The Unity of Science and The Disunity of Economics

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Abstract

Unity of science has been a very popular topic in history. The twentieth century saw the development of a radical version of this vision, the project of unified science advanced by logical positivists of the Vienna circle, and a series of attempts to build unity on a model of theory-reduction. Critics of this strategy, however, have opposed such efforts – and successfully illustrated the somehow mythical nature of the underlying logic – by emphasizing the irreducible plurality of sciences and the resulting, fundamental disunity of science. The significant difficulties associated with defending convincingly any "unity-of-science" project on traditional bases (ontological, theoretical, or methodological reduction unifications) directed the attention of both supporters and critics towards more flexible versions of unity (such as the proposal of unification as a "regulative ideal") and to the theoretical and practical foundations of interdisciplinarity – unity being seen in terms of integration between different disciplinary approaches.

The paper proposes a general theoretical framework in order to distinguish a set of possible options for integration between social sciences. As pointed out by various philosophers of science, interdisciplinarity (in its general meaning) is old news, and even the most integrative forms of disciplinary interaction seem to emerge from established disciplines. We therefore use disciplines as units of analysis, and adopt the so-called "nation" metaphor in order to investigate their relationships, using the analogy with Dani Rodrik's "world political trilemma" (whereby democracy, national sovereignty and global economic integration are mutually incompatible; it is possible to combine any two of the three, but never have all three simultaneously and in full), three ideal types of disciplinary integration, or three different roads to the realization of the unity of social science (which we here call, respectively, "reductionism"; "integration", and "complexity").
The framework is then applied to three recent proposals for unifying the social sciences that have originated within the economics profession. Our aim is to investigate the reasons why economists are increasingly debating this issue, and the (theoretical) feasibility of such projects in light of the current state of the relationships between economics and its contiguous disciplines. While throwing light on the features of disciplinary relations as conceived in each of these projects, we speculate about their "implicit" origins, which we generally locate in the disunity characterizing the current fragmented state of economics. We then discuss the potential impact of these integration projects by focusing on the issue of pluralism in both the social sciences and (in particular) within economics, at a time of pervasive specialization, continuous creation of scientific research niches and declining cross-science research programs.

1. Unity of science and the trading nation metaphor

Despite enormous difficulties in assigning a single precise meaning and content to "unity", even when only the social sciences are under consideration, the unity of science ideal, however defined, involves some kind of unification. The impossibility of defending convincingly any "unity-of-science" project on traditional bases (ontological, theoretical, or methodological reduction unifications) has directed the attention of both supporters and critics of the unity of science ideal towards more flexible versions of unity, as well as the

theoretical and practical foundations of interdisciplinarity. "Unity" is now seen as an 'integration' between different approaches. Some of these recent proposals for unifying the social sciences have originated within the economics profession. To investigate the reasons why some economists are increasingly debating this issue, and the (theoretical) feasibility of such projects, especially in the light of the current state of the relationships between economics and contiguous disciplines, it might be useful to adopt a general theoretical framework in order to distinguish a set of possible options for integration. The proposed scheme aims to highlight both the features of disciplinary relations as conceived in each of these projects and their "implicit" origins, and also make it possible to discuss the potential impact of these integration projects by focusing on the issue of pluralism in both the social sciences and within economics in particular.

Two caveats are in order: first, the scheme outlined here concerns the de facto social sciences only – it would therefore be more appropriate to refer to the Unity of Social Sciences Principle (see Nachane 2015, Calhoun and Rhoten 2010), although non-social sciences (like biology) can contribute to this integration. Second, in a "unity as integration" perspective, we adopt Bechtel's (1987, 294) now classic definition of a discipline, as a unity of analysis shaped by a peculiar "domain of inquiry, the cognitive tools used in and produced by that inquiry, and the social structure evolved by those engaging in the inquiry". Among the metaphors adopted for relationships between disciplines, the dominant image comes from geopolitics (Kellert 2008, Klein 1990). Disciplines are like nations, and their boundaries are like frontiers. According to the nation metaphor,

> certain questions, like adjustments in income tax rates, are matters of internal politics within a sovereign nation. This example corresponds to the idea that monodisciplinary approaches are sometimes appropriate. Other matters require international cooperation, as when a lake straddles a border. Still other matters may require the forging of alliances or the creation of transnational bodies such as the United Nations, and there are even some people who call for dissolving all nations into bodies such as the European Union or a world government. These situations correspond to varying forms of cross-, multi-, and transdisciplinary endeavors, each appropriate for different types of inquiry. However, the nation metaphor paints a static picture, where disciplines are seen as organized in space rather than as ongoing human activities. Because of our contemporary geopolitical conception of the nation-state, the image of disciplines as nations highlights competing social structures ("turf") and objects of study ("domains"). It also calls attention to the role of disciplines in regulating discourse ("policing").

> But this metaphor diverts attention away from disciplines as collections of cognitive tools for active investigation (Kellert 2008, 37).

Disciplines, then, are like nations which – perhaps also in view of their "relatively weak national unity" (Calhoun and Rhoten 2010, 115) – may engage in "cross-, multi-, and transdisciplinary endeavors." But how are these cases distinguished? In economics, the nation metaphor was implicitly employed by Edward Lazear (2000) in explaining why economics is imperialist and in defending economics imperialism. Lazear used international trade theory to transform economics imperialism into a win-win, Pareto-efficient trade in ideas between disciplines, rather than an imposition of ideas (Davis 2016). Similarly, Harold Demsetz had previously argued that "the strong export surplus economics maintains in its trade in ideas and methods with the other social sciences [is] an important indicator of the success of economics" (Demsetz, 1997, 1).

