HOW ECONOMISTS EXPLAIN WITH MATHEMATICS – OR SHOULD THEY?

La Trobe University, Melbourne; Professor Arjo Klamer, Erasmus University Rotterdam; Professor Marko Košak, University of Ljubljana; Professor Bogomir Kovač, University of Ljubljana; Professor Dany Lang, University of Paris 13; Professor Marc Lavoie, University Sorbonne Paris Cite, University of Paris 13; Professor Tony Lawson, University of Cambridge; Professor Igor Masten, University of Ljubljana; Professor Deirdre N. McCloskey, University of Illinois, Chicago; Professor Jo Michell, University of the West England; Professor Julie A. Nelson, University of Massachusetts, Boston; Professor Alessandro Roncaglia, Sapienza University of Rome; Professor David F. Ruccio, University of Notre Dame, IN; Professor Anwar Shaikh, New School University, NY; Professor Andrej Sušjan, University of Ljubljana; Professor Maks Tajnikar, University of Ljubljana; Professor Bruno Tinel, University of Paris 1 Pantheon-Sorbonne; Professor Jan Toporowski, SOAS University of London; Professor Miroslav Verbič, University of Ljubljana; Professor Jack Vromen, Erasmus Institute for Philosophy and Economics, Rotterdam; Professor L. Randall Wray, Levy Economic Institute

Contents

For More Mathematics and Theory in Economics

Andrej Srakar, Researcher at Institute for Economic Research and Editor-in-Chief at REEM, School of Economics and Business, University of Ljubljana

✉ andrej.srakar@ef.uni-lj.si

Economics seems to be on a crossroad and in dire need of changes. The prevailing paradigm, so-called neoclassical economics and neoclassical synthesis (and all derived and related streams of research) has been emptied of content. Simple empirical analysis of data is not enough to gain broader insight into economic phenomena. Economics studies one of the sectors/subsystems of contemporary society which is prone to all the necessary features of any social phenomena, evidenced throughout the history of social sciences. For example, one cannot study any human activity without simultaneously changing the very object it studies – this is impossible by definition. Yet, most of present-day economics studies the economy as one would study a physical, say, astronomical object – assuming the object of the study will not change due to the research itself. Absurdity of this »worldview« is apparent and will not even be discussed here – it is simply a consequence of centuries of, for example, philosophical, sociological and anthropological literature and thought. If it would be otherwise, we managed to reverse the history and start it anew – but, as this is impossible, the above is impossible (and wrong) as well. The reader is suggested to visit any library in the world and study the history of human thought to »verify« the above consideration.

That being said, we must not throw away the baby with the dirty water. Contrary to common considerations, the very apparatus of mainstream economics is not the one to blame. It is the »ideology« of the researchers which sometimes seem more like believers – logical consequence of avoiding confronting representatives from other social sciences in an open scientific debate. The emptiness of present day economics seems a logical consequence of the above – when any system closes from its

environment, this is first step to its dissolution. Renowned German 20th Century social theorist, Niklas Luhmann, has taught us that any system is both closed and open at the same time – a fact which tries to be avoided and neglected very often, with dire consequences.

But, as said, the blame is not on the apparatus. The fundamental economic problem is the issue of scarcity and how best to produce and distribute these scarce resources, this is the »A« (or »E«) of economics. To answer to this problem, usage of mathematical modelling is simply a necessity and the most logical and primary tool to use. But economics is, again by definition, applied mathematics and tools to be used depend on the problem to be solved and its assumptions. If they are wrongly set, likelihood of producing wrong results is extremely high. If one pretends human beings are basically machines trying to maximize their utility (as indeed mainstream economics does), well, go to, say, the sociologists and ask for their opinion. Despite economists will try to avoid this and convince you that sociologists (as just one example) are »dumb and incompetent«, you would receive interesting responses. Some of the sociologists will teach you about symbolic interactionism of Mead, Blumer, Cooley and Thomas. Most symbolic interactionists believe a physical reality does exist by an individual's social definitions, and that social definitions do develop in part or in relation to something "real". People thus do not respond to this reality directly, but rather to the social understanding of reality. But, we do not want to listen to those arguments and maintain running the Lagrangians and Hamiltonians to solve our basic optimization problems. Namely, the above (Mead theories) are, a commonly heard phrase: »not economics«.

But you can go and ask further. Some sociologists will tell you about structural functionalism and Emile Durkheim. According to a simple definition, this stream of social thought is a framework for building theory that sees society as a complex system whose parts work together to promote solidarity and stability. Some others will explain stories about social constructivism, a theory of knowledge in sociology and communication theory that examines the development of jointly-constructed understandings of the world that form the basis for shared assumptions about reality. This stream of thought centers on the notion that meanings are developed in

coordination with others rather than separately within each individual. Yet others will tell you about actor-network theory, a theoretical and methodological approach to social theory where everything in the social and natural worlds exists in constantly shifting networks of relationships and nothing exists outside those relationships. They will also tell you about literally hundreds of diverse and rich schools of thought like (sociological) phenomenology, social systems theory (of hundreds of backgrounds), social psychology, critical theories of various provenience, largely related to derivatives of Marxism, of social complexity theories, about social Darwinism, positivism and anti-positivism, social complexity theories, about Birmingham school of cultural studies, about social balance theory, action theory, control theory, elite theory, field theory, figurationism, world-systems theory, there is even a Chicago school in sociology (but the joy ends when hearing its other nickname: ecological school…).

Visit to the sociological »zoo« (pun intended) will bring you many challenging insights. Well, challenging is not the right word: they are pathbreaking and, even more, seem of large danger to present day economics. I dare to claim none or almost none of the above has found its way into economics, and, in particular, economic modelling. Why? Are all sociologists really so dumb and incompetent? Is everything of the above wrong? Unworthy of consideration? Is it unimportant for economics? It does speak about both society and humans[1], which are the primary object of economic thought as well – just like for sociology…

Truth seems to be very different. Economists have so far, in slightly more than two centuries of economic thought, not performed their task. Better said, present day direction of economics needs to be changed and put back to synergy (and dialogue) with other social sciences. A dialogue long forgotten and abandoned in the present day arogance seeing economics as higher than others just because of some problematic methodological claims to its scientific status. At the end of the day it is not your status, power, media influence, wealth that matter – »science« (research) is about findings, is about »truth« and about research honesty.

---

[1] I will try to avoid discussions about society not composed of human beings (say, in Luhmann's social system theory) – topic more than worthy of debate, but surpassing this short introduction.

I used sociology and sociologists above as just one example. One could repeat the exercise with anthropology, with political sciences, with large part of philosophy, with large part of psychology, even with study of religions and culture, with study of communications. You would find (super) vast area which has been left completely aside, unstudied and unmodelled in economics. Yet, it does study the same primary object as economics – society and human beings. But, surprisingly, probably none of the above mentioned streams of knowledge has any mention about humans being simple utility-maximizing machines. If you would mention this to them, they will consider you as: dumb and incompetent. Better said, you would not pass even your first exam of the undergrad study.

The above is only beginning of a hopeful new approach and change in the direction of present day economic research. Clear exposure of present day economics as done above only shows the urge to develop new directions and new perspectives. Better to say, new economic paradigm, which will be open to other approaches and streams of thought and finally begin to integrate them properly into economic thought and modelling. As just one example I shortly mention my own recent development: it has become a long standing feature of economic models to be grounded in micro foundations, i.e. to present the economic activity as a simple sum of solutions to individual utility maximization problems. This is in clear contrast and contradiction to the emergent properties of social systems: emergence occurs when an entity is observed to have properties its parts do not have on their own. It seems a simple step to model such emergent properties: present day topological data analysis, related to machine learning, seems to easily allow modelling of the above considerations. Naturally, such modelling has not been tried and done before. But it easily solves seemingly one of the largest puzzles of contemporary economic modelling. And we could easily continue: present day mathematics allows numerous perspectives, such as algebraic and differential topology and geometry, category theory, several complex variables, tropical algebra and stochastic differential equations (all of those are largely just names for very broad fields of mathematics which only allow the search to begin)

which could be used to integrate the approaches of social sciences more properly into economic modelling.

It was all of the above that lead to this special issue. We started from one of the best known monographs on economic methodology from recently deceased Dutch-born British economist Mark Blaug which marked the development of economic thought and celebrates its 40th anniversary in 2020. His book is an examination of the nature of economic explanation introducing current thinking in the philosophy of science and reviewing the literature on methodology. It discusses the troublesome question of the logical status of welfare economics, giving the reader an understanding of the outstanding issues in the methodology of economics. This is followed by a series of case studies of leading economic controversies, which shows how controversies in economics may be illuminated by paying attention to questions of methodology. Its final chapter draws the strands together and gives a view of what is wrong with the economics of Blaug's time.

Our intention was to strive for something similar in the context of the period and present we live in. The special issue consists of six papers. David P. Ellerman discusses how mathematics obscures conceptual errors in the Arrow-Debreu general equilibrium model, pointing that the model fails even as an idealized model and mistakes the logic of a private property market economy. Aleksandar Kešeljević argues that economics, with extensive use of mathematical formalism and statistical techniques, adopted the methodology of natural sciences in order to appease the misunderstanding, theoretical disagreements and rifts between the economists. Romar Correa draws on the insights of Wynne Godley (and Francis Cripps) and Martin Shubik, joining the two perspectives within the ambit of General Systems Theory. He formulates and tests for the stability of models of the capitalist system and compares and contrasts General Equilibrium and Nash Equilibrium solutions of the capitalist economy. Maik Huettinger critically discusses the main academic studies evaluating the impact of the Transatlantic Trade and Investment Partnership (TTIP) agreement, analyzing to what degree the econometric models which are predominantly used, are actually able to predict what they promise. Jesús Muñoz Bandala discusses Keynes´s relationship with mathematics

and statistics and founds that Keynes was not opposed to the use of mathematics, but he preached instead a rational use of it. Finally, Irene Sotiropoulou discusses a quest for appropriate quantitative methods in social and solidarity economy. Special issue concludes with a book review from Ivan Rubinić of The Wealth of (Some) Nations by Zak Cope.

