2008). The second set of discussions has objected to the transfer of neoclassical ideas to other social sciences on the grounds of their inherent inadequacy and misrepresentation of the nature of social relationships studied in those sciences (e.g., Fine, 2000, 2002; Fine and Milonakis, 2009). While these arguments are valuable, they do not expose the Chicago School's neoclassical conception of the relative autonomy of the social sciences and its implicit understanding of the relationships between the sciences, a view I label interdisciplinarity.

What I will do in this paper, then, is re-examine economics imperialism as a direct expression and defense of Chicago School neoclassicism, neoclassicism's strongest current. I have two particular goals in doing so. First, I want to use this discussion to make the claim that the evolutionary pathway of neoclassicism's economics imperialism is to become a performative program in the specific sense of a theory that sees the world in its own image or as a mirror of itself. I believe this performativity aspect of Chicago School imperialism is largely overlooked. Second, I want to intervene in the debate over the nature of the relationships between the disciplines, in particular to argue in support of a complexity-based multidisciplinary view as an alternative to a neoclassicism's interdisciplinarity view of the relationships between the disciplines. I will suggest that this route provides a desirable defense of economics pluralism.

The second section of the paper examines Edward Lazear's (Lazear, 2000) trade theory-based defense of economics imperialism that purports to treat imperialism as a trade in ideas, not an

imposition of ideas, which produces gains from trade for the sciences and is Pareto efficient. I discuss the way in which this argument defended Chicago against a very real threat of reverse imperialism, and how that defense supported the idea of interdisciplinarity – the key associated idea that the sciences have a relative autonomy from one another.

The third section argues that this defense was hollow, because Chicago knew perfectly well by 2000 when Lazear wrote that trade theory in the real world had to accommodate international capital movements, so that by analogy the sciences more realistically could imperialistically invest in one another despite the rhetoric of free trade. This provided a *sotto voce* stronger defense of economics imperialism because Lazear remained silent about this implication, and stuck to his gains from trade interpretation. At the same time, this created a dilemma for Chicago, because its efforts to promote Gary Becker's views (which Lazear had billed as 'trade-worthy') implied multidisciplinary – the idea that sciences could indeed have transformative effects by investing in one another. This sat badly with Chicago's core commitment to one of the main foundations of rational choice theory, the relative autonomy of agents – in this instance the relative autonomy of social scientists with their own disciplinary preferences in other fields – and left Chicago with the need to evolve a new strategy for defending economics imperialism.

The fourth section describes this new strategy as a performative one whereby economics always sees the world in its own image. To see the world in its own image, then, economics needed to model science exchange relationships across the social sciences as if scientists were autonomous individuals. Yet this modelling instead imposes neoclassicism's view of itself on other sciences. At the same time, for this strategy to be successful, economics also needed to advance new doctrines which both presupposed other scientists' autonomy and somehow might bend their practices to actually fit the neoclassical image of the rational agent. This then occurred through the promotion of such programs as mechanism design and nudge theory, which constitute means of changing other agents' preferences while yet claiming all individuals are autonomous and rational. Contrary to the view that these programs are a departure from rational choice theory, I take them to be intrinsic to the evolution of neoclassicism from a science claiming rational choice is descriptive of the world to a performative science intent on securing the practice of rational choice behavior in the world.

The fifth section argues that this history makes the case that *multidisciplinary* better characterizes the relationships between the sciences. It argues that the ideal of interdisciplinarity that the Chicago school defended (while nonetheless acting against it) rests on a view of what distinguishes the sciences that is not persuasive. I set this out argument in connection with a critique of the

philosophical commitments underling interdisciplinarity, using arguments from the thinking of the later Wittgenstein. Finally, the last section discusses what this all implies for the defense of pluralism in economics and science.