But the metaphor has also been used by economists who are critics of economics "imperialism". After proposing "economics imperialism" as a better term than "economic imperialism", which would denote both the imperialism of economics and the "economy-driven imperialism in international relations and the global economy", Uskali Mäki (2009, 352) employed the geographical metaphor in defining economics imperialism as "a form of economics expansionism where the new types of *explanandum* phenomena are located in territories that are occupied by disciplines other than economics, and where economics presents itself hegemonically as being in possession of superior theories and methods, thereby excluding rival theories and approaches from consideration". John Davis (2006) also argued that the trade metaphor helps avoid confining the discussion to "unwelcome impositions" on the part of imperialist disciplines over receiving sciences, because these latter "may be selectively appropriating nontraditional contents for reasons specific to [their] own development" (Davis 2006, 7). Whereas the "export idea", that is "the expansion or contraction of the boundaries of economics in terms of the idea of export and import of conceptual contents across these boundaries to and from other disciplines" would be "more neutral" (ibid.). Indeed, since trade surpluses and deficits are always accompanied by capital flows, the other side of a discipline running an ideas export surplus with other disciplines would be its export of a 'disciplinary capital' that finances those disciplines' trade deficits. What economics' 'disciplinary capital' is that finances other disciplines' ideas trade deficits remains to be determined.

These latter ideas go beyond Lazear and Demsetz's "export idea", that is "the expansion or contraction of the boundaries of economics in terms of the idea of export and import of conceptual contents across these boundaries to and from other disciplines" would be "more neutral" (ibid.). That Lazear and Demsetz's model of disciplinarity interaction is restricted to trade flows, and ignores the possible effects on disciplines of accompanying 'disciplinary capital' flows that might influence disciplines' internal development allows it to be modelled in two ways. Their model, then, can be interpreted as one of *interdisciplinarity*, When we only where in its focus on how ideas trade flows it "creates a new discipline or project, such as interfield research, often leaving the existence of the original ones intact" it can be interpreted as one of *interdisciplinarity*; when we also focus on the attendant disciplinary capital flows, or, perhaps, one of *cross-disciplinarity,* where this "involves borrowing resources from one discipline to serve the aims of a project in another", it can be interpreted as one of *cross-disciplinarity* (Cat 2017, sect. 3.3). In either case, however, the disciplines' interaction is usually interpreted as leaving them relatively unaffected by their trade in ideas.

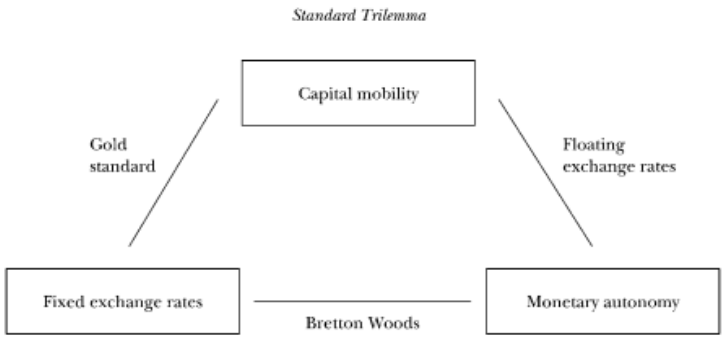
In contrast, Mäki and Davis can be interpreted as seeing the ideas trade metaphor of disciplinarity interaction as instead like what Cat characterizes as *multidisciplinarity*, that "involves the juxtaposition of the treatment and aims of the different disciplines in addressing a common problem," or perhaps even as *transdisciplinarity*, that produces "a synthetic creation that encompasses work from different disciplines" (ibid.). In each case, disciplines not only influence each other by exporting their ideas, but also by locating new territories within other disciplines outside their own, thereby influencing existing disciplinary forms through greater degrees of integration. Perhaps complexity economics is an example of a multidisciplinary field since it juxtaposes complexity reasoning from different disciplines with the need to introduce that reasoning into economics (Davis, 2006). Perhaps econophysics is an example of a transdisciplinary field since it bears limited connections to both economics and physics, and constitutes a new hybrid field that develops in a free-standing way fully outside of the fields which contribute to it and exhibits little imprint of its contributing disciplines (Schinkus and Jovanovic, 2013).

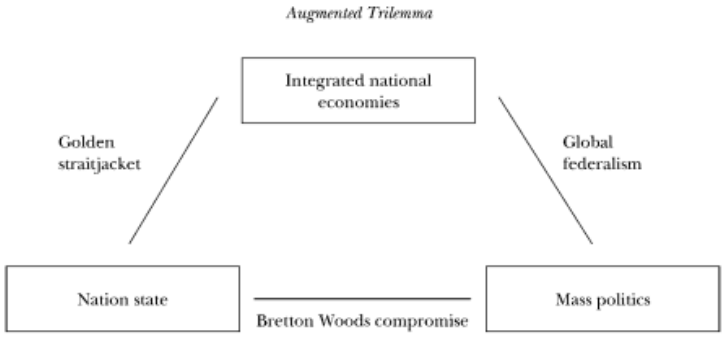
2. Unity of science: A general framework

Because even these more integrative forms of disciplinary integration are still seen to emerge from established disciplines (see Abbott 2001), we will retain the "nation metaphor" and the "trade idea" in analyzing the current discussion within the economics profession about the unity of behavioral sciences ideal. We accordingly use Dani Rodrik's (2000, 2011) "world political integration trilemma" to investigate three ideal types of disciplinary integration, or three different roads to the realization of the unity of social science. Indeed, Rodrik's trilemma is similarly derived from economics, trade theory, and open-economy macroeconomics by "analogy" and "extension" of the "impossible trinity" or "open-economy trilemma."[1] On his "Standard Trilemma" view, it is impossible for a country to enjoy autonomy of monetary policy if it adopts a fixed exchange regime in a financially integrated environment (like under a commodity money international regime), and monetary autonomy requires it to let its currency freely float (as in today's 'non-system') or control capital movements (which was the norm of the Bretton Woods monetary order). A country must choose two of the three elements (see Figure 1). Rodrik's "Augmented Trilemma" goes further, directly addresses the type of globalization produced by any possible combination of two of the three elements of the trilemma, and helps us understand the essential features of the ideal-typical international economic order associated with each type (see Figure 1). Our view, then, is that this latter framework provides a way to explain the dilemmas involved in explaining disciplinary relationships where similarly integration is on the agenda.

Figure 1

[1] The trilemma derives from the small open economies Mundell-Fleming model; see Obstfeld and Taylor 1998.