Above articles and good response to our call for papers demonstrate our initial claim. There is a big »demand« for change in the present day economic paradigm and in particular its relationship to mathematics as its cornerstone. We live in times of huge upsets, political turmoil, migrant crisis, aftermath of the Great Recession, times of the COVID-19 pandemic and the new large recession it brings. Economics has been unable to provide many answers to the mentioned problems. Main solutions of the present day relate to revival of theories and streams of thought from history: socialism and communism, Keynesianism, but also fascism and even nacism. Surely, this is no path worth following. It is a hope that above considerations and articles of this special issue will be able to provide some light into present day dark times and provide background for the development of a new paradigm in economics and social science in general, being grounded in both improved mathematics and theory.

How Mathematics Obscures Conceptual Errors in Arrow-Debreu General Equilibrium Model

David Ellerman

Faculty of Social Sciences, University of Ljubljana

✉ david@ellerman.org

Abstract

The highly mathematical nature of the Arrow-Debreu and other similar models of general equilibrium hide rather than elucidate the nature of equilibrium in a private property market economy where all factors of production may be purchased or rented. It is an empirical commonplace that the Arrow-Debreu model of general equilibrium does not describe the real world, but it is equally commonplace to accept it as representing the pure logic of the competitive market economy in an idealized world free of transactions costs. But the model fails even as an idealized model; it actually mistakes the logic of a private property market economy. Unlike McKenzie's model of idealized general equilibrium under constant returns to scale, Arrow and Debreu claim to have shown the existence of competitive equilibrium under decreasing returns to scale and positive pure profits. The Arrow-Debreu model (again unlike the McKenzie model) needs to assign the profits to individuals and this is done using the notion of "ownership of the production set." But this notion suffers from a fatal ambiguity. If Arrow and Debreu interpret it to mean "ownership of a corporation" then a simple argument of the form "labor can hire capital or capital can hire labor or a pure entrepreneur can hire both" defeats the alleged necessity of assigning residual claimancy to the corporation. A given corporation may or may not end up exploiting a set of production opportunities (represented by a production set) depending on whether it hires in labor and undertakes production or hires out its

capital to others (all by assumption at the parametrically given prices). In the latter case, residual claimancy is elsewhere. There is no such property right as "ownership of a production set" in a private property market economy.

Introduction

It is now rather commonplace, if not somewhat passé, to criticize the Arrow-Debreu (AD) model (Arrow and Debreu 1954) on empirical grounds. At every turn, the AD model makes some unrealistic, if not fantastic, assumptions in order to round out the logical structure of the model. The common view is that the AD model represents an idealized model of a market economy but that the real-world economy is unfortunately different. But we will not join in this empirical criticism of the AD model. Our point is that the AD model contains a fundamental structural error even as an idealized model of a "frictionless" market economy. The model simply gets the basic logic of a private property market economy wrong.

The Basic Modeling Error

The error is in the modeling of property rights—in the notion of the "ownership of the firm." This modeling error appears in the AD model because they allow constant *or* decreasing returns to scale. With decreasing returns to scale, positive pure profits appear in equilibrium and these profits must be assigned to economic agents. Arrow and Debreu employ the notion of the "ownership of the firm" to close that logical gap and to assign the profits to the "shareholders." If they had assumed constant returns to scale throughout, then equilibrium profits would be zero, as in model of Lionel McKenzie (1954), so the assignment of profits to individuals can be finessed (rather than answered).

The two models differ in their implications for income distribution. The Arrow-Debreu model creates a category of pure profits which are distributed to the owners of the firm; it is not assumed that the owners are necessarily the entrepreneurs or managers. In the McKenzie model, on the other hand, the firm makes no pure profits (since it operates at constant returns); the equivalent of profits appears in the form of payments for the use of

9

entrepreneurial resources, but there is no residual category of owners who receive profits without rendering either capital or entrepreneurial services (Arrow 1971, p. 70).

The modeling error in the AD model is easy to state but apparently difficult to understand. In a private property market economy, there is no such property right as the ownership of a production set (set of technically feasible production opportunities) or a production function. For instance, in the production function $Q = F(K,L)$, there is the ownership of the capital services K, of the labor services L, and of the outputs Q, but there is no ownership of the production function F. There is, however, an ownership form in a (modern) market economy, namely the ownership of a corporation, which Arrow and Debreu confuse with the ownership of a production set or function.

Separating Corporations from Production Sets

It is easy to logically separate ownership of a corporation from "ownership of a production function." Suppose we consider a production process using a specific set of capital goods that provide the capital services K. When the labor L is applied along with K, the outputs $Q = F(K, L)$ can be produced. We assume, for the sake of argument, that the capital goods are owned by a certain ABC Inc. which is owned by given shareholders. Since we are considering a production process using specific capital goods owned by a specific ABC Corporation, we are giving the AD model every benefit of the doubt to show that the corporation has "ownership of the production function." Does ABC Inc. "own" the production function F in the sense that it must own the output of the production process of the labor services using ABC's capital goods to produce Q? No—ABC does not necessarily own Q.

The argument is painfully simple, and it is captured in the old saw that "capital can hire labor or labor can hire capital." In other words, the ownership of the stock of capital goods used in production does not automatically yield ownership of the product produced using

10

those capital goods if the stock of capital goods was rented, hired, or leased out to some other party (of course, at the parametrically given competitive rental rate). If the capital goods were rented to another party, then the capital services K would be sold to that other party, say to a corporation CBA Inc. (owned by labor or some other third party). Then CBA would have to purchase (or already own) the other complementary inputs to production (such as the labor services L) in order to lay a clear property claim on the outputs Q. In that case, CBA would appropriate the ownership of the outputs Q after paying for the inputs K and L, and thus CBA would receive the net profit from the production function Q = F(K, L). Yet the ownership of the ABC corporation did not change; it is still in the hands of the same shareholders. Thus, the ownership of the corporation is not the ownership of the production function. If the identification fails in the case of a production process using specified corporate-owned capital goods, then it fails, *a fortiori*, with a more abstractly specified production function.

If by "ownership of a production function" one simply means blueprints and other technical knowledge, then such intellectual property is routinely bought and sold as an input in a production opportunity. The initial ownership of the produced Q is assigned in a different way. Nothing comes out of nothing. In order to produce Q, inputs K and L (including other inputs in a more complex case) had to be consumed in production. Whatever legal party has the ownership of the used-up inputs (that led to the production of Q) had the clear and incontestable legal claim on Q. But the ownership of the K and L used up in production is determined by the pattern of input contracts, not by the ownership of a corporation. It is determined by whether capital hires labor, labor hires capital, or some third-party (e.g., Frank Knight's entrepreneur) hires both, i.e., by who hires what or whom. If we use the word "firm" to designate that legal party who is the residual claimant in the sense of getting the ownership of Q by being the last legal owner of the used-up inputs K and L in a going-concern, then there is no such thing as the "ownership of the firm." Firmhood (residual claimancy) is determined by the direction of

the input market contracts, not by the ownership of the corporation which might supply one of the inputs (implicitly or explicitly) to the firm.

As a corollary, the whole notion is false that the ownership of the product and management rights over production are part and parcel of the ownership of the capital goods or "means of production" involved in the production opportunity. When capital goods are rented out, then the owner of the capital still owns the capital but is not the owner of the produced outputs Q nor the holder of the management rights. This notion that the legal party that is the "firm" in the going-concern sense of residual claimancy in a production opportunity is so widespread that it is a *fundamental myth* (Ellerman 1992) about the system of "capitalism."

Not only is it routine for buildings, office space, and machines to be rented out, there are even historical examples of whole factories being rented out. In the early 1950s, the Studebaker-Packard Corporation had the Packard bodies produced in a Detroit plant of the Briggs Manufacturing Company. After the founder died, all twelve of the U.S. Briggs plants were sold to the Chrysler Corporation in 1953. "The Conner Ave. plant that had been building all of Packard's bodies was leased to Packard to avoid any conflict of interest." (Theobald 2004) Then the Studebaker-Packard Corporation would hold the management rights and product rights for the operation of the factory owned by the Chrysler Corporation.

In spite of the logical argument and factual examples, most economists and legal theorists seem unwilling to draw out the implications of capital being rentable (just like people). "How can Chrysler Corporation not hold the management rights or rights to the products of its *own* factory?" Of course, conventional economists *can* understand that capital can be rented out, but they find no convenience in drawing out the consequences. They prefer to lazily assume the fundamental myth which serves as the *pons asinorum* of property theory (Ellerman 1992; 2014). For them, it is a bridge too far.

Marx popularized the capital-based phraseology of "capitalist" and "capitalism." To understand Marx's concept of the "rights of capital" embodied in the "ownership of the means of production" that crystallized in the Marxist version of the fundamental myth, one must go back to the medieval notion of dominion based on the ownership of land. What today we might call the "landlord" was then the Lord of the land exercising both political/juridical control over the people living on the land and the rights to the fruits of their labor. As the legal historian, Frederic Maitland (1850-1906), put it: "ownership blends with lordship, rulership, sovereignty in the vague medieval *dominium*...." (Maitland 1960, 174). Or as the German legal scholar, Otto von Gierke (1841-1921), put it simply: "Rulership and Ownership were blent." (Gierke 1958, 88).

It is this medieval notion of dominion associated with the ownership of land or 'landism' that Marx carried over to the ownership of capital is his conception of 'capitalism.'

> It is not because he is a leader of industry that a man is a capitalist; on the contrary, he is a leader of industry because he is a capitalist. The leadership of industry is an attribute of capital, just as in feudal times the functions of general and judge were attributes of landed property. (Marx 1977, Chap. 13, 450-451).

But this is a colossal blunder if it is meant as a description of property rights—as opposed to bargaining power. Of course, "capital" has the bargaining power particularly in the usual description of a "competitive market" where "collusion in constraint of trade" is forbidden on the part of labor-suppliers and labor-demanders. The typical "labor-demander" is a corporation wherein hundreds, thousands, or millions of capital-owners (i.e., the shareholders) are allowed to bargain as one legal party. Then in the "majestic equality" of neoclassical theory, the labor-suppliers (individual workers) and labor-demanders (individual corporations) are alike forbidden to collude together in labor unions or in corporate cartels to gain non-competitive bargaining power.