2. The Chicago School's trade theory defense of economics imperialism

Trade theory, specifically standard Heckscher-Ohlin theory of trade between nations, did not originate at Chicago, but it was fully consistent with Chicago's emphasis on competitive markets and efficiency. The ideas of specialization, comparative advantage, and gains from trade were classical, but Chicago welcomed the *neo*-classical way of using them in trade theory. So it should not come as a surprise that Lazear used trade theory to defend economics imperialism, making the argument that economics possessed a comparative advantage vis-à-vis other sciences in connection with its specialized capacity for abstraction, and consequently in being more rigorous and analytic than other disciplines (also see Stigler, 1984; Hirshleifer, 1985). The special strength of the argument, moreover, was that it made the imperialism idea, a term of seeming opprobrium, instead a defensible badge of honor for Chicago.

It is the ability to abstract that allows us to answer questions about a complicated world. As economists, however, we believe in comparative advantage. I have argued elsewhere that the strength of [neoclassical] economic theory is that it is rigorous and analytic But the weakness of economics is that to be rigorous, simplifying assumptions must be made that constrain the analysis and narrow the focus of the researcher. It is for this reason that the broader-thinking sociologists, anthropologists, and perhaps psychologists may be better at identifying issues, but worse at providing answers. Our narrowness allows us to provide concrete solutions, but sometimes prevents us from thinking about the larger features of the problem. This specialization is not a flaw; much can be learned from other social scientists who observe phenomena that we often overlook (Lazear, 2000, p. 103).

Economists, that is, specialize in abstraction and rigor as their comparative advantage, but trade with other social scientists who specialize in "broader-thinking" as their comparative advantage. This produces gains from trade for both and a higher overall level of well-being across the sciences as

compared to what would be the case under a regime of 'science autarky' in an exchange between the sciences that then effectively amounts to an 'implicit' market for scientific ideas.¹

Thus, contrary to the view that most had, economic imperialism on this understanding does not involve an imposition of economics' ideas on other sciences or any other exhibition of disciplinary power, since the trade model underlying the argument assumes that trade is free. Indeed, any free exchange or trade between sciences would also be Pareto efficient (under the first law of welfare economics), so it follows that all sciences should actually prefer such exchange, or at least regard themselves as no worse off with it, which undermines the idea of one science imposing itself unwillingly on other sciences.

Moreover paradoxically, the theory actually requires a 'reverse imperialism' or the import of other science ideas into economics to successfully count as a theory of trade. Of course most commentators on economics imperialism focus on economics' effects on other disciplines rather than the reverse, but this may be disciplinary myopia. While 'reverse imperialism' is indeed a more recent term, no doubt other science imports into economics – particularly game theory in the 1980s from mathematics and behavioral reasoning in the 1990s from psychology – were already well recognized by the Chicago School when Lazear defended and advanced his trade theory of economics imperialism in 2000. In the next section I will offer a second rationale for Chicago's defense of the economics imperialism idea, but note here in connection with the other-science influences on economics that interpreting economics imperialism in terms of trade theory had the convenient advantage of requiring that economics, like a trading country, be seen as a relatively autonomous discipline with its own independent concerns even though it was importing ideas from other sciences that might threaten its own autonomy. Thus, if the autonomy of economics might have seemed in jeopardy to Lazear and others at Chicago when he wrote, his trade theory interpretation of imperialism provided a convincing argument that this could not be the case since most economists assumed that the theory of comparative advantage was irrefutable.

Let me at least suggest, however, that the Chicago School and neoclassical economists generally indeed had good reason to be concerned about the autonomy of economics for the following reason. The incursions into economics from mathematics and psychology might not have been threatening to neoclassicism if the core of the theory had not also apparently failed. Indeed, game theory only

¹ I say 'implicit' but strictly speaking Becker's extension of neoclassical trade theory to non-market domains reframed the market process more generally as a hedonic process so that for the Chicago School there is really no important distinction between traditional markets and 'implicit' ones.

began to gain credibility in economics (having been conceived before the war and largely forgotten) after the destructive Sonnenschein-Mantel-Debreu results demonstrated that the idea of multi-market general equilibrium was no longer viable. Chicago was not a center for general equilibrium theory, but it could not but have been concerned that some in the profession were arguing that the breakdown of Walrasian multi-market reasoning signaled a possible paradigm collapse in economics whereby market-based equilibrium theory could be replaced by a players-based game theory (see Rizvi, 1994).² Hugo Sonnenschein in fact was president of the University of Chicago from 1993 to 2000 (and also a professor of economics). Richard Thaler, the behavioral economist, joined the business school at Chicago in 1995. So not only was core neoclassicism in question, a weakness internal to the Chicago School, but external forces from other disciplines had made their way onto the Chicago campus itself! From this perspective, then, Lazear's economics imperialism argument can be seen more as a defensive strategy for Chicago than an offensive one.

