A fish history of economics:

from worldly philosophers to efficiency experts, and beyond[1]

José Edwards[2]

"The study of economics does not seem to require any specialized gifts of an unusually high order. […] Yet good, or even competent, economists are the rarest of birds. […] The paradox finds its explanation, perhaps, in that the master-economist must possess a rare ***combination*** *of gifts. He must reach a high standard in several different directions and must combine talents not often found together. He must be mathematician, historian, statesman, philosopher – in some degree."*

J. M. Keynes, 1924

"In this age of specialization, I sometimes think of myself as the last 'generalist' in economics, with interests that range from mathematical economics down to current financial journalism […]. My work in economic theory has been in […] modern welfare economics, linear programming, Keynesian economics, economic dynamics, international trade theory, capital theory, logic of choice and maximization."

P. A. Samuelson, 1959

"The new vision is Science […] If economics were in fact a science, we humans would be mere robots, no more capable of choosing what was to be our response to a price rise than is a particle of iron to the presence of a magnet […] when it comes to policy recommendations, it is impossible to present economic analyses as if they stemmed unchallengeably from the givens of society."

R. L. Heilbroner, 1999

"Many of us chose economics because, ultimately, we thought science could be leveraged to make a positive change in the world. There are many different paths to get there. Scientists design general frames, engineers turn them into relevant machinery, and plumbers finally make them work in a complicated, messy policy environment […] that plumbing should be an inherent part of our profession: we are well prepared for it, reasonably good at it, and it is how we make ourselves useful."

E. Duflo, 2017

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1. A tale of two pluralisms

Generalist vs. specialist economists

The period from classical political economy up to the interwar period, was a time when economists could be considered "worldly philosophers" (Heilbroner 1953). J. M. Keynes' (1924) well-known statement that "the master-economist must possess a rare *combination* of gifts … be mathematician, historian, statesman, philosopher—in some degree" (p. 322), was probably accurate to describe the pluralism of those generalist economists during that long period.

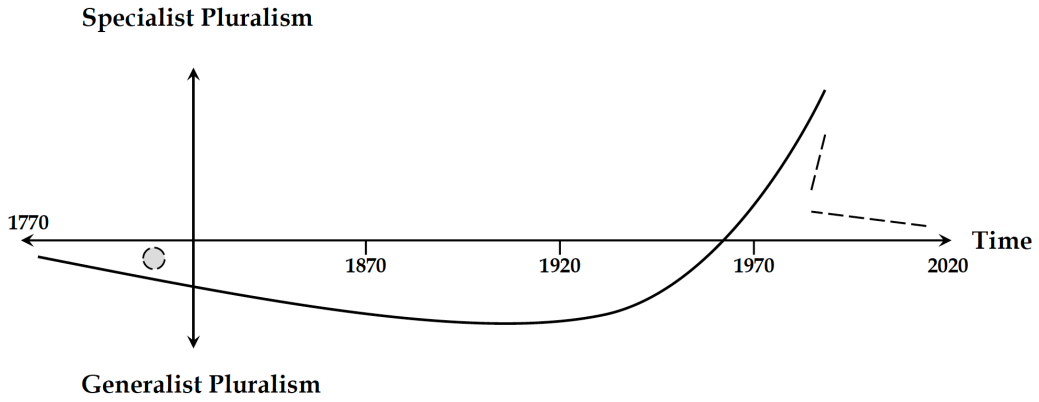
Shortly after WWII, however, economics started expanding in size, but also narrowing down in scope, along with the neoclassical synthesis put forward in Paul Samuelson's *Economics* textbook (1946-). As that textbook trained large numbers of economics and business students, the new generations of economists lost the generalist character of their ancestors. Emphasizing on means/ends definitions of economics (i.e., the efficient use of scarce resources), the new disciplinary mainstream proved able for analyzing a great variety of behavior, and subsequently specializing its domain. In that context, Paul Samuelson is better considered the first specialist rather than the last generalist in economics.

The old and the new pluralism

At about the same time (i.e., the first postwar decades), but becoming clear during the late-1960s, economics entered a process of sub-disciplinary differentiation (and also dissent) from the new mainstream. With the emerging new subfields – both mainstream and heterodox – a renewed pluralism appeared, now *among* specialized economists engaged in myriad roles as expert advisors. It is thus possible to identify two different kinds of pluralism in economics. On one hand the "old" pluralism personified in each of the relatively few economists/worldly philosophers of the long period from classical political economy up to WWII and, on the other, the new pluralism we now witness among big numbers of economics and business specialists.

The fish

In this narrative, the history of economics is represented as a fish, with the fish's width indicating pluralism, and pluralism being different in kind before and after the 1950s-60s.



Studying recent economics (i.e., since the late-1930s) from the viewpoint of economic pluralism, this history explores the simultaneous processes of specialization and expansion of economics, and how the roles of economists and their ideas,

have been changing alongside. The following sections develop on the many aspects of these processes (again, since the 1930s), keeping and eye on the general reader, but also supporting the argument with endnotes and references intended for the now also specialist historians of economics.

2. The small world of the last worldly philosophers

In *The worldly philosophers*, Robert Heilbroner (1953) developed a long history of economics since the 1,300s, times of traveling merchants, up to the "end of the worldly philosophy," in an addition to the seventh's and last edition of his book (1999). Written as a history of "great economists," from A. Smith to J. A. Schumpeter, that last edition jumps to the late-1990s and proposes a comparison between the old and the new economists:

> "The deeper and, to my mind, more significant change is the increasing appearance of a new concept as the vision—indeed, the essence—of economics, and the corresponding disappearance of another much older one. The new vision is Science; the disappearing one, Capitalism. […] if the usefulness of the worldly philosophy of the twenty-first century is to match that of the nineteenth and early twentieth, it will need to be both deepened and enlarged, above all compared to the desiccated residue with which we are left today." (Heilbroner 1999, pp. 193; 196)

Another difference, of course, is the small number of the last worldly philosophers, compared to the large number of economic specialists in the twenty-first century (see Price 1963).