The imagery of neoclassical theory gets worse—even prior to considering the property fallacy of the fundamental myth. The conventional circular flow picture assumes that *firmhood is determined prior to market activity*. The resource owners are lined up on one side and the "firms" are supposedly lined up on the other side of the input markets. But this is not the case in a free enterprise market economy.

Product Markets
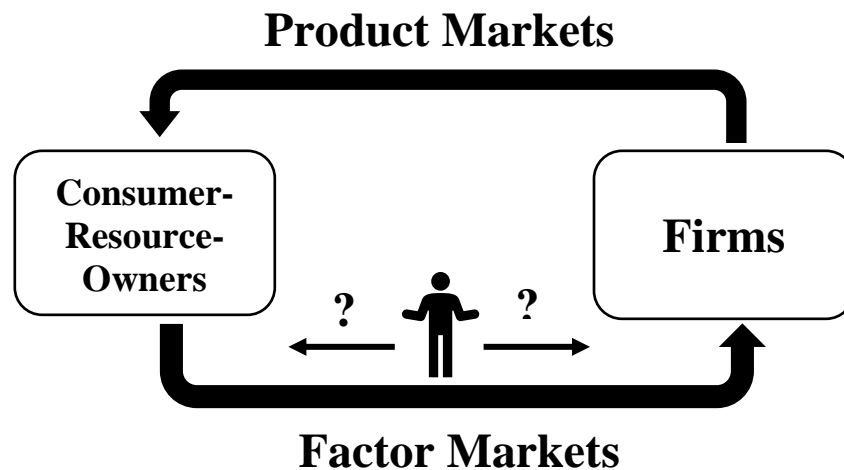
Figure 1: Circular Flow Diagram: Indeterminacy of Who Hires What or Whom

It is not legally predetermined that an input owner is a supplier of inputs rather than a demander of a complementary set of inputs. In particular, it is not legally predetermined that a capital owner (corporate or not) is a labor demander rather than a capital supplier. Prior to the market contracts, corporations are just other input owners. Any resource owner, corporate or otherwise, may aspire to be a "firm" in the technical sense of a going-concern by attempting to purchase the complete set of inputs to a productive opportunity. Prior to market contracts, legal parties are not associated with production sets, so input demand and output supply schedules are *not* even well-defined.

The fundamental myth implies that the very designation of the system as "capitalism" is a misnomer. This is even recognized by one of the more profound defenders of "the system," Frank Knight, who also traced the misconception back to Marx.

14

Karl Marx, who in so many respects is more classical than the classicals themselves, had abundant historical justification for calling, i.e., miscalling—the modern economic order "capitalism." Ricardo and his followers certainly thought of the system as centering around the employment and control of labor by the capitalist. In theory, this is of course diametrically wrong. The entrepreneur employs and directs both labor and capital (the latter including land), and laborer and capitalist play the same passive role, over against the active one of the entrepreneur. It is true that entrepreneurship is not completely separable from the function of the capitalist, but neither is it completely separable from that of labor. The superficial observer is typically confused by the ambiguity of the concept of ownership. The owner of an enterprise may not own any of the property employed in it; and further reflection will show that the same item of property may in different senses be owned entirely, or in widely overlapping degrees, by a considerable number of proprietors. (Knight 1956, p. 68, fn. 40)

Because of the precision of the mathematics, the property theoretic error can be pin-pointed in the Arrow-Debreu model. Shareholders do indeed own corporations, but *corporations do not own production sets*. There is no problem in assuming that the ith consumer owns "a contractual claim to the share a_{ij} of the profit of the jth production unit (Arrow and Debreu 1954, p. 270) where "production unit" is a corporation. The problem is in the assumption that for "each production unit j, there is a set Y_j of possible production plans" (p. 267) where no other party, aside from the jth corporation, can utilize those production possibilities. In a private enterprise market economy, there is no such property right as the "ownership" of production sets of feasible production vectors.

In the Arrow-Debreu model each consumer-resourceholder is endowed prior to any market exchanges with a certain set of resources and with shares in corporations. But, prior to any market activity, ownership of corporate shares (e.g., the shares in Chrysler Inc.) is only an indirect form of ownership of resources, the corporate resources (e.g., the factory purchased from Bragg Manufacturing Inc. and leased out to Studebaker-Packard Inc.). It is the subsequent contracts in input markets which will determine whether a

corporation, like any other resource-owner, successfully exploits a production opportunity by purchasing the requisite complementary inputs and appropriating the produced outputs—or whether those resources are sold or rented to another party.

Production as Arbitrage between Input and Output Markets

We might call the question of "who hires what or whom" the "hiring conflict" since in the context of prices that yielded positive pure profits, it is a game theoretically indeterminate conflict over who will receive those positive profits. Any proposed set of contracts that yielded one party positive profits could be upset by anyone else offering the input suppliers slightly more so that a slightly smaller level of positive profits would remain. This can be modeled by the dollar-division game where a dollar is given to three people and they can divide it in any way so long as a majority agree to the division. But no division can be a solution since any one party can propose another division to benefit that person and one other person.

In the idealized frictionless world of Arrow and Debreu, such a transaction is perfectly possible, and, indeed, production is a form of arbitrage between input markets and output markets (buy low on input markets and sell high on output markets). Since the proposed set of contracts yielding positive profits could be upset by another party willing to accept a slightly lower level of pure profits, there can be no competitive equilibrium with positive pure profits.

Thus, we have reached what, *pace* Arrow and Debreu, should be an unsurprising result— there can be no competitive equilibrium in the presence of profitable arbitrage possibilities. How do Arrow and Debreu manage to prove otherwise? Simply by not allowing anyone else to demand the other inputs except the corporation that is "identified" with the production set. But as the trivial possibility of hiring out corporate capital assets reveals (e.g., in the Chrysler example), there is no "identification" between corporations

and production sets (or production functions). Firmhood is determined within the marketplace by the pattern of who hires what or whom, and is not determined by the given initial distribution of corporate ownership. The basic property theoretic modeling error in the AD model is the assumption that corporations "own" production sets.

This result restores the symmetry between the different returns to scale. There can be no competitive equilibrium with increasing returns to scale because no one wants to be the firm (due to negative profits), and, symmetrically, there can be no competitive equilibrium with decreasing returns to scale because everyone wants to be the firm (due to positive profits). As Lionel McKenzie has consistently and correctly argued from the beginning and reiterated in his Presidential Address to the Econometric Society, there can only be a competitive equilibrium under constant returns to scale (where profits are zero and firmhood is indeterminate) (McKenzie 1981).

Mistaking Transaction Cost Barriers as "Ownership of the Firm"

The phrase "ownership of a firm" is a very slippery expression. Its meaning can slide around in the middle of an argument to suit the ends at hand. It usually means ownership of a corporation that is currently engaged in a production process. We have already shown that it is the pattern of the input contracts that makes the corporation the owner of the outputs of the production process. A rearrangement of the input contracts would switch firmhood or residual claimancy to another party and reduce the corporation to an input supplier role—all without changing the ownership of the corporation. But in realistic markets (unlike the AD model), there are huge transaction costs to rearranging the input contracts. The incumbent corporate residual claimant has sizable first-mover advantages so that any challenging party would have to incur such high transaction costs to redirect the input contracts that it might be just as cheap or cheaper to simply buy the corporation and thereby take over the residual claimant's position in the existing pattern of input

contracts. It is these transaction cost barriers which create the image that the existing corporate residual claimant "owns" the production opportunity.
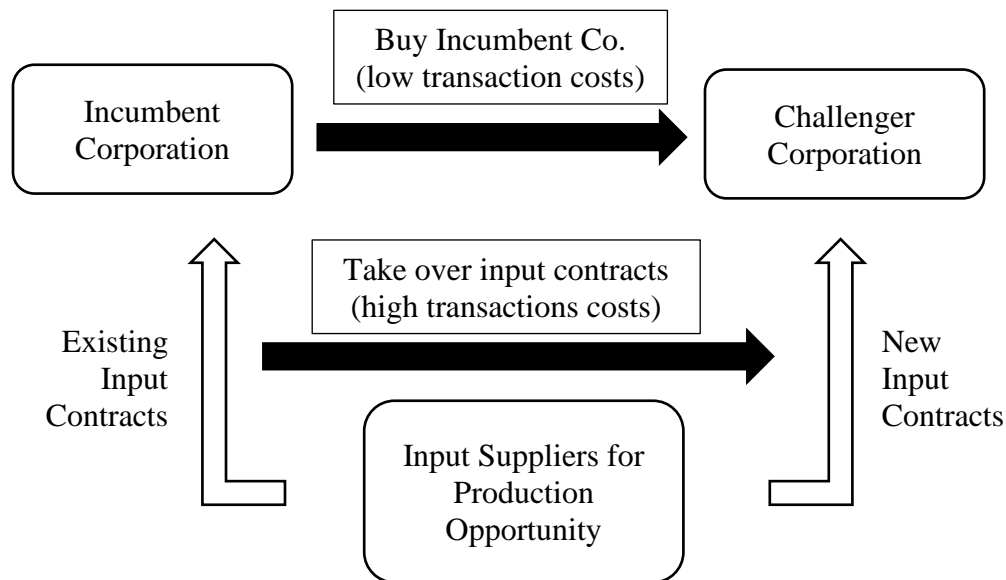
Figure 2: Two Ways to Take Over a Production Opportunity

One of the advantages of idealized frictionless models in economics, as in physics, is that they show the basic logic of the system without irrelevant distractions. We saw in the transactions-cost-free world of the Arrow-Debreu model that input contracts could be costlessly rearranged to switch residual claimancy from one party to another without changing the ownership of a corporation from one party to another. That is part of the basic logic of a private property market economy, and it precisely this logic that Arrow and Debreu fail to model correctly. That is how they get the basic logic of a private property market economy wrong.