Were it in fact simply a defensive strategy, then it can be argued that an unintended consequence of the Lazear's defense of economics imperialism and the relative autonomy of (neoclassical) economics was its accompanying commitment to a particular methodological position regarding the nature of the relationships between the sciences, namely, that the sciences in general are relatively autonomous. I characterize this as the interdisciplinarity view, which has as its chief claim the principle that the sciences are relatively independent, and cannot be fundamentally transformed by their interaction. The sciences have, as it were, or put in Chicago School terms, their own exogenous science preferences regarding the explanation of their respective subject matters. A corollary of this view, then, is that the relation between a science and its subject matter must be largely fixed. There accordingly always exist the same, perennial concerns in every science, and these concerns effectively differentiate each science from every other science.

It is fair to ask, of course, is interdisciplinarity a correct view of science? Are the sciences indeed relatively autonomous? I will address these questions below, and here simply point out two philosophical commitments that the interdisciplinarity view involves. First, technically speaking it implies that the theoretical means by which we differentiate sciences – what I term their individuation criteria – root their relative autonomy in a relation between the world and a science's own conceptual content alone. In effect, it assumes a theory of reference that requires that the set of concepts a science uses denote things in the world without links to the sets of concepts used in other

² This break-down was all the more upsetting because many economists had only a few years earlier regarded the Arrow-Debreu model as the paramount 'scientific' achievement of modern economics.

sciences.³ Second, it implies what might be termed ‘science naturalism’ or the idea that the world alone ultimately determines knowledge. Alternatively, nothing in the way in which knowledge is developed, constructed, and created influences the content of knowledge.

Below I will ask: how does the interdisciplinarity view contrast with a multidisciplinary view of science relationships? But to introduce that discussion the following section asks a prior question specific to Chicago: how should we understand its advancing a trade theory interpretation of economics imperialism in light of the fact that a number its key assumptions clearly did not apply at the time it was advanced?

3. Reassessing Chicago’s comparative advantage theory of economics imperialism⁴

My view in this section is that Lazear and others at Chicago not only knew full well at the time he used trade theory to explain economics imperialism that trade theory did not correctly describe the international economy in 2000, but, more importantly, also probably understood clearly how this would make his Pareto optimality characterization of economic imperialism misleading. While invoking the theory had the advantage I describe above as a providing a persuasive defense of an internally weakened neoclassical economics against reverse imperialism, I will argue that it also had a more subtle, *sotto voce* advantage associated with a desire to see the scope of neoclassical economics extended over other disciplines in a more conventional imperialist sense.

There are many assumptions, of course, underlying standard trade theory, but I will focus only on those assumptions that are instrumental to supposing trading countries have a relative autonomy. In the theory, trade works as a substitute for the movement of capital and labor resources between countries that would otherwise occur through foreign direct investment and immigration. Capital and labor are thus fully immobile between countries and fully mobile within countries, and this combination thus makes countries relatively autonomous. However, after the 1971 demise of Bretton Woods and the emergence of the US dollar as the world’s reserve currency, capital became internationally mobile, and by 2000 when Lazear wrote could hardly be said to be confined within

³ My treatment here is parallel to my identity theory treatment of individuation criteria as applied to the individual conception in neoclassical economics (Davis, 2013). The same theory of reference that works there to produce the atomistic individual account works here to produce, in effect, an atomistic science account.

⁴ This section is dedicated to the memory of heterodox economist Robert E. Prasch (1959-2015), whose “Reassessing the Theory of Comparative Advantage” critique of *laissez-faire* economics (Prasch, 1996) provides the inspiration for this section.

national boundaries. From a production perspective, this was manifest in the rise of global firms that could operate in any country whatever their national origins.