J. M. Keynes [1883-1946] and the possibilities for our grandchildren

Son of John Neville Keynes (Cambridge) and formed, initially, in mathematics (BA, 1904), J. M. Keynes was part of the Versailles peace conference (1919) before writing *A treatise on probability* (1921), and later on a series of academic pieces, among which *A treatise on money* (1930), several essays including *Economic possibilities for our grandchildren* (1930), and his revolutionary *The general theory of employment, interest, and money* (1936). He was then involved in the WWII effort and postwar negotiations, member of the Bloomsbury Group, modern art collector, and Director of the Bank of England even after a heart attack in 1937. Interacting with people from Roosevelt to Churchill, and from Picasso to Bernard Shaw, Keynes lived up to the "master-economist" standard put forward in his obituary on Alfred Marshall [1842-1924]. Keynes' own "rare combination of gifts" has naturally attracted numbers of historical research (Skidelsky 2003). However, relatively few serious attention has been given to his venture beyond the economic problem in his *possibilities for our grandchildren*:

> "I draw the conclusion that, assuming no important wars and no important increase in population, the economic problem may be solved, or be at least within sight of solution, within a hundred years […]. Why, you may ask, is this so startling? It is startling because-if, instead of looking into the future, we look into the past-we find that the economic problem, the struggle for subsistence, always has been hitherto the primary, most pressing problem of the human race-not only of the human race, but of the whole of the biological kingdom from the beginnings of life in its most primitive forms" (Keynes 1924).

Development, Capitalism, and the history of economic thinking: J. A. Schumpeter [1883-1950]

The last worldly philosopher in Heilbroner's book, J. A. Schumpeter was an eclectic Austrian economist somehow in between the Austrian School and the historicist strands of his contemporary German-speaking economists. He wrote his *Theory of economic development* (on entrepreneurship, 1911), before joining the German Socialization Committee in Berlin (together with his Marxist friends) after WWI. Once in Harvard (since 1932) he wrote *Business cycles* (1939), *Capitalism, Socialism and Democracy* (1942), and *History of economic analysis* (posthumously published in 1954). Heilbroner's (1999) "capitalism vs. science" distinction is best personified in Schumpeter's own social prognosis against capitalism (Schumpeter 1942).

F. Knight [1885-1972] and interwar pluralism in American economists

Asides from the British and Austrian schools inspiring J. M. Keynes and J. A. Schumpeter, the old generalist pluralism was also geographic, with specific national approaches evolving in different countries up to right after WWII. This was the case most notably in France and Germany, with their different forms of historical, social, and socialist schools. These European schools had strong influences on economists in the Americas. Morgan & Rutherford (1998) show how North American economists remained pluralists up to the period right after WWII. That pluralism meant variety not only in methods and images of scientific knowledge, but also in beliefs, ideologies, and policy advice. Whether Social Gospelers, Progressives, or Neoclassical (see Bateman 1998, Mirowski & Plehwe 2009), these economists interacted and tolerated each other in both academic and political spheres. Something similar happened in other American countries under the influence of French and German economic schools (see Edwards 2018). By presenting a few aspects of the life and work of Frank Knight, this section concludes this chapter by claiming that the old pluralism happened within (as opposed to among) economists, and went far beyond just developing and applying scientific knowledge.

3. Programming the economic mind

Economic variety and images of scientific knowledge

Although developed rigorously at least since the late-1800s, mathematical approaches were not prominent in economic research or teaching until the first postwar decades. There were also a great variety of images of scientific knowledge used by economists during that long period. According to Backhouse (2002), the mathematization of economics between the 1930s and 1970s (i.e., as it established in economic journals), involved uses for theoretical research (i.e., numerical examples, geometry, algebra) and empirical studies (either inductive, as in national income accounting, or as means for testing theories). That variety involved producing and analyzing statistical data of different sorts: money and business cycles (Fisher, Mitchell, Warren Persons, Henry Ludwell Moore), estimating demand curves (Moore and Henry Schultz), macroeconometric modeling (Tinbergen 1936, then Lawrence Klein for the US), or developing probability-based econometric models (Haavelmo) (see Morgan 1990, Backhouse 2002, Louca 2007, or Qin 2013 for the history of econometrics).

A key point in the history of economics around WWII is that, after the war, the discipline became "structured around" just a subset of the available mathematical approaches and images of scientific knowledge, but not around "real world

problems" (Backhouse 2002, p. 238). The subsequent "core" of economics was theoretical and composed of constrained optimizations, with WWII often used to explain the selection of that particular methodology.

From L. Robbins, to J. Hicks and P. Samuelson's mathematical economics

Lionel Robbins (1932) and, after him, John Hicks (1939) and Paul Samuelson (1947), played important roles in the process of establishing mathematical economics, modeling decision-making, and renewing with general equilibrium theory (Düppe & Weintraub 2014). Robbins' *Essay on the nature and significance of economic science* (1932) had the double purpose of defining "economic science" and explaining its limitations as a guide to interpret reality and for policy prescriptions (i.e., pure theory vs. applied economics). Interpreting scarcity as limited time, limited wages, and the Political Economy of War, Robbins famously claimed that economics was "entirely neutral between ends" (p. 23) and that the "problem of technique and the problem of pure economy [were] fundamentally different problems" (p. 34). After Robbins, economics in the pure sense became "the elucidation of the implications of the necessity of choice in various assumed circumstances" (p. 83). This "scientific" economics developed as free as possible from value judgments, asides from the "ultimate valuation" that, according to Robbins, would preserve its significance": "the affirmation that rationality and ability to choose with knowledge is desirable" (p. 141, check Howson 2011).

J. Hicks' *Value and capital* (1939) was conceived at the LSE during the 1930s, and under the influence of L. Robbins drew from both the Lausanne School (i.e., L. Walras, V. Pareto) and Keynes' *General Theory*. Hicks claimed "unity of method" (p. 4), and attempted to "separate out those things which are the fruit of pure logic […] from those things which are the fruit of Mr. Keynes' own point of view on social questions" (p. 4). Consequently, *Value and capital* assumed perfect competition to make a "logical analysis of an economic system of private enterprise" (p. 7). Built against Marshall's utility-based consumer demand theory, and based on Pareto's (and Slutsky's) transition from marginal utility theory to indifference curves, Hicks' concept of Marginal Rate of Substitution between two commodities, took economic theory a step closer to Robbins' standard for an economic science (i.e., "entirely free from any dependence upon a quantitative measure of utility," p. 20), but far from the wider scope of the previous worldly philosophy.