The transaction cost barriers to rearranging contracts in realistic markets create the illusion of a property right such as Arrow and Debreu's "ownership of a production set" or the everyday notion of "ownership of the firm." Transaction cost barriers are only that; they are not property rights. For instance, as transaction costs change it might become more feasible to acquire residual claimancy by rearranging input contracts rather than by

purchasing the corporation. This would not violate the corporation's "ownership of the production set" since it had no such property right in the first place.

Economists ordinarily take great pride in using their abstract models to reveal fallacies in everyday lay economic reasoning (e.g., about supply and demand). The lay notion of "ownership of the firm" is so basic and widespread that we have called it the "*fundamental myth*" of capital-ist ideology (Ellerman 1992). The idealized frictionless model can be similarly used to expose the transactions-cost-based illusion in this lay notion of "ownership of the firm" and to demonstrate the contractual nature of firmhood or residual claimancy. Yet Arrow and Debreu directly import the lay notion into their frictionless world where the fallacy is obvious to all who are willing to see it. In spite of the voluminous literature about transactions costs and property rights, there seems to be a studied incapacity to derive *this* result about the "fundamental myth" of the property system. Indeed, the importance of the arguments outlined above lies not in what they show about that creature of academic economics called the "Arrow-Debreu model" but in what they show about the basic logic of a market economy (transactions costs or not) where all factors are rentable.

Endgames to Defend the Fundamental Myth

Defining Away the Problem with Owner-Specified Outputs

There are a number of "endgames" that are used to try to defend the fundamental myth that corporations "own" production opportunities (rather than just owning some of the inputs to the opportunities). One strategy is simply to *define* the output as being that owned by the corporation, so this blocks some other party from owning that output by simply rearranging the input contracts. In our example, we showed that ABC Corporation owned Q because it owned the used-up inputs, the capital services K and the labor services L, and if any other party by a rearrangement of the input contracts owned K and L then that party would own Q without having to buy ABC Corporation. But a common reply to this argument by lay and professional economists is that the ownership of "ABC's

output Q" is part of the ownership of ABC Corporation, so some other party would have to buy ABC to get the ownership of ABC's Q. But this formulation already assumes that Q is defined as "ABC's output" and thus it begs the real questions as to how Q got to be ABC's output as opposed to some other party's output—a question which is answered by looking at which party owned the input services used up in the production of Q, i.e., by considering who rents what or whom in the marketplace. The auto bodies coming off the assembly line in the factory owned by Chrysler were not "Chrysler's output Q" since the factory was leased to Studebaker-Packard.

One could similarly beg the price-theoretic question of how price is determined by incorporating price in the specification of a commodity. One does need any price theory to determine the price of a "$2 chunk of cheddar cheese." But one does need some theory of price to determine how this chunk of cheddar cheese (specified otherwise than by price) has a $2 price. In a similar manner, one doesn't need any property theory to determine who owns the "*Briggs* auto bodies" that roll out one end of a production building owned *and operated* by Briggs, but one does need to reconsider the owner of the auto bodies (sans Briggs specification) that roll out of the same production building when owned by Chrysler—and leased to and operated by Studebaker-Packard.

Hidden-Factor Ploys

Another common ploy (more favored by academic than lay economists) to salvage "ownership of production functions" is to build some privately-owned factors into the "shape" of the production function or set. Since these factors are not shown in the notation of the production function or set, one cannot represent in such a model the possibility of some other party renting that factor. Hence one can supposedly say the owner of the hidden factor "owns" the production function. This seems to introduce the methodological innovation of "proof by bad notation." But this is not a joke. It was the ploy used by Arrow and Hahn in their treatment of the AD model.

McKenzie (1981, 2002), Koopmans (1957, p. 65), and others have interpreted the Arrow-Debreu model as assigning production sets to specific parties by postulating "hidden factors" owned by the parties. But this compromises the model in a number of ways (see Ellerman 1982, Chapter 13; or McKenzie 1981). Firstly, there are no non-market-*able* privately owned input services, and Arrow and Debreu have identified none. Some hidden factors which might be used to supposedly justify decreasing returns are not privately owned, e.g., publicly-owned (congested public roads) or unowned natural factors. The existence of unowned or publicly-owned factors does not account for the assignment of production sets to specific parties. Arbitragers also have access to those factors so they could defeat any proposed equilibrium with positive pure profits.

Arrow and Hahn try to replace "not market-*able*" with "not market-*ed*." But it is incoherent to simply assume that "not all inputs are, in fact, marketed" (Arrow and Hahn 1971, p. 61) *when the production sets are first being specified*.

> For any vector y, let y^M and y^P be the vectors formed by considering only the marketed and private components, respectively. For the firm, assume that the private components are given:... From the viewpoint of the study of markets, only the vector y^M is relevant. (Arrow and Hahn 1971, p. 61)

Arrow and Hahn then restrict the production vectors to their "marketed" components and leave the "private" components implicit in the shape of the production sets (all prior to the determination of any equilibrium prices). But whether an input is marketed or held for private uses will depend on the equilibrium configuration of prices (which are hardly known or assumed when production sets are first being specified).

The Arrow-Hahn tactic is not only methodologically incoherent; it could be inconsistent with the other assumptions. As Edwin Burmeister has pointed out:

(A) formulation which assumes that certain markets do not exist is incomplete and, more importantly, it may be inconsistent with profit maximization. (Burmeister 1974, pp. 414-415)

Suppose an economic reform was in the past instituted in communist Russia where some inputs were traded on free markets with factory managers instructed to maximize profits, but certain other inputs were designated as "not marketed" and were not exposed to market forces (see previous Arrow and Hahn quote). Neoclassical economists would be very quick to point out that if some factors were hidden from exposure to scarcity-reflecting market prices, then there could no assurance that the factors would be efficiently allocated. Any "efficiency theorem" the Russians might derive would be bogus due to the existence of the non-marketed hidden factors that are not exposed to market signals. Unfortunately, neoclassical economists display a learned ignorance of this critical but rather elementary insight when Arrow and Hahn use the same tactic (p. 61) and then claim to prove the equally bogus "efficiency theorem" for their model (p. 110).

In reviewing a book about Nicholas Kaldor, Frank Hahn (of Arrow and Hahn 1971) seems to have had second thoughts.

(Kaldor insisted) that perfectly competitive general equilibrium only made sense under constant returns. To economists brought up on Arrow-Debreu this seems plainly wrong. Constant returns are not assumed. (Hahn 1988, p. 1746)

Citing modern work by McKenzie and others that does not assume the identity of firms to be given prior to market activity, Hahn concludes that Kaldor was "substantially right" (p. 1746). So, McKenzie was also right all along that when all factors are exposed to market forces and are rentable or publicly available, then there can be no equilibrium except under constant returns to scale and zero profits.

In McKenzie's book on general equilibrium theory (2002), he presents both his model and the Arrow-Debreu model. For his model, he presents production possibilities as convex cones of activities (i.e., constant return to scale) where "In the economy of activities the individual firms are suppressed." (McKenzie 2002, p. 197). When presenting the AD model, McKenzie interprets it as using the hidden non-marketed factor ploy that was quite explicit in the Arrow-Hahn book (1971).

> In the present discussion we will take the diametrically opposed view that the firms are fundamental to production and each firm owns a technology or a possible production set Y_f that is given. The firm trades in the goods that are used in production or that issue from production but not in the things that determine the possible production set which it owns. The set of firms, f = 1,..., F, is also given. This approach to the competitive economy was taken by Arrow and Debreu in their classic article (1954). (McKenzie 2002, p. 197)

In spite of McKenzie's earlier remarks on the AD model (1981) and his private remarks to the author, "Actually I have directly challenged the Arrow-Debreu paradigm in my papers subsequent to the 1954 piece." (McKenzie 1986), he only focused on the mathematics in his book (2002). He left unmentioned the point that there is no ownership of production sets in a private property market economy where all factors (hidden or not) are marketable or publicly available. For instance, there is no "ownership" of the "production set" that economists might associate with the former-Briggs factory owned by Chrysler and leased to Studebaker-Packard. There is the ownership of the factory, but the exploitation of the production possibilities associated with the factory was determined endogenously in the marketplace.

But since Arrow and Debreu used their jerry-rigged model to supposedly prove the existence of competitive equilibrium in the *general* case of non-increasing returns to scale and positive pure profits, they were "sainted" with Nobel Prizes in Economics—while McKenzie (who correctly restricted his model to constant returns) was passed over for the Nobel Prize.

23

Criticisms by Kornai and others of the Arrow-Debreu model

The criticisms given here, like the critics of the hidden non-marketed factor ploy, e.g., McKenzie (1981), Koopmans (1957), or Burmeister (1974), point out conceptual errors and incoherence in the Arrow-Debreu model. However, the 'standard criticisms' of the Arrow-Debreu model have focused on the unreality of its assumptions. In addition to the run-of-the-mill criticisms of the idealized consumer-resource owners and firms and in view of the importance of increasing returns in actual economies (Young 1928), Nicholas Kaldor (1972) at least made a more significant but still empirical criticism of the assumption of non-increasing returns.

But, quite aside from Arrow and Debreu, the perfectly competitive model was never intended by serious thinkers (as opposed to writers of popular texts) as a model of an actual private property market economy. As Frank Knight put it:

> Economic theory is not a descriptive, or an explanatory, science of reality. Within wide limits, it can be said that historical changes do not affect economic theory at all. It deals with ideal concepts which are probably as universal for rational thought as those of ordinary geometry. […] The fact that description of ideal behaviour in part explains actual behaviour operates as a source of confusion; the notion that economics is a science explanatory of actual behaviour is the most important single confusion in the methodology of the science. (Knight 1969, pp. 277-79)

The competitive model is seen as an abstract idealized model like a frictionless model in physics. Neoclassical economics also interprets the model as a normative "regulative ideal" (in Kant's phrase); the normative measure to apply to actual economies is how they approximate the competitive ideal and how any such divergence can be reduced.

In addition to Kaldor (1972), Janos Kornai made a broad empirical critique of the AD model in his book *Anti-Equilibrium* (1971) as an "intellectual experiment" (Ibid., p. 11). But Kornai slowly evolved away from empirical criticism to see the virtues in abstract models.