Technically speaking then, countries can still trade according to comparative advantage, but the resource base they employ is no longer solely their native endowments as originally assumed in the theory and before by David Ricardo. Indeed, France might enjoy comparative advantage in a certain type of export by relying on English capital. Thus its economic national identity from the point of view of the theory becomes nominal rather than real in the specific sense that while its resource advantage still lies within its geographic boundaries, those resources and the gain they generate can be under foreign control and accrue to England, so that economically speaking France's real economic identity is less clear. In trade theory, of course, a matter such as profit repatriation, which the ownership control issue would reflect, is treated as a financial transaction that falls outside the boundaries of the theory, and thus can be *ceteris paribus* (!) ignored. So while France's comparative advantage from an export made possible by English capital would still accrue to France, it is well possible on another level that this advantage would really accrue to England.

This may seem a fine point from the viewpoint of theory, but as people are well aware today it is hardly a fine point when it comes to thinking about who has power in their economies. In identity terms, if foreign capital dominates the economic affairs of a country, *de facto* that country's national identity is in some way determined by that foreign capital or by those nations from which it originates. This point is made stronger if we consider the unrealism of another assumption trade theory makes: diminishing returns. Diminishing returns tends to secure a competitive environment. In those circumstances we could then say that foreign capital is no better off than domestic capital since diminishing returns works against the emergence of monopoly power. But clearly increasing returns exist in many industries, consequently competition need not prevail, and therefore monopoly power can accumulate, especially in the hands of global firms that are large relative to national firms.⁵

What I believe, then, is that Lazear and others at Chicago knew full well at the time he advanced his trade theory account of economics imperialism that an updated trade theory allowed that countries' national identities were better regarded as nominal, and that countries economic affairs could be directed in some considerable degree by non-nationals. I also believe that people at Chicago could additionally see what this implied about Lazear's trade theory of economics imperialism. After all,

⁵ The argument that even large firms will behave competitively – the contestable competition idea (Baumol, 1982) – assumes there are low barriers to entry and exit from markets. This condition likely does not reflect the advantages large global firms have in international markets.

these were skilled economists who had already generalized the principles of neoclassicism to multiple settings. How, then, should we interpret that theory?

I suggest that we think in terms of how the theory worked simultaneously on multiple levels, namely as a trade theory and also as an expression of the ideal of interdisciplinarity. The former made Lazear's argument about economics' scientific comparative advantage being rigor. The latter had a normative message that would have been appealing if the comparative advantage argument seemed contrived and an unrealistic representation of the world of science. Together they ran counter to the widely held view that economics imperialism was simply an exhibition of power. Presumably most people outside economics were largely uninterested in if not just unacquainted with the trade theory part of the argument. The more subtle idea that the source of a science's nominal gains might actually accrue to another science was perhaps also an idea that only economists would seriously entertain. So what was important was less the trade theory view than the interdisciplinarity view it entailed, even if this had been unintended at the outset. This would have then left the door open for Chicago to actively promote its disciplinary 'foreign investment' in Becker's extension of neoclassical principles to ostensibly non-market domains that other sciences investigated – not a trade in ideas but rather a one-way transmission of Chicago ideas.

I suggested in the last section that under the effects of reverse imperialism Lazear's trade theory of economics imperialism in the first instance functioned as a defensive strategy. But that took the theory at face value, and in light of the historical environment in which it was produced the theory ought to now also be said to function as an offensive strategy that sought to defend neoclassical economics by extending its domain under the cover of a popular interdisciplinarity banner. In effect, the best defense is an offense, especially when the latter is masked!

Of course scientists regularly work on multiple levels simultaneously because the theories they advance are frequently accompanied and justified by the methodological claims they make about their theories. Often these levels are meant to be broadly consistent with one another. But it is not uncommon for scientists to make methodological claims for their theories that are more generous than their theories can support. One not uncommon variant of this is the extreme case whereby the methodological claims made for a theory are so generous as to actually give a false or misleading characterization of that underlying theory. Many would call this an ideological sort of representation of a theory. Lazear's trade theory of economics imperialism, then, seems to be a paradigmatic example of this, since it presents a methodological view of the relationship between the sciences,

interdisciplinarity, which is quite the opposite of what the theory realistically implied, and was likely thought to have implied by its proponents.