Written from 1937 to 1941, Paul Samuelson started his *Foundations of economic analysis* (1947) at 22 years old, in an "attempt to show that there do exist meaningful theorems in diverse fields of economic affairs" (p. 5). Proceeding from two general hypotheses: "that the conditions of equilibrium are equivalent to the maximization (minimization) of some magnitude [and] that the system is in "stable" equilibrium or motion" (ibid.), Samuelson took mathematical economics even further away from the Marshallian standard. R. Weintraub (1991) develops on E. B. Wilson's impact on that very young Samuelson through the Harvard Pareto Circle, and R. Backhouse's (2017) *Founder of modern economics: Paul Samuelson* explores the early life and work of that narrow young scholar.

Optimization and planning during WWII

As pointed out earlier, WWII is often used to explain the postwar rise of mathematical economics. After all, the war effort did require optimizing the use of scarce resources and efficient planning at the national level, which happened through "statistical decision theory, operations research, and mathematical programming" (Backhouse 2002, p. 253, see also Dorfman et al. 1958, Mirowski 2002, Hands 2007, Thomas 2014, Erickson 2010, Selisker 2016). That planning brought

together military engineers and economists to develop applicable variants of cost-benefit analyses. According to Porter (1995) or Fourcade (2009): "cost-benefit analysis in the United States emerged among military engineers and was taken over by economists only after World War II" (Fourcade 2009, p. 111). It was supposedly from the Department of Defense, that cost-benefit analysis "spread to all kinds of government expenditures, and later even to regulatory activities" (Porter 1995, 188).

A puzzle to solve regarding the rise of this form of mathematical/technical economics during and after WWII, is that it continued expanding long after the war period. There are several competing explanations for this. The Cold War (i.e., another war effort) together with preferences for a market system in America and McCarthyism, is one among them (see Morgan & Rutherford 1998). Another is that the postwar synthesis between the new mathematical modeling and Keynesian macroeconomic management, became the training ground for younger (and much bigger) generations of economics and business students in America, and then also elsewhere (Weintraub 2017).

4. Economists become technical experts

Technicality, science and the state

The rise of economic experts during the postwar period owes to the escalation of technical approaches to science and their relation to politics, more generally. According to Porter (2006), there was a separation/division of labor between research and politics, grounded on the "expectations that politicians will generally not meddle with the scientific work on the condition that science, reciprocally, should stay clear of politics" (Porter 2006, p. 1273). Rigorous and impersonal methods were "taken as the ground for social science objectivity" (ibid.). By "focusing on objects and problems that can be examined impersonally," the social sciences became "preoccupied with precision, with neutral information, even when the thing measured or characterized is not exactly what we are trying to comprehend" (p. 1274, check Bachkouse & Fontaine 2010).[3] Since WWII, social scientists also became protected "by higher degrees, by university departments, and by professional societies" (p. 1284), as science became "a skill anchored in specialist communities"(Shapin 2008 in Porter 2009, p. 296, check Shapin 1992). In that more general context, constrained optimizations "emerged as an ideal for the analysis of government expenditures and regulatory action of all kinds" (2006, p. 1285), and satisfy a "demand for technical expertise to mobilize an economy" (2009, p. 305).

The new economic experts responded to "new demands posed by the aftermath of the war [that] asked for more, and more serious, training in the social sciences, as well as more training in science fundamentals" (Maas 2014, p. 277). The MIT, for instance (more below), allowed for Samuelson's engagements with RAND, which implied "stepping aside" from politics to become a "detached technician" on the "state of the economy and on the government policy options" (p. 291).

[3] "Like Pearson, Fisher did not pretend that statistics could or should be reduced to a wholly impersonal routine, yet Fisher, still more than Pearson, encouraged the opposite view with his claim that the whole reason for performing an experiment is to allow nature the opportunity to refute the null hypothesis (that is, that the treatment or the alleged cause has no effect). Such language encouraged scientists, social as well as natural, to treat the outcome of a statistical test of significance as the one thing that really matters […], and for public agencies, impersonal knowledge of this sort was just what they were looking for from science." (p. 1290).

Expanding government expertise

Asides from economic theory and war planning, which eventually extended to other aspects of government, macroeconomic management also became increasingly translated into the technical/specialist language of economists, which allowed for discussing policy issues using macroeconomic equations and diagrams (Giraud 2010), alongside the otherwise narrow theoretical developments at the MIT, Harvard, or the Cowles Commission (i.e., at the University of Chicago and then Yale since the mid-1950s). However, of the two main strands related to policy, and in Fourcade's (2009) terms: "By and large, the work of government economists is not associated with macroeconomic stabilization (though the design of national accounts and macroeconometric models did at one point employ legions of economists and statisticians), but instead involves the use of microeconomic tools and concepts to evaluate social programs, design regulatory rules, or manage externalities." (Fourcade 2009, p. 111).[4]

Narrow, cohesive, global economists

Male-dominated (70% of PhDs) and hyper-specialized (Abbott 2001, Frank & Gabler 2006, Jacobs 2013), economics is also distinguished from other social sciences by its higher entry-costs and insularity: "a (substantial) majority disagree or strongly disagree with the proposition that "in general, interdisciplinary knowledge is better than knowledge obtained from a single discipline. Such results are consistent with the notion that economists, with their distinctive confidence in the superiority of their own discipline, are less likely to feel the need to rely on other disciplines or even to acknowledge their existence" (Fourcade et al. 2015, p. 95).

Economics also shows a unitary and hierarchical disciplinary core, transmitted in textbooks (including at the graduate level) from "elite" departments. Tightly managed, including the job market and hiring process: "Economics departments at the very top of the pecking order exchange students among themselves in higher proportions than in other fields" (2015, p. 97), cohesiveness is also reinforced in the economics profession by the publishing process (concentrated among "top" University Presses at Chicago, Harvard, MIT), and gatherings at the ASSA meetings (AEA 18,000 members).