> Reality is never so "perfect". Yet this pure theoretical structure, owing exactly to its "perfection", seems to be suitable to serve as an abstract frame of reference. (Kornai 1979, p. 196)

In Kornai's more recent intellectual autobiography (2006), he pronounced the "experiment" a failure (Ibid., p. 194; see also Khosravi 2018) as he agreed that the abstract modeler is not attempting a realistic theory.

> Modelers can be accused of many mistakes, but not of abstracting from reality. That is the essence of building models. The easy way to criticize is to say, look, the model assumes this thing, but in reality everyone sees something else instead. (Kornai 2006, p. 183)

Hence in his mature reflections, Kornai concluded that the fault lay not in the academic stars such as Arrow and Debreu, but in the popularizers and textbook writers.

> I began the section by pointing to an essential mistake in the domain of the philosophy of science in *Anti-Equilibrium*. I should have attacked not the purity of the theory (the abstract, unreal nature of its assumptions), but the wrong use of it in mainstream economics. The real addressee of the critique should have been *mainstream teaching practices and research programs.* The creator of a pure theory cannot be obliged to include such a warning in his or her work. (Ibid., pp. 184-5, his italics)

In Kornai's institutional writings, he understood—but did not elaborate on—the fallacy behind the fundamental myth that the net income and management rights in a production opportunity are supposedly attached to the ownership of the underlying capital assets. At

first, he seems to attach the net income rights (which he called "type a" property rights) to the capital asset.

> a. *Rights to residual income*. The owner has the right to dispose of the income generated by the property. One generally arrives at a more accurate description by defining this right as one to the residual part of the income, meaning that having deducted all the costs associated with utilization of the property from the income obtained with the help of it, the remaining income belongs to the owner.[5] (Kornai 1992, p. 64)

But then Kornai's footnote 5 tells the different story that the residual income rights are determined by the pattern of market contracts (by who rents what or whom), not simply by the ownership of capital.

> To clarify the concept of residual income it is worth considering the position of a tenant farmer who pays a fixed rent to the landowner for the use of the land. In this case the residual income is made up of the income from the produce of the land, less all costs, including the rent. To that extent, it is the tenant who has type a property rights over the produce and not the landowner. (Ibid., fn. 5, p. 64)

Now Kornai has in his hands the necessary insight to explain why the "given" ownership of corporations in the idealized Arrow-Debreu model would not rule out the arbitrage that would change "who rents what or whom" in the presence of positive pure profits.

Unfortunately, Kornai does not apply this insight in his analysis of the AD model in his early or later work. In distinguishing the AD model from McKenzie's model, Arrow focused on the point about decreasing returns and positive profits.

> The Arrow-Debreu model creates a category of pure profits [while in] the McKenzie model, on the other hand, the firm makes no pure profits (since it operates at constant returns);… . (Arrow 1971, p. 70)

Yet, throughout Kornai's early and late work, he never really focuses on this point, and, in fact, he constantly refers to the "Walras-Arrow-Debreu" general equilibrium theory and thus overlooks the crucial difference in the models since the Walrasian model had constant returns and zero profits.

Concluding Remarks

The Arrow-Debreu model mistakes the whole logic of who is to be the firm in a "free market economy." The question of who appropriates the results of a production opportunity is not settled by the initial endowment of property rights. It is only settled in the markets for inputs by who hires what or whom. This fact reveals another fundamental flaw in neoclassical economics, this time in capital theory and corporate finance theory. Since a firm does not "own" the future contractual behavior of suppliers and customers, the discounted present value of the future profits ("goodwill") from some assumed behavior cannot be legitimately added to the value of some present property such as a capital asset or a corporation—as is done in those theories. Hence, an understanding of the property flaw (the non-ownership of production functions or sets) in the AD model opens the way to the conceptual criticism of neoclassical capital theory and corporate finance theory (see Ellerman 1992).

In a private property market economy, it is not "given" that a capital owner (corporate or not) is a labor-demander rather than a capital-suppler, and similarly for a land-owner or labor-owner. In the usual "circular flow diagram" of the textbooks, it is not predetermined if a given resource-owner stays on the seller side of the "factor markets" or moves over the firm side of the market as a buyer of a complementary set of resources to undertake production.

In other words, the determination of who is to be the "firm" is not exogenous to the marketplace; it is a market-endogenous determination. This adds *a new degree of freedom* (who is to be the firm as a going-concern?) to the model which can only be ignored in the special case of constant returns and zero economic profits when it doesn't matter (at least for price theory) who is the firm. This new degree of freedom eliminates the possibility of a competitive equilibrium with positive economic profits, e.g., with decreasing returns to scale in some production opportunity. Thus the Arrow-Debreu model does not correctly model a perfectly idealized competitive equilibrium in a private property market economy where all factors are rentable or publicly available.

References

Arrow, K.J. 1971. "The Firm in General Equilibrium Theory," in R. Marris and A. Woods (eds.) *The Corporate Economy,* Cambridge: Harvard University Press.

Arrow, K.J. and Debreu, G. 1954. "Existence of an Equilibrium for a Competitive Economy," *Econometrica.* Vol. 22: 265-290.

Arrow, K.J. and Hahn, F.H. 1971. *General Competitive Analysis,* San Francisco: Holden-Day.

Burmeister, E. 1974. "Neo-Austrian and Alternative Approaches to Capital Theory," *Journal of Economic Literature*.Vol. XII: 413-456.

Ellerman, D.P. 1982. *Economics, Accounting, and Property Theory*, Lexington MA: D.C. Heath.

Ellerman, D.P. 1992. *Property & Contract in Economics: The Case for Economic Democracy*, Cambridge USA: Blackwell.

Ellerman, D. 2014. "On Property Theory." *Journal of Economic Issues* XLVIII (3 Sept.): 601–24. https://doi.org/doi:10.2753/jei0021-3624480301.

von Gierke, O. 1958. *Political Theories of the Middle Age*. Translated by F. W. Maitland. Boston: Beacon Press.

Hahn, F. 1988. Review of *Nicholas Kaldor* by Anthony Thirlwall. *Journal of Economic Literature*. XXVI (Dec. 1988): 1746-1747.

Kaldor, N. 1972. "The Irrelevance of Equilibrim Economics." *Economic Journal* 82 (328): 1237–55.

Khosravi, M. 2018. "Janos Kornai and General Equilibrium Theory." *Acta Oeconomica* 68 (5): 27–52. https://doi.org/DOI:10.1556/032.2018.68.S.4.

Knight, F. 1956. *On the History and Method of Economics.* Chicago: Phoenix Books.

Knight, F. 1969. *The Ethics of Competition and Other Essays*. Freeport NY: Books for Libraries Press.

Koopmans, T.C. 1957. *Three Essays on The State of Economic Science,* New York: McGraw-Hill.

Kornai, J. 1971. *Anti-Equilibrium. On Economic Systems Theory and the Tasks of Research*. Amsterdam: North-Holland.

Kornai, J. 1979. "Economists and Economic Thought: The Ouevre of Kenneth J. Arrow." *Acta Oeconomica* 23 (1/2): 193–203.

Kornai, J. 1992. *The Socialist System: The Political Economy of Communism*. Oxford: Clarendon Press.

Kornai, J. 2006. *By Force of Thought: Irregular Memoirs of an Intellectual Journey*. Cambridge MA: MIT Press.

Maitland, F.W. 1960. *Frederic William Maitland: Historian*. Edited by R. L Schuyler. Berkeley: University of California Press.

Marx, K. 1977 (Orig. 1867). *Capital (Volume I)*. Trans. by B. Fowkes. New York: Vintage.

McKenzie, L. 1954. "On Equilibrium in Graham's Model of World Trade and Other Competitive Systems," *Econometrica.* Vol. 22 (April 1954): 147-161.

McKenzie, L. 1959. "On the Existence of a General Equilibrium in a Competitive Market," *Econometrica.* Vol. 27: 54-71.

McKenzie, L. 1981. "The Classical Theorem on Existence of Competitive Equilibrium," *Econometrica.* Vol. 49 (4): 819-841.

McKenzie, L. 1984. "Letter from Lionel McKenzie to David Ellerman," July 26, 1984.

McKenzie, L. 2002. *Classical General Equilibrium Theory*. Cambridge MA: MIT Press.

Theobald, M. 2004. "Briggs Mfg. Co." Coachbuilt (website). 2004. http://www.coachbuilt.com/bui/b/briggs/briggs.htm. Accessed 8/23/2018.

Young, A. 1928. "Increasing Returns and Economic Progress." *Economic Journal* 38 (December): 527–42.

On Methodological Pluralism in Economics

Aleksandar Kešeljević

School for Economics and Business, University of Ljubljana

✉ saso.keseljevic@ef.uni-lj.si

Abstract

Author argues that economics, with extensive use of mathematical formalism and statistical techniques, adopted the methodology of natural sciences in order to appease the misunderstanding, theoretical disagreements and rifts between the economists. Neoclassical school consolidated its monopoly position within economics by mainly dictating strict methodological rules. Author believes that methodological normativism reduces the diversity of methodological approaches within economic community. The article highlights that obsession with mathematical and statistical procedure is a consequence of the reductionist understanding of the world as a closed system and economic process within. Misleading picture of the world leads to one best epistemology, one best theory and one best methodology within economics. Methodological monism precludes neoclassical economics from efficiently resolving actual problems and offering practical advice. In this paper author shows that methodological pluralism leads economic science into self-reflexive system with less methodological inertness. Author emphasises the importance of freedom in forming limited and finite range of methodological approaches. Each of them, underlying the particular understanding of the world, cannot persist in the science market without respecting rigorous standards and without adequate demand for its findings from the aspect of resolving actual dilemmas of our time.

Introduction

Economics investigate the functioning of the economy and economic methodology[1] studies the working of economics as science. Economic methodology investigates the nature of assumptions, forms of explanation and specifies criteria based on which we can evaluate economic theories (Boumans, Davis, 2010; Pheby, 1988). I believe that most economists have not been current with the development in the field of economic methodology. Emergence of economic methodology as a separate field within economics encouraged economists to distance themselves from methodologist (Davis, 2003; Dalen, 2007). The changing nature of economics, which leads to a constant state of change and development in economic methodology, additionally drifted both clubs apart. And lastly, theory of science is indispensable for the proper understanding of the economic methodology since the latter is strongly interwoven with former (Burell, Morgan, 1979; Boumans, Davis, 2010).