Yet there is a contradiction in Lazear's multiple level strategy. Assuming Chicago economists could see behind Lazear's argument, they would know that interdisciplinarity did not represent the true state of the sciences. Indeed, given the recent successful incursions from other sciences into economics, they already had reason to worry that sciences might indeed have transformative effects on one another – the idea of multidisciplinary, not interdisciplinarity. Yet at the same time they could not accept multidisciplinary, not just because it rendered Lazear's trade theory defense of economics imperialism null, but more importantly because neoclassical theory was deeply wedded to the idea of relative autonomy via its principle that economic agents are atomistic agents with their own exogenous preferences. Were Chicago to accept, even *sotto voce*, multidisciplinary with respect to the sciences, assuming they were good at seeing implications, then by analogy this key doctrine would be open to the argument that agents were interdependent and possibly the inference that standard optimization analysis was thus meaningless. Thus Chicago found itself in the contradictory situation of acting on multidisciplinary while denying its meaning and relevance not only to others but also to itself. Such is often the way with ideological representations that damage their proponents as well as those at whom they are directed.

What I want to argue in the next section, then, is that this contradictory situation led neoclassical economists allied to the Chicago School to evolve a new strategy going forward that acted as a further extension of its economics imperialism program, namely, it needed to become performative in the particular sense of a theory that always sees the world in its own image or as a mirror of itself. The rationale for this strategy is as follows: if neoclassicism were to imperialistically occupy other social sciences, making their disciplinary identities more nominal rather than real, and yet it were still to be believed by Chicago that interdisciplinarity held, then economics would need to 'discover' that there existed the same relationships between atomistic agents in those other sciences it sought to occupy as it held operate in economics. Then economics could still be said not to have transformed other sciences through active promotion of its own program, the interdisciplinarity ideal would remain secure publicly and for itself as well, and there would seem on the surface of things to be no basis for the idea that economics imperialism involves the exercise of power.

4. Neoclassicism's performative ambitions

This view clearly depends on there being a certain amount of ambiguity in the 'discovery' idea. One advantage, then, of neoclassicists 'discovering' there exist the same atomistic agent relationships in other sciences as were thought to exist in economics is that it would be possible to say that these relationships had been described rather than prescribed (ostensibly ruling out performativity). Indeed, why the 'discovery' idea might have become especially appealing to Chicago was that it answered a methodological critique of rational choice theory along just these lines that behavioral economics had recently developed. Behavioral economics seeks to explain how people actually make choices, and thus aims at providing what it regarded as a genuinely descriptive theory of choice. Behavioralists thus argued that by comparison neoclassicism's rational choice theory, with its axiomatic basis, was a normative theory of choice that prescribed how people ought to choose in order to be rational so as to satisfy the axioms of the theory (cf. Heukelom, 2014). All that neoclassical economists had to do, then, to show they were describing rather than prescribing behavior was to 'discover' that people in non-market settings actually behaved rationally.

I suggest that part of what this involved was a reinterpretation and slight extension of the (vague) concept of an incentive. Neoclassicism's rational choice theory has long emphasized people having incentives created by prices and incomes. We might even say that prices and incomes 'incentivize' people to behave in certain ways. However, though there is not a big difference linguistically between saying people have incentives and saying they are incentivized, in economics being incentivized refers not only to role of prices and incomes, but also to things that can be done to ensure that people have certain incentives, such as designing the environments in which choices are made. The point here is that when those environments are designed and constructed to work in neoclassical way, it then becomes possible to 'discover' that people have precisely the incentives those environments were designed for. *Voilà!*