Economics also shows a widely shared (i.e., universalist) technical/specialist style. Along with creating internationally recognized awards celebrating the technical character of the discipline, such as J.B. Clark medals (American Economic Association, since 1947) or prizes in Memory of Alfred Nobel (Bank of Sweden, since 1969), economics is globalized through processes of standardization and transnational coordination rooted in the economists' own technically-framed preferences for globalization (Fourcade 2006, 2009, check Slobodian 2018). However, despite its cohesiveness, it is still possible to find national differences between the US, Britain, and France (Fourcade 2009).

[4] "Figures from the Office of Personnel show that the number of federal employees listed as "economists" grew from about seven hundred in the late 1920s to a little over five thousand in 1997, with a peak toward the end of the 1970s." (Fourcade 2009, p. 109). Fourcade (2009, pp. 90-110) explores the expansion of economic expertise in government. Also on natural experiments (p. 133) and the private "economics industry" (pp. 114-125): an "economic consulting market" including econometric forecasting, law and economics (Abbott 1988), think tanks,"at the crossroads between politics, business and universities […] sometimes aggressive purveyors of ready-made research for political staffs " (p. 122). Three periods: late 1800s-1920s (academization, disciplinarization), 1930s-60s (national accounting, macroeconometrics and public expertise), 1970s- (neoliberal govenmentality, business application of economics, finance and microeconomics, market liberalization) (2009, p. 2). Check the international hegemony of American economics (Fourcade 2009, p. 63): the centrality of market institutions, highly technical graduate training: "seeking to anchor their own authority in the ideology of professionalism, and second by bringing professionals into the public domain through a market for policy" (p. 61). Also empiricism (NSF funding since the late-1950s), the rise of business schools (around 50% of economics PhDs in business schools), the role of PhDs (pp. 72-77), the rise of finance (2015, p. 102), the dominance of financial economics within finance (Jovanovic 2008), and performativity (2015, p. 109).

5. First specialists

Paul Samuelson, the MIT, and rise of mainstream economics training

The postwar rise of Paul Samuelson's department at the MIT is part of the story of success of the economic mainstream), as "new economists were needed as teachers, as government analysts, and as business economists" (Weintraub 2014, p. 9, also Cherrier 2014, Svorencik 2014, Teixeira 2014). The "classical humanities-based education" declined (relatively), as the "demand for economics courses and for business courses exploded (ibid.). This happened alongside the neoclassical synthesis put forward in Samuelson's *Economics* textbook, and also through several other textbooks by MIT economists. The history of the MIT, among the more generalized rise of business schools (Augier & March 2011) and the social sciences in the Cold War (Solovey 2012), is part of the story of specialization in economics.

The neoclassical synthesis in theory and policy

As pointed out earlier, there are several competing/complementary explanations for the appearance of a single mainstream economics together with "marginalized heterodox activities" after WWII (Weintraub 2017 p. 572): the "Keynesian revolution," the "rhetorical stabilization of mathematical and econometric model-based economics," "the Americanization of economics," the development of Cold War social sciences (game theory in particular), and "The Servicemen's Readjustment act of 1944, known informally as the GI Bill [which] reshaped American higher education" (Weintraub 2014, p. 9). The neoclassical synthesis encompasses several of these explanations.

Theoretically, the synthesis happened between Walrasian and Keynesian economics (see Weintraub 1991, Modigliani 1944, Patinkin 1965, Leijonhufvud 1968/73, Hands 2007, de Vroey & Duarte 2013, Backhouse 2014). However, the story is more complex than just a narrative on economic theory, as it also involved policy issues and, especially, economics training. Giraud (2014) develops on Samuelson's *Economics*' "middle of the road" position "between laissez-faire and governmental planning, arguing that free markets and private initiative need to be supplemented by state intervention to ensure economic efficiency" (p. 134). The first versions of *Economics* (1946-48) were, indeed, policy oriented "with the clear objective of promoting the demand management policies that the author had been witnessing since the early 1940s at the National Resources Planning Board with Alvin Hansen" (p. 149). The operationalization of this program happened by translating Keynesian (i.e., not necessarily Keynes') insights (but Hicks 1937, Hansen 1953) into the new framework introduced by Samuelson and other mathematical economists (see Pearce & Hoover 1995, Backhouse 2014), but now in textbook form. Producing the textbook involved "political negotiations" including Samuelson, his MIT department colleagues, his critics (some from the MIT board), and the editors of the textbook at McGraw-Hill.

The first three editions of *Economics* evolved toward stabilizing the neoclassical synthesis (Giraud 2014). The 1948 (1st) edition included the "Keynesian cross" and "Y=C+I+G," together with claims for making economics scientific (Pearce & Hoover 1995). The 3rd edition (1955), included the IS-LM model along with the neoclassical synthesis terminology:

> "Repeatedly throughout the book I have set forth what I call a "grand neoclassical synthesis." This is a synthesis of (1) the valid core of modern income determination with (2) the classical economic principles. Its basic tenet is this: Solving the vital problems of monetary and fiscal policy by the tools of income analysis will *validate* and bring back into relevance the classical verities. This neoclassical synthesis does something equally important for the teaching of economics. It heals the breach between aggregative macro-economics and traditional micro-economics and

brings them into complementing unity." (1955, p. vi)

That terminology remained until the 7th (1967) edition of the textbook (Backhouse 2014), which claimed "we are all Keynesians now." From the 8th to the 11th edition (1970-1980), Samuelson remained the sole author of the textbook. The 8th edition stated that "money matters very much," a reorientation towards the problem of inflation, while also including the "Phillips curve" in the main text (Pearce & Hoover 1995, p. 204). From 1985 onwards, *Economics* became coauthored by W. Nordhaus and remains, to date, one of the main introductory textbooks together with G. Mankiw's *Principles of Economics*, Krugman & Wells' *Economics*, and more recently *The Economy* (Bowles & Carlin 2020): all "Samuelsonian" textbooks in their different ways.