Economists use all kinds of methodologies to help them comprehend the economic reality. Methodology of the political economists were for example quite different from marginalist one. Political economists believed that socioeconomic reality was too complex to allow empirical investigation in order to create coherent picture of the world. Consequently economic theory boasted rich and often controversial views with opposing policy orientations. Marginalists brought revolution into methodology, since economists wanted to obtain less ambiguous results. Economists start to construct models, by using mathematics and statistics, to create a picture of reality.

The economist changed from political economist who drew his expertise in institutional, philosophical and historical context to instrument maker who is an expert in statistic and econometric techniques. Instead of being actively engaged in public discussions economist become a scientist who writes mathematical articles for important, but little read journals. Actual practices of economists changed over time to such an extent they also altered their

---

[1] Economic methodology should be distinguished from economic method, though the two terms are often used interchangeably. By contrast economic method attempts to provide answers how questions and tools are used by economists. For example, maximization assumption is tool that is used in economics to explain behaviour.

self-perception as economists. Economists begin to call themselves just "economists", rather than "political economists".

The main goal of the article is to point out that methodological approach of the dominant school in economics is consequence of a misleading picture of the real world. Understanding of economy as a closed system leads to one best (positivistic) epistemology, one best (neoclassical) theory and one best (monist) methodology. Subordination to the mainstream school crowds out alternative methodological approaches and leads to the inability of economics to deal with real life problems. In this paper we combine ontological and epistemological issues with science market as the most important selection mechanism in order to determine which methodological approach would be the most appropriate to suit the nature of the problem under investigation. While there exists an extensive literature on the particular issues, explain further on, to my knowledge there were no attempts to tackle these three issues from complementarity point of view (ontology-epistemology- market). The aim of the article is to fill this gap.

I shall argue in the article that neoclassical school consolidated its position within economics mainly by strictly dictating methodological rules in order to appease the dissent and misunderstanding between economists (1). I seek to point out that methodological monism is a consequence of a reductionist understanding of the world as a closed system and economic processes within (2). I believe that methodological monism crowds out alternative approaches and limits the ability of economics to cope with real life problems (3). I strongly point the importance of education for economist and freedom in forming alternative methodological approaches (4). I shall argue that only in the science market the intellectual superiority of particular methodology in resolving actual dilemmas of our time can be proven by (5).

The article is structured as follows. In section two, methodological normativism of the neoclassical school is presented. Section three points out desire for universal application of such methodology. The aim of section four is to present methodological monism as a result of understanding of economy as closed system which precludes proper understanding of

reality and policy making. Section five proceeds with importance of methodological pluralism by allowing range of different methodologies. In section six the importance of freedom in forging new methodological approaches is pointed out. The next section points out methodology standards and science market as selection criteria. Section seven concludes.

Neoclassical paradigm and methodological normativism

Paradigm is understood as a set of generally adopted scientific achievements which a scientist can employ to resolve the problems at hand without having to re-establish or clarify the basic assumptions, concepts and methods (Kuhn, 1998). Paradigm members share the system of education that is common to all members of the particular group in a given time. Paradigm cannot exist without consent on fundamental theoretical and methodological issues. Without such consent, there can only be a multitude of candidates for it.

Economics has strongly favoured internal pluralism from its very beginnings, leading to rich and often controversial history of opposing theoretical and policy advice orientations. In addition to periods when the flow of ideas in economics was not as consistent, there were also periods of strong consent and unity. Economic discipline reached the level of paradigm in certain respective periods of its development, characterized by a high level of internal coherence. We can define four such paradigmatic periods in the history of economic thought: Classical political economy (1776-1890), Marshallian economics (1890-1936), Keynesian economics (1936-1970s) and the New-classical economics (1970s-date). These periods are often identified with publications of the founders of each approach: "The Wealth of Nations" by Adam Smith (1976), "Principles of Economics" by Alfred Marshall (1890), "The General Theory" by John Maynard Keynes (1936) and collection of papers by Thomas Sargent and Robert Lucas published as "Rational Expectations and Econometric Practise" (1981).

Between four paradigmatic periods we have Marginalist, Keynesian and Rational expectations "scientific revolution". When one paradigm replaces the other one, there is a change in assumptions, methods and concepts (Boumans, Davis, 2010; Kuhn, 1998). For example, the earlier focus on growth, distribution and classes in classical political economy

was replaced by marginalist reasoning, rational decision making, price determination and workings of the market. Economic theory developed a fairly straightforward and closed system based on rationality, equilibrium and methodological individualism. The starting point is the individual's rationality from which equilibrium is inferred through deductive logic.

New paradigms frequently do not do away with any link to the old ones as they at least adopt the facts that were explained in a satisfactory manner by the previous ones (Blaug, 1992; Kuhn, 1998). For example, Paul Samuelson integrated Marshal's microeconomics and Keynes's macroeconomics in the 20th century, by forming the neoclassical synthesis. In the field of theory, neoclassical synthesis is not fully consistent as actually combines the Marshall's ideas of equilibrium with the Keynes's ideas of disequilibrium. There are also differences from a methodology standpoint. Marginalists pertain to use of mathematical methods that allowed logical analysis. On the other side Keynes produced plausible stories rather than testable hypothesis and econometric models. Keynes reacted with frontal attack on mathematical-statistical approach (Keynes vs. Tinbergen).

Johnson (1983), Ward (1972) and Dalen (2007) maintain that neoclassical school strongly monopolized the field of science in economics. Neoclassical economics acts as a unifying nexus for newer research approaches in economics such as game theory, new-institutional economics, new-behavioral economics and much of experimental economics. In spite of greater diversity since 1950 this is understood as a continuation of a mainstream. Neoclassical school also succeeded in terms of publication in scholarly journals and through the influence of economists on adoption of key decisions in a society. The unity of introductory economics textbooks and articles in reputable journals illustrate high level of homogeneity. Many economists also adopt the neoclassical school because this makes it easier for them to have their work published. Therefore, the domination of neoclassical paradigm is often asserted in the economic scientific community.

Monopoly of the neoclassical paradigm does not automatically imply absence of other theoretical views within economics. Today's consent within economics is largely based on a political process of power by rendering individual schools subordinate to the mainstream

current. Neoclassical economists often treated other approaches in economics as inferior and unscientific. The main trouble with the dominant paradigm is that the diversity of views is at risk as the standard view – whether it is neoclassical or not – crowds out alternative ones (Dalen, 2007; Kuhn, 1998). Within the economic community relatively separate systems of particular paradigms or core schools could be said to exist (Dow, 2008). In addition to the dominant or mainstream neoclassical school there are also heterodox or dissident types or views as Institutional, Austrian, Radical political economy school and so on… Theoretical pluralism means variety of theories which provide different analysis of the real world, understanding of economy, policies and predicted outcomes.

By asumming, there are in addition to the neoclassical school also other schools then the question of comparison arises. How to choose among them? Criteria as simplicity, falsifiability and prediction are often used for choosing among theories within the same paradigm. However, mutual comparison of paradigms is not possible as paradigms are more or less mutually exclusive. Paradigms are incommensurable because they rely on different set of assumptions. Kuhn (1998) believes that one paradigm cannot be the basis for evaluation of another, because there is no neutral theoretical field for their comparison. With incommensurability, there is no clear basis on which to choose one theory over another. It is namely difficult to judge why theoretical achievement of a neoclassical economist is any better than the scientific contribution of an institutionalist.

The solution seems to be in methodology. In certain period economists, due to ever more frequent theoretical disagreements and rifts, turned to methodology. If we can obtain the "right" methodology then economics is more likely to arrive at results that are less ambiguous (Pheby, 1988). Shaping a more uniform methodology appeared sensible, if not requisite at the break of the 19th century, as it contributed to appease the dissent and misunderstanding between political economists. In terms of methodology, the word "marginalist revolution" pertains to the heavily use of mathematical methods that allowed logical analysis and departure from more descriptive approach of the classical political economy in the 18th and 19th century. Since the fundamental goal of economic theory was to develop more objective and exact science, physics was taken as an ideal by the economists.

Especially in the last paradigmatic period economics reached a high level of methodological unity. Neoclassical school has consolidated its monopoly position within economics mainly by strictly dictating methodological rules (methodological normativism). Most economists accept these rules regardless of whether they belong to the mainstream camp or not (McCloskey, 1983). It may be viewed as a paradox that the ideas of the mainstream school, unacceptable to many from the theoretical content, were quite acceptable from the aspect of methodology. McCloskey (1983) defines the predominating methodological approach in modern economic theory as a combination of logical positivism, deductive method, instrumentalism and operationalism.

Due to the need for objectification of knowledge, the economy found itself in the grip of scientific deductivism. Logical conclusions were derived from axioms (rationality) by employing mathematical methodology to maintain consistency. Positivism stresses objectification of knowledge and equated economics with classical physics.

Instrumentalist stresses that economic theory must be verified by the forecasts (Friedman, 1984). The goal is to submit hypotheses that can withstand the harshest possible attempts of rejection. The central test is comparison between forecast and experience; based on this comparison, a theory is either adopted or rejected. Models are not representations of reality but instruments that predict well or not. Most instrumentalists employ econometric techniques.

Samuelson's operationalism puts forward the notion that it is very difficult to foresee the changes in response variables caused by the effects of the explanatory variables; therefore, econometrics should provide the answer regarding the algebraic sign for each parameter (Caldwell, 1984). A theory is not in the operational sense, if the algebraic signs or parameters are not specified. Operationalization links abstract models to experimental measurements (Blaug, 1992).