Let us review the "augmented trilemma" or the "world political integration trilemma" as Rodrik explains it. In his (2000, 180) words: "If we want true international economic integration, we have to go either with the nation-state, in which case the domain of national politics will have to be significantly restricted, or else with mass politics, in which case we will have to give up the nation-state in favor of global federalism". The former option is the "Golden straitjacket" of the Washington Consensus, nations' policy autonomy being suppressed in order to favor the ultimate aim of full integrating national markets into a single world market. The second option, a "Global federalism" solution would amount to transferring the power to regulate markets from nation states to a world government. A third option, the "Bretton Woods compromise" resulting from the combination of nation states and mass politics actually requires sacrificing the aim of complete international economic integration. Still, as Rodrik makes clear in *The Globalization Paradox* (2011, 72), this option does not imply rejection of globalization; rather, the "embedded liberalism" of the Bretton Woods order (domestic needs coming first, and the requirements of the global economy second) actively but indirectly favored globalization "as a byproduct of widely shared economic growth along with some modest opening up".

The nation metaphor, *cum grano salis*, allows applying this scheme to disciplinary relations. Disciplines are indeed like nations, and the integration concepts the latter provide can help us think about integration of the former. Disciplines, then, replace nation states in Rodrik's trilemma. Any "unity of science" (however defined) principle – the ideal of perfect international economic integration becomes the principle of free circulation of ideas in science – is undermined by disciplinary (national) borders. Consider what national borders involve. National borders have "a significantly depressing effect on commerce, even in the absence of serious formal tariff or nontariff barriers, linguistic or cultural differences, exchange rate uncertainty, and other economic obstacles" (Rodrik 2000, 178). To this, one can add slow international price arbitrage in commodities, home biases in investment portfolios, capital flows from debtor to creditor countries, restrictions of any kind to labor mobility. In Rodrik's reasoning, failure to reach full integration stems from the existence of national borders, which "demarcate political and legal jurisdictions. Such demarcations serve to segment markets in much the same way that transport costs or border taxes do. Exchanges that cross national jurisdictions are subject to a wide array of transaction costs introduced by discontinuities in political and legal systems" (ibid.).

The world political trilemma is essentially about borders: economic borders – that must be removed one way or another, to realize an ideal of perfectly integrated global economy – depend on *jurisdictional* "border" effects – national borders "technically", that is legally, segment markets – and *political* "border" effects – nation states (their citizens) demand policy space to make political choices that aim at regulating markets. Apparently, full economic integration can be achieved only by removing either jurisdictional or political borders. In truth, *tertium datur* – this is also the logic and essence of the Bretton Woods compromise. Like happiness in Eleanor Roosevelt's dictum ("Happiness is not a goal… it's a by-product of a life well lived"), integration can be achieved as a byproduct of national growth (that is, by considering it as a means, rather than an end in itself). Thus, integration is achievable even in the presence of jurisdictional or political borders, provided that it is not regarded as an ultimate end.

It can thus be argued that while the institutional barriers created by the stratification of disciplines in academia correspond to formal barriers to trade and capital flows, and that, exactly like these latter in recent decades, they can be reduced or overcome by deliberate

intervention – that is, by the establishment, for example, of social science departments, discontinuities in languages, "laws" and methods between different disciplines segment the market for exchange of ideas like jurisdictional or political "border" effects. The equivalent of transaction costs borders create are 'disciplinary translation costs' – protocols for how issues should be approached within disciplines, discipline-specific concepts, methodological rules tied to how a discipline's subject matter should be understood, etc. – that function to discourage exchanges and adoption of ideas and disciplinary practices across disciplinary borders. These translation costs segment the *loci* where exchanges of ideas can occur between researchers from different branches of knowledge. Like formal barriers to trade and capital flows, disciplinary barriers create protected domains of production for individuals trained in a discipline, and promote disciplinary autarky. This then creates material incentives for researchers within disciplines to further maintain these barriers making the segmentation of disciplines a self-reinforcing process that produces an overall fragmentation of science.

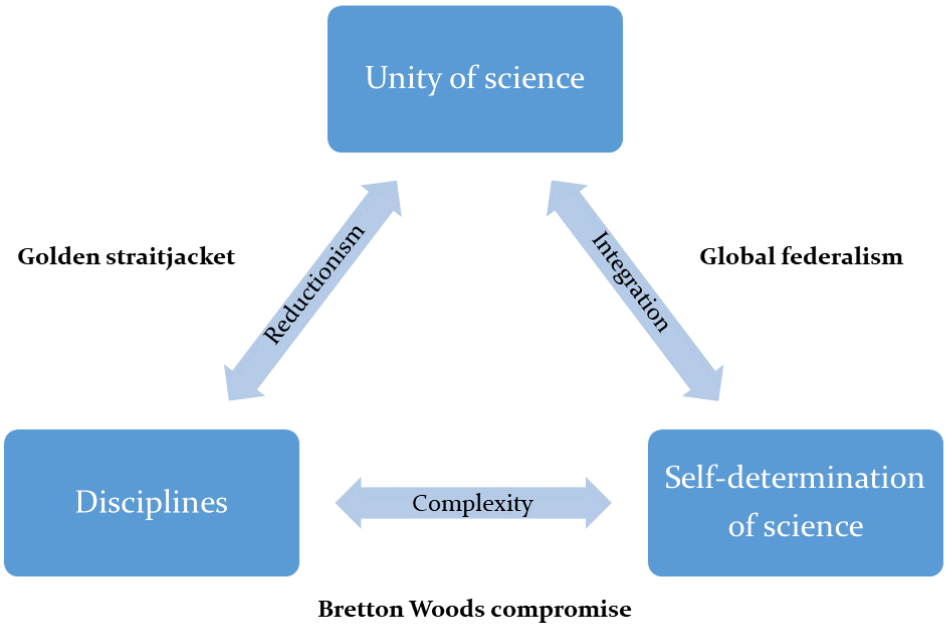
Even without entering the delicate issue of unambiguously defining both disciplines and disciplinary boundaries, the nation metaphor – following Rodrik's scheme – would induce us to believe that there exist three possible roads to unity of science (UoS) as disciplinary integration, and three different operational modalities to achieve it. In the scheme that follows, where the node "disciplines" replaces the node "nation-state", we use the term "unity of science" (replacing "integrated national economies") to refer to the realization of a unified market for exchange of ideas, where scientists make different disciplinary perspectives interact, and promote their integration, by freely transmitting ideas from one science to another. The node "mass politics" of the world political trilemma is replaced here by one named "self-determination of science". Within Rodrik's scheme, mass politics is, in a word, democracy, that is, to put it even more concretely, the possibility to pursue domestic objectives, unrestrained by the needs of the international economy. The two examples Rodrik employs to illustrate the node are the nineteenth century gold standard and Argentina during the Washington Consensus epoch, when political choice was reduced to "Pepsi or Coke", as Friedman (1999, 87) argues, that is to "nuances of tastes" (ibid.), the goal of nation-states being rather "to appear attractive to international markets" (Rodrik 2000, 182). "Domestic" means, in our framework, "disciplinary": integration – unity of science – seems scarcely compatible with a rigid disciplinary matrix. For a number of reasons,