Applied policy science at the Chicago School of Economics

Asides from macroeconomic management and a few textbook microeconomic principles, for the new technical economics to become fruitful it was necessary to make it applicable to solving real-world problems. This aspect was particularly important at the Chicago School of Economics (different from the Chicago Economics Department). Emerging also during the postwar period, the Chicago School "understood economics to be an applied policy science" (Emmett 2010, p. 1). Following A. Marshall's image of economics (i.e., unlike Hicks or Samuelson), it developed its own blend of theory, methodology, and policy prescriptions, while relying highly on empirical research (Hammond 2010). Milton Friedman's (1953) methodological essay, and G. Stigler and G. Becker's (1977) article on the exogeneity of tastes for economic analysis, remain landmarks in the development of the Chicago School's approach to economics and public policy.

Unlike other initially more mainstream approaches, "Chicago price theory tends to be more concrete, less abstract; more pragmatic, less speculative; a tool to solve problems rather than a set of problems to be solved, and derived to a greater extent from evidence rather than from abstractions" (Hammond 2010, see also Emmett 2011). Connected with earlier strands of American institutional economics (Medema 1997, Rutherford 2010, Stapleford 2011), the Chicago School is also close to the neoliberal movement, and its program for creating a new "competitive order."[5] It remained a minority position against Keynesian thinking until the 1970s (check Peck 2011), after what it blended together with the other now mainstream approaches (Hammond 2010). By then, the Chicago approach also served as a foundation for imperialistic claims of economists, which extended throughout the final third of the 20th century (and then to nowadays in its new variants, more below). After all, the approach consisted of "relatively simple price theory applied with imagination" (Hammond 2010, p. 10).

[5] Check Hammond (2011) on neoliberalism, Friedman, and creating the 'competitive order,' as well as comparisons between Friedman, Galbraith and Samuelson. For Chicago, neoliberalism, and the Mont Pelerin Society, see van Horn & Mirowski (2010), van Horn (2011), Caldwell (2011), Cherrier (2011), Nik-Khah (2011), Nik-Khah & van Horn (2016). According to that literature, for Chicago economists much of politics could be understood as if it were a market process, and therefore amenable to be formalized. Politicians, it was claimed, were just trying to maximize their own utility, as were voters" (p. 199).

6. Economic imperialisms: theoretic, empiric, performative

Imperial decision theory and the positive/normative dichotomy

The positive/normative dichotomy, discussed from introductory textbooks (e.g., Samuelson's) to methodological literature (e.g., Friedman 1953, Stigler & Becker 1977), has become part of the economists' rhetoric about their discipline reaching scientific standards (McCloskey 1983, 1990). Underlying its insularity among the social sciences and humanities (Fourcade et al. 2015), and imperial ventures to studying objects of other disciplines (see Stigler 1984, Lazear 2000, Medema 1997, Nik-Khah & van Horn 2012, Davis 2016), the illusion of economics being scientific just like the natural sciences, is part of the imperialists' argument: "Economics is not only a social science, it is a genuine science. Like the physical sciences, economics uses a methodology that produces refutable implications and tests these implications using solid statistical techniques. […] a focus on efficiency leads economists to ask questions that other social sciences ignore" (Lazear 2000, p. 99).

Although "the is-ought distinction has ancient roots in Western philosophy, much of the contemporary discussion can be traced to David Hume" (Hands 2012). "Hume's dichotomy," "Hume's fork," or "Hume's guillotine" (p. 220): the imperative that "one cannot deduce an ought from an is," is often considered to be the positive-normative dichotomy's most enduring philosophical lesson" (p. 220). In economics, the already mentioned Lionel Robbins was "one of the most influential voices supporting the prohibition of the normative," and impulse of "positive" justifications for economic theory.

However, the economists' decision theory is "neither a positive/descriptive theory of real economic agents, nor an ethical theory about what such agents ought to do" (p. 227). It does not fit "neatly into the "positive" category as economists have traditionally defined it" (p. 229), although "most modern economists generally consider rational choice theory to be a positive, not a normative, theory; endorse the position that normative statements/concepts should be prohibited from scientific economics; and equate normative theories/presuppositions with ethics" (p. 231). For philosophers, and more recently behavioral economists, rational choice theory is rather a specific type of normative theory: "it fails empirically as a descriptive theory of actual people" and "only describes what rational consumers should do" (p. 230).

Unlike most postwar economists, previous worldly philosophers, such as L. Walras or J. N. Keynes, did not think of economics in binary terms, but used threefold distinctions.[6] In our fish history, economics transitioned from those older distinctions, to the now predominant positive/normative dichotomy. For our purposes here, it will be useful to move back and retain a triad: in our case, a performative/positive/normative scheme.

Making evidence-based expertise credible, and freak…

A similar, although different, form of imperialism started during the early-1980s and culminated with the so-called "credibility revolution" in econometrics (Leamer 1983, Angrist & Krueger 1991/2001, Angrist & Pischke 2010, Ashenfelter 2014). Whereas the previously mentioned research on economic theory had relatively dominated during the first postwar decades (see Biddle & Hamermesh 2017), the 1980s and 1990s gave way to studies using "little to no theory," and a "much

[6] On the differences between the "positive," "normative," and "ethically normative," see Hands (2012, p. 227). J. N. Keynes (1890) distinguished "positive science" (what is) from "normative science" (what ought to be) and "art" as a system of rules for the attainment of a given end (p. 221). L. Walras' triad included pure, applied and social economics.

simpler econometrics."[7] The new empirical economists also became capable of processing much more of the increasingly available data (Backhouse & Cherrier 2017, Panhans & Singleton 2017).[8]

The new empirical research aims at the experimental/positive standards of (again) the natural sciences. However, much of the econometrics under the credibility revolution has evolved around just "quasi-experimental" methods. Relying on instrumental variables, regression discontinuities, and difference-in-differences, this new econometrics identifies causal inferences using (mostly) already available datasets (Panhans & Singleton 2017). Besides providing evidence-based policy evaluations, these quasi-experiments have continued feeding the illusion of economics reaching the standards of the natural sciences. Cahuc & Zylberberg (2016), for instance, claim that economics has become an experimental science, and that the "experimental revolution" in economics is producing scientific knowledge, comparable to that produced by life scientists (see also Chetty 2013, Edwards et al., forthcoming).[9]