Neoclassical methodology is relying on deductive reasoning, induction and bold testing of hypotheses by checking against empirical facts. Such methodology is a consequence of the inconsistency or split between Marshall's microeconomics and Keynes's macroeconomics. Microeconomics is from methodological standpoint essentially deductive, whilst macroeconomics is more inductively inclined (Pheby, 1988). Deductive logic is largely identified with logic, use of mathematics and axioms as rationality for which no proof is required. Inductivism emphasises observation, empirical work and testing of hypothesis. On one side we have an excessive mathematization in microeconomics (theory without measurement) and on the other side instrumentalism with building of the large scale econometric models in macroeconomics, concentrating more on technical matters than on theoretical considerations (measurement without theory). Integration of mathematical economic theory with statistical procedures is the way for economic discipline to prove its scientific character. Such methodological approach is an ideal for the majority of contemporary economists.

Methodological monism and economics as queen of social science

A methodological "revolution" started in 1871 with the breakthrough of the marginalists school (Jevons, Menger, Walras) no longer studied the social system as a whole, but rather diverted their attention to the relation of an individual to a good and to allocation of factors of production through the market. Reasons for moving from more descriptive approach in the 18th and 19th century of classical political economy period to more formal modelling that strongly dominated after 1950s onwards were frequent disagreements in theory and lack of objectivity. The arrival of computer additionally stimulated development of economics as a "box of instruments or tools", with focus more and more on mathematical methods and statistical-econometric tools (Groenewegen, 2007).

With extensive use of mathematical formalism and statistical techniques economics adopted the methodology of natural sciences (methodological monism) (Blaug, 1992; Caldwell, 1984; Hassard, 1993). Rodrik (2015), Dow (2007), Worswick (1972) and Pheby (1988) go so far as to submit that economics has become indiscernible from mathematics, a discipline that

represents the apex of scientific purity. The key ingredients of mainstream methodology are logical positivism, scientific deductivism and empirical testing. Logical conclusions are achieved by employing mathematical methodology to maintain consistency. Theory is deductively built on the axioms of rational behaviour and empirical work is based on testing as the main vehicles to prove scientific character.

High level of methodological unity within economics also affects the formation of methodological approaches in other social sciences. Kuhn (1998) conceives of normal science as science within a paradigm and a tripartite structure: significant facts, matches of facts with theory, and proliferation of paradigm to other fields. If the purpose of normal science is not novelty, then the only sensible direction is research in other fields, which is also characteristic of the neoclassical paradigm. Neoclassical theory argues that rationality can be applied to all fields of human life where scarce resources and problems of choice appear. Becker (1974, 1976) advocates application of rationality to the study of family, fertility, human capital, and criminal. Radnitzky and Bernholz (1987) champion economic analysis of history, democracy and autocracy. Stigler (1984) pointed out economic analysis of politics, sociological structures, history and law. Application of rationality to new fields has led many to recognize in economics the universal science (Eichner, 1983; Fukuyama, 1995). It has been also dubbed the "queen" of social sciences.

Economic imperialism of the neoclassical school is manifest internally within the economic community and externally in its drive to conquer other social sciences (Johnson, 1983; Ward, 1972; Dalen, 2007; Lazear, 2000; Mäki, 2008). With its methodological apparatus neoclassical economics reduces the diversity of methodological approaches and opinions within economic theory. On the other hand its uncompromising forays into other fields impedes it a better cooperation with other scientific communities. Stigler (1984) believes that the push of economics to other areas was a violent gesture as economics received no "invitation".

I believe that rigorous methodology renders both, internal pluralism within economic scientific community and external pluralism in the sense of more intense cooperation with other social sciences. I am convinced that failure to better cooperate within its own and with

other scientific disciplines renders the neoclassical school for a profound understanding of complex problems. Mainstream economic theory lost the capacity of an anthropocentric view of the world and as a result it falls short in its attempts to respond to the contemporary challenges and policy advices. Lack of realism is addressed in more details below.

Economy as a closed system and lack of realism

Particular understanding of the world and economic process within leads to decision about the used methodology. The nature of the subject determines the way we make knowledge about it. In ontological way this refers to whether reality consists of many substances or one. Methodology is a consequence and a conscious choice derived from a particular understanding of the nature of the real world (Burell, Morgan, 1979; Dow, 2007; Lawson, 1997).

I believe that methodological monism of the mainstream economics is a consequence of a misleading picture of the world. Economic models generally portrayed economy as a closed system by sharing the same causal structure of the world (Turner, Pearce, Bateman, 1994; Rodrik, 2015; Mäki, 2018; Lawson, 2017). In the closed system all relevant variables can be identified in model and relationships between variables are knowable and unchanging. Since the real world is understood as one substance and closed system than only one methodological approach is appropriate. In this sense neoclassical methodological approach is reductionist. It fails to recognise that economy is only one part of the whole environment. Such a methodological approach has restricted the ability of mainstream economics to deal with many challenges. Many authors point out this deficiency of the neoclassical approach:

- Mises (1962), Goodwin (2008), Leontief (1971) and Lawson (1997, 2017) maintain that the main problem of neoclassical economics is in its uncritical and a-priori use of models which cause it to neglect reality.
- Pheby (1988) believes that neoclassical methodology is becoming a purpose unto itself as it mostly deals with its own deductive logic, rationality and unrealistic models.

- Blaug (1992) asserts that neoclassical economics has relatively weak forecasting power and that has failed most conspicuously when attempting to provide practical advice.

- Coase (1998) characterised mainstream economics as "blackboard economics" with hardly any relation to reality since something cannot be true just because you write (and prove) it.

- Mayhew (2008) points out that orthodox economics is inadequate to account for the lives of the vast majority of people.

- Blinder (2010), Helbing&Balietti (2010), Kowalski&Shachmurove (2011), Gunn (2011) and Maas (2014) pointed out that since 2007 the global financial and economic crisis has significantly intensified controversy about the status of mainstream economics.

Summing up the findings of the said authors, it could be maintained that obsession with rigorous approaches preclude neoclassical economics from efficiently resolving certain problems and offering practical policy advice. Monist methodology, as a consequence of the reductionist understanding of the world as a closed system, brought together economists and reconciled to a certain point differences in their opinions. However, I believe that such a methodological approach has become the paramount source of inflexibility and obstacle for deeper understanding of reality and of solving complex problems.

Economy as an open system and pluralism in education

Methodological monism of the mainstream economics is a consequence of looking at economy as a closed system. Socio-economic reality is just not like that, since it is an open system (Lawson, 1997, 2017). In economy as an open system, which is able to function due to the support of its ecological foundations, there is no one best way of theorizing about. Economy extracts, process from and discard large amounts of physical materials into environment. Thus, in the open system external boundaries of the system are fluid and not knowable. Relationships between variables cannot be identified in advance since "ceteris paribus" does not apply in the real world.

Since the nature of social reality is understood as plural so can knowledge system be understood as a structured plurality, allowing a range of methodologies (Dow, 2007; Mäki, 2018, Negru, 2017). The diversity of methodologies in economics is the necessary counterpart to the plurality of the social world. Methodological pluralism is thus a conscious choice which includes a number of methods derived from particular understanding of the real world. Methodologies used by researchers should be tailored to suit the nature of the problem under examination (Rodrik, 2015; Lawson, 1997, 2017). Thus, several methodological approaches can coexists together in economics and this is in stark opposition to methodological monism defined by universal regularities. Different economic schools of thought, such as Austrians or Marxian economics, have developed different methodologies to help them comprehend the plural economic reality. Their methodologies focus on different types of models and levels of analysis (e.g. individual, class, institution). Methodological pluralism helps us be aware which methodology is appropriate for the particular subject-matter under investigation and to understand how far a chosen methodology is till preferable.

The question of methodological pluralism is in relation to education of economists as well (Raveaud, 2010; Dow, 2007; Dalen, 2007). Methodological awareness is a consequence of how economics is taught in the schools. Economic education is mainly dominated by the monist methodology and majority of undergraduate students are never exposed to methodological perspectives beyond mainstream. The pledge for a change in curriculum and education system of economists has been addressed on one hand by scholars (Komlos, 2019; Barone, 1991; Goodvin, 2008; Negru, 2017) and on the other hand by students (Post-autistic movement, Rethinking Economics, Cambridge Society for Economic Pluralism). Both explicitly ask for methodological (and theoretical) pluralism in economics in order to obtain the anthropocentric view of the world. After Big Recession (2008) very little has changed in the practical realm, although the literature on pluralism in education has mushroomed.

I am deeply convinced that in the curriculum more attention should be given to different methodologies. Understanding of economy demands not only technical expertise, empirical work and testing, but also solid understanding of history of economic thought, economic

history and economic philosophy. Students (and later policy makers) should be methodologically aware of different approaches, their limitations, sensitivity on a changing reality and the opportunity costs of alternative approaches. Methodological pluralism enables students in economics to get the highest forms of knowledge and simultaneously prevents the mainstream from taking over the spirit of the programme and education.

Freedom leads to methodological pluralism

Economists have forgotten that, as witnessed by the history of science, major leaps or scientific revolutions were only made when certain methodological rules were abandoned and others allowed. I believe that the importance of freedom in forming methodologies should be particularly emphasized in order to departure from methodological monism of the neoclassical school.

Economics adopted the methods of positivism in order to free itself from the medieval dogma, superstition, and everyday experience. Economist facing the urge to publish and the desire for recognition is compelled to communicate predominantly within its own paradigm or academic community. Institutional environment determines and restricts his research work. In turn scientists provide a feedback to further consolidate the position of a (neoclassical) paradigm. This might lead to ideological conduct of economist who defends a particular theory longer than necessary because of his convictions. By employing mathematical formalism and model approach, economics rules out any possibility of "exceedingly free" formation of methodological approaches. Commitment and silent consensus in the community are key characteristics of any paradigm. Exclusive membership in neoclassical one leads to lack of self-reflection, inability to express dissent and precludes freedom of research. Many authors stress deficiency of neoclassical methodology from the aspect of freedom.

McCloskey (1983) maintains that neoclassical methodology leads scientists into "intellectual imbecility". Eichner (1983) and Calas&Smircich (1999) contend that neoclassical school forms a scientific language that curbs the diversity of opinion and forces scientists into

"intellectual slavery". Caldwell (1984) and Ovsenik (1999) contend that neoclassical school cannot and should not monopolize the field of science with its normativism. Kristensen (2001) believes that through the dominance of the neoclassical paradigm scientists were deprived of their freedom to a point where they have become "free slaves".