however, disciplines – like nation-states – are resilient. A possible option is therefore to maintain disciplines, but to re-configure them – in other words, to harmonize them – in such a way as to make them inoffensive with respect to the ultimate aim of a united science, or even to make them key drivers of integration.

The trilemma outlines three possible modalities of disciplinary integration. We characterize these as: (1) "Golden straitjacket"/reductionism/interdisciplinarity; (2) "Global federalism"/integration/a movement from multidisciplinarity to transdisciplinarity; (3) the Bretton Woods compromise/complexity/a movement from cross-disciplinarity to transdisciplinarity (see Figure 2).

Two elements deserve attention. First, in what follows, the traditional categories "inter-", "cross-", "multi-", and "trans-" disciplinarity are used in a very specific sense, whose boundaries are strictly determined by the unity of disciplines ideal that such forms of relations between disciplines can eventually help to achieve. For example, "interdisciplinarity" here means, more correctly, interdisciplinarity leading to unity of behavioral science", or, interdisciplinarity in terms of such unity. A corollary is that we always refer, here, to general tendencies, or in any case tendencies that can be generalized, and never (only) to relationships between specific disciplines. Second, exactly like in Rodrik's scheme, a temporal (either logical or historical) dimension is involved, which explains why each possible scenario can be associated with more than one type of disciplinary relations, complicating matters and making distinctions less clear-cut than they would otherwise appear.

Figure 2



2.1 "Golden straitjacket" (reductionism; interdisciplinarity)

A first option is to combine the UoS principle ("integrated national economies") with disciplines ("nation states") – which like nation states (see Rodrik 2015), do (still) matter. This option, the 'Golden straitjacket' or Washington Consensus in the world political trilemma, is a *reductionist* one: disciplines can continue segmenting the market for exchange of ideas if and only if researchers devote their work to pursuing the UoS ideal. The rules of the game are set by the requirement of uniting science; each specific discipline has to ensure that the development of its various (sub)approaches are compatible with other disciplines, so as to allow the emergence and identification of a single theoretical framework for the integration of all disciplines.

Negatively put, the UoS principle compels scholars to restrain from pursuing research programmes that create actual or potential tensions with the overall shared framework – in other words, science development is not self-determined but is subject to external requirements. Scholars are denied the right to influence their discipline's path of development by building trade relationships with scholars from other disciplines at their peripheries, where the influence of each discipline's core is at its minimum. The import of concepts, contents and approaches from other

disciplines can in fact threaten disciplines' independence, whereas the primacy of the UoS principle forces a centralization of disciplinary development around each discipline's core concepts and theories which are aligned with shared core concepts and theories of other disciplines.

This strategy is reductionist in that the segmentation of disciplines goes hand-in-hand with their internal standardization around their respective dominant programs of research. Trade with other disciplines is restricted to trade between different disciplines' dominant or core programs, that is between programs that claim to fully represent their disciplines, and so are able to engage in trade just like nations. This still leaves open what the content of different disciplines' dominant programs is, so different disciplines can compete through trade to impose their respective contents on each other. As in the case of the Washington Consensus[2], the emphasis is on export-led growth as alternative to import-substitution strategies. Disciplines are invited to play a mercantilist game by exporting their core approaches, while possibly resisting any import from others. Integration will evidently show traces of the influence of the most successful – "imperialist" – disciplines, those that, in this zero-sum game, exhibit the highest volumes of exports.

The main operational modality of this first road to integration is *interdisciplinarity* (in its strict sense). As Alvargonzález (2011, 388) notes, in fact, "just as international relationships between different countries do not imply denying the sovereignty of each, interdisciplinarity would not negate the independence of each discipline". In the case of the 'Golden straitjacket', belief in this status of relative autonomy can justify disciplinary imperialism: Lazear's famous defense of economics imperialism in 2000, justified by the gains that trade in ideas should ensure to social sciences, appear to rest upon a conception of this kind (Davis 2016). It is however to be noted that the underlying aim of Lazear's defensive strategy was to make the threat of "reverse imperialisms" by other social sciences appear harmless. To do so, Lazear is compelled to deny, implicitly, that disciplines like psychology (might) locate 'disciplinary

[2] By encouraging the adoption of "competitive" exchange rates and export-led growth policies, "the Washington Consensus has created perverse incentives that set nations against nation in a process that perpetuates a world of slow growth (if not stagnation)" (Davidson, 2004-5, 217).

capital' of their own within economics, and at the same time to neglect how economics imperialism actively located economics' 'disciplinary capital' within other social science disciplines. In truth, as we show below, it may simply be that the autonomy of social sciences implied in conceptions of interdisciplinarity of the kind here discussed is an ideal type, an artificial construction, overlooking empirical evidence on disciplinary interactions.