One recent manifestation of this logic is mechanism design theory (that earned the 2007 economics Nobel Prize), which I take to be a model performative neoclassical program. What mechanism design theory does is reverse-engineer the agent interaction-outcome relationship, starting with outcomes that are efficient, and then designing structures of interaction (particularly game theoretic ones) that will produce those outcomes (Hurwicz and Reiter, 2006). In the standard interaction-to-outcome route in many real world circumstances, agent behavior and the forms of interaction do not exhibit efficiency. Thus to guarantee that goal and the behavior that it requires, the world needs to be designed and reconstructed to achieve it. When this is done, individuals cannot participate in the designed system except in the capacity as rational individuals. Examples are design of auctions to privatize public goods, replacement of regulators by regulatory mechanisms, clearing-house

exchanges such as for the allocation of medical residents, and tragedy of the commons land-sharing systems.

A second recent manifestation of this logic is behavioral economics' nudge theory (Thaler and Sunstein, 2008). Here, rather than reverse-engineer the agent-interaction-outcome relationship, the goal is to directly engineer the individual by changing the choice space in such a way as to substitute the identity and preferences of the expert economist for the identity and preferences of the individual, thereby guaranteeing that 'individuals choose' rationally (cf. Davis, 2011, pp. 65ff) – clearly an especially strong way to see the world in one's own image! Of course, Richard Thaler, the economist principally involved in developing nudge theory, is a behavioral economist at Chicago (and in the business school, not in the economics department) rather than a neoclassical economist. What nudge theory consequently reflects is how behavioral reasoning and psychological arguments can actually comfortably support neoclassical principles. People's observed behavioral characteristics may not fit standard analysis, but given the right design opportunity, the argument goes, their 'inner rationality' will prevail (cf. Sugden *et al.*, forthcoming; Hausman, forthcoming).

Thus, taking a performative theory to be one that sees the world in its own image, that world can then indeed appear in its own image if the proponents of that theory have succeeded in constructing it as such. Mechanism design and nudge theorists have taken on this task, and have accordingly made it possible for it to be 'discovered' that people are indeed rational. But why isn't it obvious that what they 'discover' has only been 'discovered' because of what has been constructed, and that what they find is not really there to be found? It seems the best way to explain this derives from the ideal of interdisciplinarity. Above I introduced two philosophical commitments behind the interdisciplinarity view. The second I termed 'science naturalism,' the idea that the world alone ultimately determines knowledge, or alternatively, nothing in the way in which knowledge is constructed, developed, and created by scientists influences the content of knowledge. From this perspective, science is a pure cognitive activity and not at all a productive activity. It follows that science on this view can only 'discover' what already exists, and moreover that scientists who subscribe to this view must be blind to the effects of their own activities on the nature of what they investigate.

Interdisciplinarity in its 'science naturalism' dimension, then, gives a performative type of theory the necessary momentum it needs to innocently advance, and thereby facilitates the evolution of economics imperialism. Interdisciplinarity in the other main philosophical commitment I introduced, however, is problematic for neoclassicism's performativity extension of economics

imperialism. That commitment involves the basis on which sciences are differentiated from one another, and concerns what I termed their individuation criteria. I treat this basis as the implicit theory of reference a science employs for the scientific terms it uses. The main idea is that the set of concepts a science uses to denote things in the world refer to those things without making, in effect, lateral reference to the sets of concepts used in other sciences. Sciences use their own distinct languages whose connection to the world is independent of the languages that other sciences use. Different scientific languages are, as it were, 'pure' in the way that they hook up to the world.

This doctrine is broadly complementary to interdisciplinarity's 'science naturalism' commitment that holds that it is the world that determines knowledge. What is added here is the conduit through which the world determines knowledge, or the channel or pipeline through which scientific terms refer to the world. Each science then manages its own independent conduit, giving it its own domain of operation, and the world, it must also be assumed, is in itself sufficiently segmented as to make this possible. In the following section I consequently discuss what is problematic about this doctrine for neoclassicism's performativity extension of economics imperialism.