The also called "data revolution" (Einav & Levin 2014), together with new capabilities for data processing (check Stigler 1965 on "the age of quantification"), have expanded the scope of economics including, for instance, the study of happiness data, and analysis of subjective outcomes more generally (Hamermesh 2004, Edwards 2010/12, Edwards & Pelle 2011, Banzhaf 2017). Among these other imperialistic studies, one finds different forms of "freakonomic literature" intended to popular audiences: "Since the science of economics is primarily a set of tools, as opposed to a subject matter, then no subject, however offbeat, need be beyond its reach" (Levitt & Dubner 2005, p. 14 from Fine & Milonakis 2009, p. 94).

Engineers, architects, plumbers

Back to the performative/positive/normative triad, "game theory, behavioral economics and mechanism design theory (three main developments in later mainstream economics) have moved increasingly to the view that economics functions in a performative way toward the world, aiming to change the world to fit economic theory, thus abandoning the 'misconception' that economics should function as a descriptive science." (Davis 2017, p. 526). This (now explicit) change "first occurred when game theorists were called upon to design auction processes for licensing the electromagnetic wave spectrum to telecommunications firms under the aegis of the US Federal Communications Commission (FCC) in 1994 (cf. Nik-Khah 2005)." (p. 531). According to Davis (2017), the "point here is not that game theory can remake the world in its

[7] Whereas in the 1970s and 1980s economists were using data to test and operationalize economic theory (see Stafford 1986, also Backhouse & Biddle 2000, Hamermesh 2013, Rodrik 2015), in the 1990s they were turning away from structural econometrics (Backhouse & Cherrier 2017, p. 15). Biddle & Hamermesh (2017) suggest three periods: before the 1960s, from the 1960s through the early 1990s (characterized by the use of mathematical models, optimization and equilibrium to generate and test hypotheses about economic behavior), and from the late 1990s a partial abandonment of economic theory in applied work in the "experimentalism paradigm." Also on the "quasi-experimentalist" idea that "research designs" were flexible approaches "along with an argument that the circumstances that had generated these data would allow 'credible identification' of a 'causal effect'" (p. 2). Their hypothesis is that due to the credibility revolution, the share of empirical articles relying on formal theoretical models, was noticeably lower in the early 2000s than in the 1970s.

[8] Panhans & Singleton (2017) on the 2010 symposium in the Journal of Economic Perspectives. Similar to the Freakonomics literature, Angrist & Pischke (2010) point at examples from the economics of crime, education and health. Then on "quasi-experimental methods" suited to meet the demands of patrons of economic research, particularly policymakers. The emphasis on "transparency" of the techniques for obtaining "credible" causal effects for "evidence-based policy evaluation" underscores the marketability of quasi-experimental approaches" (p. 131). Check Levitt & List (2008) on the history of experiments, Ashenfelter (2014) on difference in differences and "the credible, transparent evaluation of social programs: evidence-based policy evaluation" (p. 147). Check Card (2001).

[9] "This paradigm shift has also been institutionalized in schools of public policy, applied economics and public health, in turn influencing the way economics engages with neighboring disciplines and policymakers (Hirschman & Berman 2014). This new analysis is "much more credible," and more "readily consumed by policy makers" (Colander 2005, pp. 292-3). Check Deaton 2009, Brodeur et al. 2020.

own image but rather than it seeks to do so" (p. 532), something similar happening with more recent "market design" initiatives (Roth 2002, Mirowski & Nik-Khah 2017). In a design problem, "the goal function is the main "given," and the mechanism is the "unknown," the analysis aims at identifying those mechanisms that make it possible to achieve the desired goal—in particular, efficient outcomes. Thus, 'the design problem is the "inverse" of traditional economic theory, which is typically devoted to the analysis of the performance of a given mechanism'" (Hurwicz and Reiter 2006, p. 3) (p. 534). Also Maskin (2008, p. 567) on implementation theory (Davis 2017, p. 535).

In addition, recent calls for economists becoming "choice architects" (Thaler & Sunstein 2008, Edwards 2016/18) or "policy plumbers" (Duflo 2017, Su & Colander 2021), aim at assisting governments to design policies up to the point of "engaging with the details" (Duflo 2017, p. 1). Implementing policies based on the economists' theories of "incentives, information, imperfect rationality, etc." (p. 2), is yet another form of imperialism. Celebrated with the highest distinctions available in the economics profession, these new perspectives decide about the character of the new markets and about how to nudge people toward "desirable" economic behavior, including prescriptions for the effective implementation (i.e., the plumbing) of such policies.

As listed at the beginning of this document, for Duflo (2017): "Many of us chose economics because, ultimately, we thought science could be leveraged to make a positive change in the world." It is the supposed "comparative advantage" of economists, she adds, that "makes it a responsibility for our profession to engage with the world on those terms. " (p. 15)

7. Back to the new pluralism

Economic research explodes! Specialization and dissent: mainstream and heterodox pluralisms

The rise of indexed economic literature during the last three decades has motivated a series of research attempting to classify economics (Ellison 2002, Kim et al. 2006, Kelly & Bruestle 2011, Hamermesh 2013, Card & DellaVigna 2013, Claveau & Gingras 2016, Cherrier 2017, Angrist et al. 2017, Kosnik 2018, Ambrosino et al. 2018, Edwards et al. 2018). The JEL Classification System (Cherrier 2017) has become the main reference for identifying the different fields in economics. However, none of the JEL-based studies really accounts for the increasing diversity of economics since the early-1990s. For 1991, the EconLit database includes 11,901 articles, 29,117 for 2005 (+144.66%) and 35,502 for 2018 (+21.92%). The number of JEL codes included in the database increased (exploded) by 277.83% during the 1st period, and 56.68% the 2nd period (21,796; 82,353; 129,032 codes for 1991, 2005, and 2018 respectively). However, the increase in variety of JEL (3rd level) codes was much smaller during that same period, augmenting only by 17.53% and 5.74% (593, 697, and 737 different codes). On the other side, the average number of JEL codes by articles increased from 1,83, to 2,83, to 3,97 (i.e., by 54.65% and 40.28%).