2.2 "Global federalism" (integration; multidisciplinarity to transdisciplinarity)

A second possible path to integration rests on the blurring of disciplinary boundaries, or in Rodrik's framework the abandonment of the nation state. Relationships between disciplines are in this case redefined so as to permit the construction of new hybrid fields between them that develops in a free-standing way fully outside of the fields which contribute to them. Unity is here sought for as a solution to a perceived problem of fragmentation in social sciences themselves. In politics, federalism aims at integrating diverse nations by transferring some key powers to a centralized authority while reserving others for national governments. Nations and their political entities do not disappear – the purpose of federalism is to eliminate "border effects", by aligning jurisdictions – to continue with Rodrik's trilemma – with the globally integrated market. Likewise, and consequently, the space of policy – of public debate and democracy – is not suppressed but transferred to the supranational level, and (political) choices are made in the context of a supranational arena. The option is a *Global federalist* one: disciplinary integration, which admittedly owes to the necessity of finding multidimensional solutions to complex societal problems, can occur by developing an independent framework and language, allowing researchers to communicate directly with each other. Compared to the reductionist option, the emphasis on disciplines' variety is not negative; the polemical target is distinctness and social science disciplines' self-perception as distinct. Boundaries are conceived as obstacles to inter-disciplines communication.

An obvious parallel is here with currency unions. Conditions for success are, first and in general, a not-too-high degree of heterogeneity as concerns language, customs,

loyalty and attachment to one's nation – to borrow from Friedman's (1997) well-known criticism of the European Monetary Union. "Narrow" instead of "broad" interdisciplinarity (that is, integration between disciplines with compatible methods, paradigms, epistemologies, Newell 1998) raises the chances of success; various forms of mutual disciplinary adaptation, promoting non-reductionist convergence by abating disciplinary barriers, as well as the development of inter-field theories (see Darden and Maull 1977), can come to help in this regard. Second, "labor" mobility, which can be enhanced by modifying the system of training so to incorporate insights from multiple disciplines and allow researchers full freedom in working at disciplinary peripheries to exploit interconnections between disciplines. Finally, the impact of asymmetric shocks can be reduced by providing funds for cross-disciplinary research projects, otherwise too often victim of the power of (core) disciplines.

The form of disciplinary interaction of this second road to integration is *transdisciplinarity*, or perhaps, more accurately, a forward movement from *multidisciplinarity* to *transdisciplinarity*. As Cat distinguishes them, *multidisciplinarity* simply juxtaposes "the treatment and aims of the different disciplines in addressing a common problem," while *transdisciplinarity* goes farther and produces "a synthetic creation that encompasses work from different disciplines." To borrow from Klein's (2010) taxonomy: this involves a movement from partial to full integration, from a complementing of different disciplines' respective contents (where the structure of knowledge is unquestioned) to hybridizing them (that is through a destructuring and restructuring of knowledge), from shared programs of research (different groups of specialists tackling different aspects of complex problems) to fully cooperative research (that is, to teamwork). In sum, it involves moving from a logic of juxtaposing to one of transcending disciplines. Put differently, the development of a transdisciplinary approach proceeds by progressively diluting the strong imprint of contributing disciplines that still characterizes integration in the first (logical) steps of the movement from multidisciplinarity to transdisciplinarity.

2.3 "Bretton Woods compromise" (complexity; cross-disciplinarity to transdisciplinarity)

Options 1. and 2. both presuppose integration as ultimate aim, actively sought for, that can be reached either by a reductionist or by a federalist principle. To put it differently, both options rely on intentionality – integration requires devoted efforts aimed at establishing continuity between the different operational closures operated by different fields (Alvargonzález 2011). There is however a third option, combining (the existence of) disciplines and self-determination of science, and favoring a horizontal pattern of integration. The logic of this option is pretty similar to the one of the "Bretton Woods" model for economic integration. In the Bretton Woods world, nations were able to restrict trade openness and to impose capital controls: despite commitment to a freer world, some degree of protection from potentially harmful international dynamics was believed to be indispensable for member countries to achieve the desired socio-political goals. The resulting "embedded liberalism" model – multilateral free trade was based upon state interventionism (Ruggie 1982) – ensured thirty years of unprecedented growth and a progressive globalization of the world economy, while the defense of national policy space allowed the promotion of so-called varieties of capitalism (Hall and Soskice 2001; see Rodrik 2011).

Economic integration is, in Rodrik's "Bretton Woods compromise" model, a by-product of national growth. Like nations, disciplines grow by enjoying *de jure* and *de facto* policy space: they impose institutional constraints, they can discriminate between trade partners, and they can select contents to appropriate. The costs of unity are perceived to be simply too high, both because unity would jeopardize the institutional power that stems from autonomy of individual disciplines, and because of the rising transaction/translation costs of trespassing the boundaries of one's own discipline to trade with specialists from other disciplines. The story of science in the 20th century is one of specialization and increasing differentiation of the sciences, to the extent that several recent calls for reunification of behavioral sciences point at the "scandal" (Gintis 2007, 15) of pluralism in social science disciplines. Still, national growth also increases imports.

Disciplines' development follows a similar path: disciplinary specialization, the result of a discipline's growth and the cause, at the same time, of rising transaction/translation costs, is accompanied by internal specialization (see Cedrini and Fontana 2018, Davis 2019). This latter is produced by growing difficulties in coping with the mounting burden of (previously accumulated) knowledge; being a self-reinforcing mechanism, internal specialization raises transaction costs in trade between a discipline's core and peripheral research programmes, lessening the force of the core of a discipline and blurring its boundaries (see Davis 2018). The apparently paradoxical result is that, by diminishing transaction costs, internal specialization favors exchange at the periphery with other disciplines: narrower expertise also allows for contributions from other disciplines. Specific ideas might spread and prosper within a discipline, and then be the object of "foreign" demand by specialists from other disciplines. Ideas can be "domesticated", in the attempt to serve (foreign) disciplinary goals – that is, to investigate "anomalies", or uninvestigated topics – while respecting the internal structure of the importing discipline. However, it may happen that foreign specialists use such ideas while working at the frontier of their own disciplines, where the influence of both the importing and the exporting disciplines is not so clear or decisive. The new research programme thereby developed blurs the boundaries between the disciplines, not least because it evidently attracts specialists from the exporting disciplines. This might be an example (and a very tangible one) of 'disciplinary capital' exported by disciplines running trade surpluses to 'finance' trade partners' deficit. Attracted by both the growing – however "local" – importance of the foreign market for the development of their ideas, and the significant reduction in transaction/translation costs brought about by the creation of multi-disciplinary research teams, experts from the producing discipline can act as multinational enterprises directly investing in the foreign country (see Hymer's 1976 theory of foreign direct investments). Due to self-reinforcing specialization (functioning similarly to the passing of time and the process of product standardization in Vernon's 1966 product life-cycle theory), "investors" may even finally become foreign to their own discipline: production finally shifts to the previously importing discipline, which ideas re-exports them to the discipline that had originally introduced them.