5. Economics imperialism versus multidisiplinarity

To begin, we need to be clearer about what a theory of reference involves. A theory of reference, then, is not only an account of how terms pick out things in the world. It is also an account of how people employ terms to pick out things in the world. That is, reference intermediates between people and the world, and consequently represents a dual sort of relationship in which both parts of this intermediation – the term-to-the-world and the term-to-the-referrer parts – work together. Simply stated in this way it thus seems there are two contributing parts that share equal responsibility. However, when we are thinking of reference as something used to produce explanations, it can be argued that the two sides of this relationship are asymmetrical to one another in that how people use reference in making scientific explanations carries the main weight compared to how referring terms pick out things in the world.

This has not always been the view in the philosophy of language, and indeed twentieth century analytic philosophy can be roughly characterized as first ignoring the term-to-the-referrer part of the story, and then reversing itself and giving it primary emphasis. Ludwig Wittgenstein's career symbolizes this. The early Wittgenstein of the *Tractatus Logico-Philosophicus* (Wittgenstein, 1922) essentially put all the emphasis on the term-to-the-world link. The later Wittgenstein of the

Philosophical Investigations (Wittgenstein, 1953) then put essentially all the emphasis on the term-to-the-referrer link, arguing in his famous *Investigations* doctrine that meaning is use, or that use is the principle determinant of meaning.

What Wittgenstein's reversal in thinking does, then, is use his changed view of reference to reject scientific naturalism. The effect of this is that it embeds language in the world of human practices. Consider an important implication of this. If we were to neglect the fact that reference is a use of language, then we could think of language as a stand-alone structure that people encounter and to which they are all externally related in the same way. Conversely, embedding language in human practices means that people can be expected to use language differently, so that variation in social structures and the heterogeneity of people makes the term-to-referrer part of reference a complex matter.

Wittgenstein actually got to his view of meaning as use through a critical argument that targets the view that we all encounter language in exactly the same way. That argument is known as the private language argument. If we all use language in precisely the same way, then we have no need to communicate with each other to be able to use language. That is, we each know the meanings of terms by a special inner reference without the need to communicate with others. This is idea of a private language. However, Wittgenstein argued – persuasively for most philosophers today – that the idea of a private language is incoherent, basically because it completely mystifies the person-meaning connection. Thus there can be no such thing as a truly private language, and language is essentially social.

If we follow Wittgenstein, then, and drop interdisciplinarity's term-to-the-world theory of reference, which is its means of showing how scientific naturalism operates, we remove the basis that interdisciplinarity employs for individuating the disciplines as relatively autonomous. At the same time, by expanding the space for term-to-referrer thinking about reference, we not only contest interdisciplinarity's scientific naturalism, but also we undermine the idea that the disciplines are relatively autonomous.

Expanding the space for term-to-referrer thinking about reference opens the door to a range of ways in which how we use language determines its relation to the world. In effect, the terms we use to refer to the world come accompanied by a whole array of lateral terms and penumbras of neighboring meanings and concepts. Translating this back into interdisciplinarity's relative autonomy of the sciences view, the consequence is that no science has a private language relation to its subject matter. The ways in which sciences refer to the world they investigate is a messy affair with many lateral

relationships that can cross the boundaries between sciences. In effect, the ways we use language go beyond the ways sciences use language, and are accordingly not confined to any imperatives scientists might like to insist upon.

It is difficult, then, not to make the further step, and say that these cross-science-boundary uses of concepts and meanings also include a role for influences of one science's language and concepts on another – that is, the idea of multidisciplinary. Are there grounds for saying there are also causal effects of one science's language on other science's languages?

Wittgenstein has a further thinking bearing on this question. He is also known for his idea about how meanings in languages are connected to one another – the idea of a language game. Like all games, language games have rules, or a set of implicit normative principles that determine how a set of meanings and concepts can be used. Rules, then, have causal force. They require that language be used in some ways and not others to make communication possible. On this view, then, if sciences make cross-science-boundary use of concepts and meanings, their uses of concepts and meanings must also causally influence one another. No science can be in a science language-game of shared concepts and meanings, and not play by the rules of that science language-game.