A process in place since the 1980s, has been the diversification of mainstream economics (Colander 2000). The transition from "neoclassical dominance to mainstream pluralism" (Davis 2006) refers to the rise of new mainstream subfields, such as game theory, experimental economics, behavioral economics, complexity economics, or financial economics, a form, perhaps, of "reverse imperialism" (Davis 2008, Cedrini & Fontana 2018) that has been illustrated by an hourglass figure

similar to the fish-shaped diagram in this proposal (Boetke et al. 2008).[10] The new mainstream pluralisms, for Cedrini & Fontana (2018, also Colander 2000, Davis 2006, Boettke et al 2008, Hands 2015), "significantly deviate from the neoclassical core" (p. 1). They suggest a "fragmentation" of mainstream economics, which "may persist over time under the impact of self-reinforcing mechanisms of specialization and the resulting creation of new specialties and approaches" (p. 1).[11]

Economic pluralism has been a particularly fruitful topic in discussions among heterodox economists (Dow 2004/8, Dutt 2014, Garnett 2006, Lee 2009, Garnett et al. 2010), and economic methodologists (Davis 2008, Hands 2015). Given that heterodox economics is a pluralist set since its origins: i.e., including post-Keynesian, radical, institutionalist/evolutionary, ecological, feminist, and Austrian economists (Dobusch & Kapeller 2012), it is, in a sense, natural that ideas about how to reconcile differences and create a general program for economics (see Hodgson et al 1992), have developed mostly among these scholars. Cedrini & Fontana (2018) develop on pluralism in heterodox economics as "ethical principle," "methodology," "open system," or "normative principle." Then on the "first-wave" pluralism of dissenting heterodox schools (Garnett et al 2010), and "second-wave" after the 1992 AER "plea for a pluralistic an rigorous economics" (Hodgson et al 1992):

> "The International Confederation of Associations for Pluralism in Economics was established in 1993. Then came the Post-Autistic Economics movement. This stemmed from a petition by French economics students, circulated in summer 2000, for broadband approaches to economics teaching. The issue was raised again in 2001 by the 'Cambridge 27' group of 27 PhD candidates at Cambridge UK ('Opening Up Economics' was the title of their manifesto) and, in that same year, by students from 17 countries, who released an 'International Open Letter' calling for reform of economics education. Finally, an International Student Initiative for Pluralist Economics was established in early 2014 by various groups of students from different countries. Pluralism has recently become the topic of many academic conferences." (Cedrini & Fontana 2018, footnote 2)

[10] Boettke et al (2008) claim that contemporary economics is (i) focused on "big questions," and willing to look outside economics, (ii) empirically focused, and (iii) dramatically influenced by freakonomics and "increasingly directed at a popular lay audience." They claim these are positive changes. Then on "economics and the hourglass" (from Kreps 1997). Since A. Smith to nowadays, the hourglass analogy runs through the period from the marginal revolution to after WWII, when "the narrowing of economics greatly accelerated." By the late 1990s, they claim, "the hourglass was at its narrowest" (p. 17). Only "the 1990s saw a transformation of the discipline," with the collapse of communism and lingering problems of underdevelopment, in combination with the excessive formalism of economics. Then on Acemoglu, Johnson, Robinson's (2000/1) articles and also Shleifer et al's (2002/3). After that on G. L. S. Schackle's "years of high theory" during the 1930s, and that "undergraduate majors in economics have dramatically increased since the mid-1990s (ref. from Wall Street Journal). On Levitt, Dubner and then R. Frank, T. Harford, Steve Landsburg and Tyles Cowen: "because freakonomics-type research often targets the public, it depends crucially upon conveying economic ideas using natural language as opposed to mathematics. It is too early to say, but the increasing popularity of freakonomics may have some effect in pushing economists back toward the style of reasoning and analysis the classical political economists employed" (p. 21). Check also Kreps (1997) on Paul Romer's hourglass (no reference), describing "roughly the development of orthodox or mainstream economics, and (at that) primarily in the US" (p. 66).

[11] On specialization check Jones (2009, 2010), Conti & Liu (2015), Tilgham et al (1998), Jones et al (2014). Then Heiner's (1983) two strategies to overcome the competence-difficulty gap: "either they learn more by attaining broader education at greater costs; or they narrow their field of expertise by specializing" (p.11). Stigler et al (1995) on "the specialization of journals," Buccola (2006) on the multiplication of economic associations, Cherrier on the JEL codes, especially the 1991 revision, which "made evident the process of radical specialization and fragmentation accompanying the explosion of economics since the 1960s" (p. 11). Jacobs (2014) on "newly born journals [which] are often interdisciplinary in character but extremely specialized" (p. 12). On the increase in economics coauthorship since the early 1950s (Laband & Tollison 2000, also McDowell and Melvin 1983). Kuhn's The road since structure (2000), Wray (2011) on the "epistemic dimension of scientific specialization" and "topic-incommensurability." Also Kuukkanen (2012), and Backhouse & Cherrier (2017) on "fragmentation" (check). Gintis' (2007) proposal of "a framework for the unification of the behavioral sciences (p. 15), and the idea of repairing the fragmentation of these sciences (p. 16, also Clarke 2007 on Gintis). Finally, Wray 2011 on the "hope for a unified science". Check also Cedrini & Fontana (2018) on fragmentation and the 1991 symposium "The next hundred years" (Pencavel 1991). The Journal of Economic Literature (Perlman 1969, Pencavel 2008). Also on the magnitude of economic publishing: from around 1,000 economic articles indexed annually in the 1950s (WoS?), to about 5,000 from 250 journals in the early 1970s, to 30,000 today from about 550 sources (WoS). Margo (2011) on "the economic history of the AER."