Cross-disciplinary ventures resulting from different disciplines drawing on one another to serve independent goals can develop into transdisciplinary research programmes. Consider the field of economics and ethics as recently studied by White (2018), who focuses on the two-faced development of this field within economics. One form of development is carried out by heterodox economists, and emphasizes the abuses made by mainstream economists of concepts borrowed by ethics. The other is carried out by mainstream economists by employing an accommodationist perspective, whereby concepts borrowed from ethics are framed in economicist terms in order to enhance the explanatory power of economics. Still, *both* economics *and* ethics borrowed from one another for their own independent purposes: two, rather than one, cross-disciplinary economics and ethics fields, one within economics and one within ethics, can thus appear. As the case of the economics and ethics field within economics shows, the two resulting new fields might tend to reproduce internal divisions typical of the contributing disciplines, confirming Abbott's (2001) hypothesis as regards the fractal structure of disciplines. At the same time, this logic would be consistent with the increasingly recognized relevance of cross-disciplinary ventures in the history of social science since WWII as complement rather than alternative to the disciplinary system, the apparent interdisciplinary chaos so widely discussed in the current literature being perhaps the result of excessive emphasis on the rigidities of disciplinary boundaries themselves (see Fontaine 2015). All this is to argue that there is a *complexity*, bottom-up or not (fully) intentional approach to integration (see Davis 2018, Neves 2012), whose main operational modality is *cross-disciplinarity*. The paradox is only an apparent one: that cross-disciplinary ventures can transform into trans-disciplinary research programmes that have an impact on the contributing disciplines themselves is due exactly to specialization. It is this latter, as seen, to cause the emergence of "hybrids" (Dogan and Pahre 1989), that is "interstitial cross-disciplines" (Smelser 2004) which are then followed, as Dogan and Pahre argue, by the recombination of specialized fragments across disciplines. Disciplines continue to exist but the term "disciplinary" has a weakened role owing exactly to the pervasiveness of specialization and the effects it produces in terms of researchers' attachment to cross-disciplinary topics of research. In this complexity-

theory vision of knowledge development, "different disciplines exhibit many overlapping, cross-cutting relationships, have many different links to one another, and are consequently dependent upon and influence one another in multiple ways" (Davis 2018: 19). The transformative impact of one discipline upon another is evident in the creation of the new research programmes that tend to populate the landscape of a discipline like economics, none of which have origins or develop within the strict boundaries of the discipline itself, despite the fact that none of them can be easily omitted when trying to give a definition as accurate as possible of the discipline itself.

3. Some recent proposals by leading economists for unifying behavioral sciences: A discussion

The scheme here proposed allows investigating some recent proposals by leading economists for the reunification of behavioral sciences, and to draw some conclusions concerning the risk and opportunities for pluralism in economics. A "powerful driving force", unification in economics has been heretofore overlooked, Marchionni (2009: 12) observes; at an epoch of increasing fragmentation for their discipline, the attention economists devote to the issue of unity of science cannot be so easily ignored in discussions concerning the current status and evolution of economics. Ross's (2014) recent *Philosophy of Economics*, for instance, assumes that the philosopher of (economics as) science needs to be "speculative, forward-looking historian of science with a special focus on interdisciplinary unification", and openly advances the thesis whereby, for both pragmatic and "sound" reasons, economics and sociology are converging – "the traditional basis for dividing these disciplines has collapsed", and "the scientific enterprise would be well served by its institutional demise (i.e., by the fusion between economics and sociology departments and societies)" (Ross 2014: 20).

It is to be noted that any argument in favor of (the possibility of) unity of behavioral science can be, either directly or indirectly, also one against pluralism in social sciences. Indirectly, when the focus in on the general schemes of explanation (for instance, the evolutionary perspective) that tend to unify the phenomena under consideration (Kitcher 1999). When unity is regarded as an ideal, even simply a "regulative" one, as in Kitcher's 1999 contribution on the apparent disunity of science, or is discussed as "working hypothesis" in Wylie's (1999)

sense, "the local knowledge" – using Cartwright's terminology in that same symposium (1999) – "of today is a spur to the unification of tomorrow" (Kitcher 1999: 348). Directly, when supporters of unity of science put an emphasis on the dysfunctions that the otherwise unavoidable struggle between incompatible perspectives on the same objects of investigation tend to produce, weakening the explanatory power of behavioral sciences.

Consider Herbert Gintis's (2007, 2009a, 2009b) proposal of a "framework for the unification of the behavioral sciences". Gintis attacks the "scandalous" but hitherto "tolerated" (2007: 15) situation of latent or concrete conflict between behavioral disciplines, which would cause problems of scarce credibility as concerns their status of "true sciences" (ibid.: 1). Believing that a "strong current of unification, based on both mathematical models and common methodological principles for gathering empirical data on human behavior and human nature" would make it possible to render "coherent the areas of overlap" of the disciplines themselves (ibid.: 15). According to Gintis, unification should result from the adoption of a "common underlying model, enriched in different ways to meet the particular needs of each discipline" (ibid.: 1), whose development is currently impeded by the "incompatible models" (ibid.) of behavioral sciences. The "analytical tools" required to construct the common framework "incorporate core principles from several behavioural disciplines", writes Gintis (ibid.). Adopting the evolutionary perspective and game theory as "major conceptual categories" (ibid.), Gintis' new framework rests on five "conceptual units". A general "gene-culture coevolution" perspective (first unit) – "the application of sociobiology" (Gintis 2009a: 224) –,incorporates both "the most important analytical construct in the behavioral sciences operating at the level of the individual" (ibid.: 222), that is, a rational actor model based on choice consistency rather than maximization (second unit), and a "sociopsychological theory of norms" (ibid.: 233) aimed at making the sociological and economic models of social cooperation compatible (third unit). (Evolutionary) game theory (fourth unit) is raised to the status of "universal lexicon of life" (Gintis 2007: 8); complexity theory (fifth unit) concludes the list.