On these grounds I take multidisciplinary to be a consequence of a reasonable understanding of language and meaning. From this it follows that the latest stage of economics imperialism⁶ ultimately cannot fulfill neoclassicism's performative ambitions, though I do not deny that mechanism design and nudge programs when implemented can have real effects on people. These effects certainly deserve full scrutiny and discussion in their own right as a matter of a clear and transparent examination the ill effects of paternalism in social and economic policy-making.⁷ However, let me add to this critical argument about interdisciplinarity a positive one from complexity economics regarding why multidisciplinary correctly describes the relationships between the sciences.

Complexity economics can be characterized as follows:

It is a different way of seeing the economy. It gives a different view, one where actions and strategies constantly evolve, where time becomes important, where structures constantly form and re-form, where phenomena appear that are not visible to standard equilibrium

⁶ By analogy to Lenin's argument about capitalism, the highest stage it can reach.

⁷ Thanks for this point go to the R.E.G.A.R.D.S. philosophy of economics group at Université de Reims Champagne Ardennes.

analysis, and where a meso-layer between the micro and the macro becomes important (Arthur, 2013, p. 1).

Agents' "actions and strategies constantly evolve" and "structures constantly form and re-form" in a process of interaction at the "meso-layer" level that continually changes their relation to one another. If we take agents to be sciences and structures to be the relationships between sciences, then in a complex world the sciences and their relationships are constantly changing each other. Accordingly, sciences can only appear relatively autonomous in the short run. Their relatively independent identities, that is, are nominal in the sense of states of affairs that abstract, like trade theory, from the forces of influence that sciences have on one another. Perhaps one way of thinking of this is indeed in terms of investment in new domains, as in Chicago's economics imperialism idea. But that narrow, single channel surely under-estimates the variety of forms of interaction between sciences. At the very least, if there is economics imperialism, there are just as much other science imperialisms directed to economics' domain. As Chicago feared, neoclassicism, the idea of an independent price theory economics, cannot be insulated from the rest of science.

6. The grounds for pluralism in economics and science

I close this discussion with comments on how multidisciplinary supports pluralism in economics and science. To begin, we might suppose just the opposite view of what multidisciplinary means for pluralism. If sciences continually sway one another, we seem to live in a world in which broad cross-science influences suppress differences, the hallmark of pluralism. At one level, interdisciplinarity is appealing because it ascribes a local autonomy to sciences, and so by extension we might infer the same local autonomy applies to different approaches within sciences. However, the problem with interdisciplinarity, I have argued, is that it makes this defense of relative autonomy through a scientific naturalism that essentially says that the underlying world we refer to possesses a given (segmented) structure that suits the differentiation of the sciences. So it is quite possible for steadfast neoclassicists to say that underlying structure is of a nature that only supports their view of the world of atomistic individuals (e.g., Tirole, 2014). Given their implicit use of the private language reasoning, of course no one can know what such a mystical 'underlying structure' might involve, and so this gives arbitrariness and power in science a great opportunity to work against pluralism. Thus I recommend that pluralists avoid trying to defend pluralism by emphasizing difference *per se*. Difference in ideas is of course important, but it needs a stronger basis than interdisciplinarity is likely to provide.

That basis can be argued to lie in fact in multidisciplinary for the following reason. The characterization of complexity theory above treats the multidisciplinary conception as an evolutionary one in which novelty is ever-present. This is not to say everything changes all the time, and there is no stability to the sciences or the relations between them. But it is to say that in an evolutionary world change is always occurring and somehow accompanies stability. Thus differences in how the sciences jointly and separately explain the world constantly emerge. Pluralism seen from this perspective is both a descriptive and normative view. That different approaches continually emerge is a fact about the nature of science – when one accepts the philosophical argument of multidisciplinary. It also seems to be a fact about science that most people wish science should freely advances. From this, it seems entirely justified to recommend that science environments be open and pluralistic.

Needless to say, the details of securing this goal are many and demanding in economics, because neoclassicism since the early reverse imperialism incursions from the 1980s has arguably become an increasingly defensive and yet aggressive approach. No support for pluralism seems likely to be found among the ranks of neoclassical economists. The risk is just too high to core principles. Thus as has only been too long clear, the defense of pluralism falls to heterodoxy.

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