They also include Dobusch and Kapeller's distinction between "interested" (heterodox) and "disinterested" (mainstream) varieties of pluralism, and Rodrik's (2015) pluralistic defense against Fourcade et al.'s (2015) "insularity" (Cedrini & Fontana 2018, p. 4).

"In growth we trust": discussing sustainability, inclusiveness, full employment

In *Economic Possibilities for our Grandchildren*, J. M. Keynes (1930) discussed about the end of the economic problem (i.e., the struggle for subsistence), at least for the wealthier countries in about a hundred years from his days. And, in a sense, the most pressing issues these days are not efficiency problems, but ensuring a sustainable and inclusive development (Jacobs & Mazzucato 2016, Mazzucato 2018) together with managing an increasingly excessive (i.e., not scarce) labor supply (Brynjolfsson & McAfee 2011). Although recent heterodox writers have attempted to "rethink capitalism" along those lines (e.g., Jackson 2009, Mazzucato 2014, Jacobs & Mazzucato 2016, Mazzucato 2018), much of the arguments in this literature remain discussions about growth and efficiency expertise (e.g., for/against austerity measures). This is the case, for instance, of Jacobs & Mazzucato's (2016) three "key insights:"

> "First, we need a richer characterization of markets and the businesses within them […]. Markets are better understood as the outcomes of interactions between economic actors and institutions, both private and public."
>
> "The second key insight is that it is investments in technological and organisational innovation, both public and private, which are the driving force behind economic growth and development […] governments can do far more than 'level the playing field', as the orthodox view would allow. "
>
> "Recognition of the role of the public sector in the innovation process informs the third key insight. This is that the creation of economic value is a collective process. Businesses do not create wealth on their own. No business today can operate without the fundamental services provided by the state"

Something similar happens in debates on inequality and growth, opposing "evidence-based" positions from both mainstream and heterodox sides (check Felber 2015, 2017):

> "There is striking evidence—now gathered and acknowledged by the OECD and IMF—that economies with more equal distributions of income and wealth have stronger and more stable economic growth than those with greater inequality […]."Crucially, as experience of legal minimum wages has shown, raising wages tends to force firms to invest in improving productivity, which strengthens economic performance"[12]

Something similar seems to happen in discussions over technological unemployment, Brynjolfsson & McAfee (2011), for instance, include a series of growth-based prescriptions and recommendations.[13]

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[12] Check Mazucatto (2018) on: 1) A Brief History of Value. 2) Value in the Eye of the Beholder. 3) Measuring the Wealth of Nations. 4) Finance: A Colossus is Born. 5) The Rise of Casino Capitalism. 6) Financialization of the Real Economy. 7) Extracting Value through the Innovation Economy. 8) Undervaluing the Public Sector. 9) The Economics of Hope. Check Jackson (2009) on: 1) Prosperity Lost, 2) The Age of Irresponsibility, 3) Redefining Prosperity, 4) The Dilemma of Growth, 5) The Myth of Decoupling, 6) The 'Iron Cage' of Consumerism, 7) Keynesianism and the 'Green New Deal', 8) Ecological Macro-economics, 9) Flourishing – Within Limits, 10) Governance for Prosperity, 11) The Transition to a Sustainable Economy, 12) A Lasting Prosperity

[13] Check Brynjolfsson & McAfee (2011) on: 1) Technology's Influence on Employment and the Economy. 2) Humanity and Technology on the Second Half of the Chessboard. 3) Creative Destruction: The Economics of Accelerating Technology and Disappearing Jobs. 4) What Is to Be Done? Prescriptions and [19] Recommendations: on education (5), on entrepreneurship (4), on investment (2), and on laws, regulations and taxes (8).

On discussing the boundaries between science and applied policy (including Senior, Mill, J. N. Keynes, Robbins 1981), Su & Colander (2021) recall virtues of the old generalist pluralism with which this document started. Taking on Duflo's (2017) analogy on economists as plumbers, they argue that: "An economist dealing with policy would use a methodology different from scientific methodology," which "demands knowledge and judgments far beyond scientific knowledge" (p. 15). In Duflo's discussion, they claim, "the major task for the economist-as-plumber is to make sure the policy, once implemented, will function effectively to achieve the assigned goals. In other words, what is deemed as desirable goals that a policy aims to achieve has already been determined in some way." However, while "Science has no problem with adding issues of plumbing in Duflo's sense," it "does have a problem with adding those aspects of policy that relate to values and sensibilities." (p. 25): "We see economists needing not only changes in mindset, but also in how they are educated … they would be introduced to ethics, aesthetics, politics, psychology, etc., and taught their importance." (p. 26).

On thinking beyond the economic problem, it is possible to identify at least two strands of recent literature addressing the problem: inter/transdisciplinary social research (e.g., Colander 2014, Jacobs 2014), and revisiting the scope and method of the art of political economy (Colander 2009/2018, Rodrik 2015, Colander & Freedman 2018, Johnson 2020, check also Boonin 2019/20, Hausman & McPherson 2009). Although these two strands point at overcoming the specialist character of current efficiency expertise, the first aims at integrating different specialized disciplines, whereas the second renews with the old generalist pluralism of which J. M. Keynes was part:[14]

> "for the first time since his creation man will be faced with his real, his permanent problem-how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well […]. For many ages to come the old Adam will be so strong in us that everybody will need to do some work if he is to be contented […]. Three-hour shifts or a fifteen-hour week may put off the problem for a great while. For three hours a day is quite enough to satisfy the old Adam in most of us! […]. But beware! The time for all this is not yet. For at least another hundred years we must pretend to ourselves and to every one that fair is foul and foul is fair; for foul is useful and fair is not."

[14] On the limits for efficiency expertise, check from Koppl (2018), Nick Hanauer (video), Fourcade et al (2015, pp. 106-111), Alexandrova et al (2020). Also Jacobs' (2014) "defense of the liberal arts disciplines and research universities in which they have thrived for the last sixty years" (p. 9). Colander (2014) on the idea that the "heterodox economists' agenda should be a greater blending of all the social science departments" (p. 516), together with transdisciplinary proposals for both undergraduate and graduate training.

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