To refer to the general framework proposed in the present article, Gintis offers an illustration of the "Golden straitjacket" road to integration, which combines the ultimate aim of unifying behavioural sciences with the persistence of heterogeneous disciplines. The only possibility to achieve the desired result is to sacrifice self-determination of science. In

effect, the unifying bridges can make behavioural sciences compatible in those areas where their objects of study overlap only by triggering a reform of the core of disciplines themselves. In response to his critics, Gintis (2007: 46) clarifies that his proposal outlines "a unifying bridge, not a unified alternative". But in adding a caveat in a note to his proposal – wherein he apologizes for "generalizing concerning the nature of disciplines (e.g., psychology, economics) and subdisciplines (e.g. cognitive psychology, neoclassical economics)", ibid. – he invites readers to note that "it is the core of the disciplines that must be changed, and the celebration of doctrinal diversity often serves to deflect attention away from the need for fundamental reform" (ibid.: 16). The proposal "leaves much of existing research and many core ideas untouched" – that is, "many research areas in each disciplines would … likely to be untouched by unification" (ibid.: 46). Still, in the attempt to illustrate an example of "consistent" and "synergic" disciplines, that are the two qualities they should exhibit to be described as "unified" (Gintis 2009b), Gintis (with Helbing, 2015) provides sociology with the missing "core analytical theory" that every discipline should have developed with time to be defined as "mature". Resting upon the same principles (rational choice theory, evolutionary theory, game theory and complexity theory) that inspire the proposal for the reunification of behavioral science, the "general social equilibrium model" sociology should endow itself with is here considered as "an expansion of the [Walrasian] general equilibrium model of economic theory" (Gintis and Helbing 2015: 1), to be combined with elements from classical sociological theory. Criticisms of the proposal have focused on the "imperialist" character of the model (Witt 2015)[3], and the use of an "all-embracing mantra of rationality" (Hodgson 2015: 108) that amounts to liquidating sociologists' concerns for morality and other values.

Like Gintis, David Colander (2014: 517) has recently criticized the "pluralistic" state of social sciences: "each social science follows a relatively narrow methodological approach, and there is little conversation and cross fertilization of methods and approaches from one social science to another", whereas the major problems of today's societies require a

[3] Gintis claims that the proposal is directly inspired by Parsons and Shil's 1951 attempt at unifying behavioural sciences through the famous AGIL model, and by Edward O. Wilson's ambition to include the 'last branches of biology' – that is, the recalcitrant social disciplines – in the 'Modern Synthesis' of sociobiology (Wilson 1975, 1998), the main difference being that Wilson did not indicate any unifying principle. The three quotes that introduce the chapter on unification of behavioural sciences in Gintis's 2009 *The Bounds of Reason* are from Edward Wilson, Gary Becker and Jack Hirshleifer; to get rid of pluralism in social sciences, Gintis appeals to the formerly imperialist disciplines, (socio)biology and economics, and asks them to drive the reunification.

transdisciplinary perspective to be solved. Colander emphasises the lack of a common "scientific foundation for all social sciences" (Colander et al. 2010: 3) and favours reintegration of the contributions of all behavioural disciplines into the core of all social science training, through development of a framework that exploits "advances in theory, analytical and computation techniques … and advances in statistical analysis" (ibid.). Like Gintis, Colander believes that disciplines are not necessarily destined to disappear; still, they need to be "interconnected by a common theoretical and scientific foundation" so as "to integrate their policy advice into transdisciplinary advice" (ibid.). The proposed solution starts from the creation of single social science departments at the graduate level and similar blending at the undergraduate level (specialization into single disciplines can then follow after this core training).

Looking at its specificities – its "Don Quixote nature" (Colander 2014: 523) included –, Colander's proposal can be considered as an illustration of (perhaps a preliminary step towards) the "Global federalism" option in the framework here proposed to deal with unity of science. The movement from multidisciplinarity to transdisciplinarity is here curiously but effectively evoked by employing a "cake metaphor". "It is as if you poured the flour, milk and eggs into a cake tin, and threw it into an oven without even stirring, let alone blending the ingredients", whereas it is mandatory "to stir, mix, fold and beat all the social sciences" (ibid.: 517). The unifying bridges that should make the creation of a "transdisciplinary social science" possible include statistics, complexity and modelling foundations of social science, game theory – conceived as "framework and method that transcends any social science", providing "a common language and narrative to bridge the gap among the social sciences" (ibid.: 518) – but also "philosophical and methodological" and "humanistic" foundations of social sciences. These latter should make students aware of "the usefulness of different approaches in examining different questions" and of "the limitations of an analytical social science approach" (ibid.: 519). Contrary to Gintis's, Colander's proposal does not aim at reforming the core of behavioural disciplines, with a view to impeding the development of internal approaches that are manifestly incompatible with the main pillars of the proposed framework. Rather, the "dysfunctional pluralism" to be remedied is thought to derive from a "lack of methodological diffusion among social sciences" (ibid.: 517).

Remarkably, Colander presents this proposal as a solution to the problems raised by heterodox economists when underlying the need for pluralism within economics. "Once the models have included the many issues that heterodox economists contend ought to be included" – many of which require the methods and insights from other social sciences to be treated – "there is little reason to carve out a separate economics subfield. With the development of evolutionary and epistemic game theory, the core model of modern economics by its very nature goes beyond economic issues and embed them in social and culture reality" (ibid.: 524). When the modern game theory framework becomes the core model of social sciences, there will be no compelling reasons, Colander holds, to distinguish between heterodoxy and mainstream theory. This means "returning economics to its social science roots" (ibid.). Some institutionalist economists have recently argued that to favour the advent of a radically alternative mainstream in economics, it is necessary to move towards the more "comfortable home" of social sciences (Hodgson and Stoelhorst 2014: 529). Here, a zeitgeist favourable to the institutional/evolutionary perspective can prepare the arrival of a "paradigmatic evolutionary social science", writes Stoelhorst (2014: 680), which economists could exploit to revolutionize their own discipline, if only they were "willing to cast themselves as evolutionary social scientists first, and as economists only second" (ibid.: 679).

The "Bretton Woods compromise" option about unity of science does not forcedly require approval of the "disunity of science" thesis; or, in any case, it invites – contrary to how defenders of unity of science tend to represent it when advancing more flexible versions of unity – an exploration of the non-necessarily gloomy implications of disunity for scientific development. Exactly as the "Golden straitjacket" option, the "Bretton Woods compromise" employs disciplines as units of analysis, and assumes their existence as a given. In discussing, in 1989, the fragmentation and recombination of social sciences, Dogan and Pahre could rightly describe economics as a discipline endowed with a highly recognizable and well-structured core, with internally- (not externally-) driven divisions, and its practitioners as "insufficiently hybrid" (Dogan and Pahre 1989: 68): "while they can apply the economic method to diverse subject matter with success, they do not use their findings to enrich the method itself" (ibid.). Still, the example (and above-mentioned relevance for the present and future evolution of economics) of game theory itself shows that economics – a major exporter, like psychology – is not immune to whirlpool effects (Intriligator 1990: 316),

whereby "an idea developed in one behavioural science is applied or extended in another and then that extension is used or further developed in the original science". These effects, and the import of concepts and methods from other social sciences in contexts of "reverse" imperialisms (economics' growth in size and diversity, to borrow from Pencavel's 1991 speculative reflections on the future of economics), have concurred to produce today's "mainstream pluralism". The mainstream of economics is currently populated by a number of research programmes whose common features are, first, the fact of deviating, and significantly so, from the (previous) core of the discipline; second, their external origins; and, third, their being carried out by separate communities of researchers (Davis 2006). It is only apparently a paradox that the Bretton Woods option, so respectful of disciplines' right to autonomous development, can eventually configure a social science landscape wherein what each discipline is can be, and probably should be investigated in terms of its boundaries with related disciplines (Davis 2018). It is the periphery, now, not the core, that defines what economics is.

In effect, as Bechtel (2007) remarks, to insist on strict disciplinary autonomy can be counterproductive. On one side, as Kitcher (1999: 348) claims, while it is possible to describe many individual sciences as "ventures in what Alison Wiley [1999] usefully calls "local unification", attempts to work out systematic way of treating a family of questions", research in economics is now often driven by practical and pragmatic imperatives, which are at the origins of "piecemeal models". On the other side, economics seems to proceed by continuously developing inter-field theories or "cross-disciplinary research clusters" (Bechtel 1988: 110). The interactions between fields thereby generated, as (Wiley 1999: 300) argues following Darden and Maull (1977), "often result, not in a reductive assimilation of one field (or theory) to the other, or in a simple borrowing of information, technology, or explanatory models that leaves each essentially unchanged, but in the formation of substantially new theories and research programs concerned with relations between phenomena that cross-cut the traditional domains of neighbouring fields". For a number of reasons, the situation of today's mainstream economics demonstrates the necessity to go beyond, as Wiley (1999: 313) suggests, the "polarized options defined by debate over global unity and disunity theses". It should be rather recognised that "the scientific disciplines are unevenly and contingently interdependent in any number of ways that are crucial to their practice and success as a family of enterprises" (ibid.). This is evidently the essence of the "complexity vision" of

science lying behind the "Bretton Woods compromise" model in the scheme here sketched, as becomes evident once the focus of the analysis shifts from the fragmented state of today's disciplines (with their fuzzy boundaries, to borrow from the open-system logics; see Neves 2012) to the patterns of interconnection (see Grantham 2004) which currently characterize the social science landscape.

The case of economics is of high interest in this regard. For, on one side, economics' insularity (see Fourcade et al. 2015) is strictly connected to its core-periphery structure – where the periphery is occupied by research programmes, as said, that – the result of cross-disciplinary, sometimes evolved into trans-disciplinary ventures – significantly deviate from the core, making mainstream economics a much more pluralistic environment than it used to be in the decades of the apogee of economics imperialism. As long as the core-periphery structure of the discipline reflects the orthodox-heterodox divide within economics, peripheral research programmes will be more related to other disciplines, while core programmes will be less related to other social sciences (Davis forthcoming). This means that insistence on the core of disciplines as criterion for their maturity risks jeopardising any attempt to develop a truly transdisciplinary social science – advocacy of a Golden straitjacket model, in other words, may finally result in the promotion of scientific imperialisms by "mature" sciences. Clarke's (2007) criticisms (of a "disunity of science" kind) to Gintis's proposal – the new framework "would involve the abandonment of much work that does not fit easily into [it]"; it would prevent, also in reason of its static nature, any new perspective on human behaviour, and, finally, it "would presumably involve the cessation of work intended to advance the case for other unifying models of the behavioural sciences" (Clarke 2007: 22) – illustrate the possible troublesome consequences of its implementation.

The "Global federalist" option, as seen, and at least in the intentions of its supporters, would eradicate the "problem" of internal diversity within disciplines. Colander defines pluralism advocated by non-orthodox economists as a "wrong type" of pluralism: pluralism and economics should be thought of from the perspectives of social sciences. Still, this amounts at circumventing the problem without truly addressing the reasons why greater pluralism is recommended in economics. To put it slightly differently, if economics is to participate in the new transdisciplinary social science, it should first clearly identify concrete ways of weakening the core-periphery structure that characterises it – but, this way, the problem

would already be solved. One possible solution is to move from normative to descriptive pluralism – the former needs a basis in an understanding and explanation of the nature of difference and diversity in economics (Davis 2019). Which is simply another way of framing the whole issue in the terms of the "Bretton Woods compromise" option, with its focus on specialization as driver of internal diversity in economics, progressively liquefying internal and, as a consequence, external disciplinary boundaries, as well as on a "complexity view" of pluralism – shifting the focus from the proliferation of research niches to the increasing, biological in tone interconnection between different kinds of specialization and approaches.

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