I believe that understanding of complex problems requires a broader insight based on different methodological approaches. Only more freedom leads to methodological pluralism, meaning there is more than one best methodology. Without freedom there could be no scientific progress. Freedom to form one's own methodological approach is at the very "heart of science". All social scientists, economists included, approach the study of particular phenomena (in)directly, (un)willingly, or (un)knowingly through methodological approaches that are deeply rooted in the theory of science. Methodology issues cannot be understood without deeper insight into the theory of science which is indispensable for understanding of the former (Burell, Morgan, 1979; Boumans, Davis, 2010). Not surprisingly, the neoclassical theory rejects any epistemological questions because this debate could seriously threaten its imperial position (Eichner, 1983; Dow, 2007).

I believe that the economic scientific discipline, by promoting positivism and membership within the neoclassical paradigm, strongly underestimated the importance of freedom in forming diverse methodological approaches. Kuhn allows greater plurality in economics than positivism, as there can be a greater number of competitive approaches. Nevertheless, I contend that the attention being paid to the importance of freedom in the formation of methodological approaches is still inadequate, due to commitment and silent consensus within the mainstream paradigm. On the other hand, Feyerabend's pluralism certainly allows the most intellectually free model of understanding of knowledge at the epistemological level. Feyerabend's (1999) slogan "anything goes" means that scientist is free to form such methodology approach that will, in one's own belief, be best suited for correct understanding of the particular problem. Freedom is important in formation of various methodological approaches however the choice of the best one should still be resolved.

Problem of choice and methodological standards in the science market

We need stronger emphasis on freedom to form appropriate methodological approaches in economics. However, methodological pluralism is criticized extensively by many authors. Parker (1994) maintains that it is difficult to agree with the "anything goes" principle since it may lead to intellectual nihilism. Hassard (1993), Calas&Smircich (1999) and McKinley&Mone (1999) argue that it is impossible to have all the answers as claimed by monism however this also does not require a poorly defined pluralism. Authors point out that deviation in the direction of pluralism means less clarity and more complexity. The most common reproof is that it leads to relativism.

The problem of choice of the most appropriate methodological approach also exists. Methodological pluralism means a "range of toolbox" out of which a proper one should be selected. I believe that, in the absence of any absolute agreed criteria upon carrying research in economics, we should focus on anti-mismatch stand, methodological standards and science market with supply of different methodological approaches and demand for their findings.

Economists can use all kinds of methodologies to help them comprehend the economic reality. I strongly believe that different methodological approaches should live together under the umbrella of economics, each of them underlying the particular understanding of the complex world. For example, institutionalist could opt and accept mathematics and econometrics as tools if could be justified by the subject under investigation. Methodological pluralism helps us be aware which methodology is appropriate for the particular problem in order to avoid using the wrong tool. However, economists do not possess capacity or ability to choose proper approach since they are constrained by time, energy and possessed knowledge (Mäki, 2018). I believe rigorous standards are needed in assessing our methodological work in order not to come at the cost of a less rigorous type of analysis and to help us avoid the mismatch problem.

I believe we should strive for limited and finite range of methodological approaches for particular subject-matter under investigation with constructive communication among them. Methodology involves besides methods of argumentation also communication by which economist seeks to persuade one another (McCloskey, 1983). Methodological pluralism, as a rhetorical practise, should foster proliferation of mutually competitive approaches in a science market. I believe that criteria cannot be based on exclusion of other methodological approaches by monism but only in struggle and selection of the best one. In competitive clashes methodologies progress both internally and relative to others by gaining importance and significance. It is a paradox that economic scientific community with a strong emphasis on market, as the most important selection mechanism, has failed to consider such mechanism in the field of ideas (Pfeffer, 1995; Kešeljević, 2014). Especially for economists, it would make sense to use (science) market as the key criterion of choice.

It is difficult to establish whether neoclassical methodological approach has any advantage over the institutionalists one in case when both of them fulfil certain standards. We do not have an absolute set of appraisal criteria by which to choose the best methodology. Pluralism means that no methodology could be said to be the best. I am also convinced that no methodological platform can persist in the long run without adequate demand in the professional and lay public for its findings. Science market does not depend only on the supply side, where we are dealing with different methodological approaches, but also on the demand for their findings. Demand side shows how successful a particular methodology is in resolving actual dilemmas and needs of our time.

I am deeply convinced that economic science must become an attractor of different methodological approaches. In education of today's economists more attention should be given to different methodological approaches. Methodological awareness enables economists to decide which methodologies are the most appropriate for the particular problem. However, only in the science market with rigorous standards can the intellectual superiority or inferiority of particular methodological approach be proven. The most appropriate approach in economics should be chosen through the struggle for customers in the science market. Science market as final mechanism of selection should reveal which

methodological approach in economics has competitive advantages over others from the aspect of resolving problems and dilemmas of our time.

Conclusion

Economic theory has a rich and often controversial history of opposing theoretical orientations from its very beginnings. Variety of theories understands economy differently, suggest different policies and predict different outcomes. Due to incommensurability problem, there is no clear basis on which to choose one theory over another. Due to ever more frequent theoretical disagreements the economists turned to methodology in search of a solution.

Integration of mathematical economic theory with statistical procedures is the way in economics to prove its scientific character, similar as those in natural sciences. Such a methodological approach has become an ideal for the majority of contemporary economists. By strictly dictating methodological rules neoclassical school consolidated its monopoly position within economics. Consent within economics is based on a political process of power by rendering individual schools subordinate to the mainstream current. Rigorous neoclassical methodology renders both, internal pluralism within its own scientific community and external in the sense of more intense cooperation with other scientific disciplines. Neoclassical methodological approach is a consequence of the reductionist understanding of the world as a closed system and economic process within. Economics lost the capacity of an anthropocentric view of the world. Obsession with methodology precludes neoclassical economics from efficiently resolving problems and offering practical advice.

I strongly believe that, in the education of today's economists, more attention should be given to diverse methodologies. Understanding economy as an open system leads to methodological pluralism, as a conscious choice, and a finite number of methods can be derived from it. I believe that freedom in forming proper methodological approach is at the very heart of every science since without freedom there could be no scientific progress.

Economics must become an open society, free of methodological normativism and monism. We should strive for limited and finite range of methodological approaches, each of them underlying the particular understanding of the world, with meaningful standards in assessing methodology work. Only a market for science as a mechanism of selection can be a final criterion of which methodology approach has, in the spirit of Ricardo, a competitive edge over the others. One methodology has to refute a competing one in order to be able to assert its own through persuasion of potential buyers from the aspect of solving problems. Especially for economists it would make sense to use market as the key criterion of choice since no approach can persist in the long run without adequate demand for its findings. Economics would only in this case become loyal to its own fundamental ideas and principles.

References

Barone, C. 1991. Contending Perspectives: Curricular Reform in Economics. *Journal of Economic Education*, Vol. 22(1), pp. 15–26.

Becker, G.S. 1974. A Theory of Social Interactions. *The Journal of Political Economy,* 82, November-December, pp. 1063-1093.

Becker, G.S. 1976. *The Economic Approach to Human Behavior*. Chicago: Chicago University Press.

Boumans, M. and Davis, J. 2010. *Economic methodology – Understanding Economics as a Science.* Palgrawe Macmillian.

Blaug, M. 1992. *The Methodology of Economics.* Cambridge: Cambridge University Press.

Blinder, A.S. 2010. Teaching Macro Principles after the Financial Crisis, Princeton University CEPS, *Working Paper,* No. 207 (April).

Burell, G. and Morgan, G. 1979. *Sociological Paradigms and Organizational Analysis.* London: Heineman.

Calas, M. and Smircich, L. 1999. Past postmodernism? Reflections and Tentative Directions. 1999. *Academy of Management Review,* 24 (4), pp. 649-671.

Caldwell, B. 1984. *Appraisal and Criticism in Economics.* London: Allen&Unwin.

Coase, R. 1998. The new institutional economics, *AEA Papers and proceedings*, May, 72-74.

Dalen, V.P.H. 2007. Pluralism in economics: A public good or a public bad? In *Teaching pluralism in Economics,* ed. John Groenewegen, Wedward Publishing Limited, Cheltenham, pp. 40-63.

Davis, J. 2003. Economic methodology since Kuhn. In *The history of Economic Thought*, ed. Warren Samuels, Jeff Bidlle, John Davis, pp. 572-587.

Dow, S.C. 2007. Pluralism in Economics. In *Teaching pluralism in Economics*, ed. John Groenewegen, Wedward Publishing Limited, Cheltenham, pp. 22-39.

Dow, S.C. 2008. A Future for Schools of Thought and Pluralism. In *Future Directions for Heterodox Economics*, ed. Harvey T., Robert, F., Garnett, R., University of Michigan Press, pp. 9-26.

Eichner, A. 1983. *Why Economics is not yet a Science?* New York: M.E. Sharpe.

Feyerabend, P. 1999. *Proti metodi.* Ljubljana: Studia Humanitatis.

Friedman, M. 1984. The Methodology of Positive Economics. In *Appraisal and Criticism in Economics*, ed. Caldwell, B., London: Allen & Unwin, pp. 138-178.

Fukuyama, F. 1995. *Trust.* New York: Simon & Schuster.

Goodvin, N. 2008. From Outer Circle to Center Stage; The Maturation of Heterodox Economics. In *Future Directions for Heterodox Economics*, ed. Harvey, T., Robert, F., Garnett, R., The University of Michigan Press, pp. 27-52.

Groenewegen, J. 2007. On pluralism and interdiscplinarity in Ecoonomics. In *Teaching pluralism in Economics,* ed. John Groenewegen, Wedward Publishing Limited, Cheltenham, pp. 1-21.

Gunn, C. 2011. *Neoclassical Economics, Heterodox Economics, and Too Big to Fail*. Notes on Education in Economics, Paper prepared for the Conference of the International Confederation of Associations for Pluralism in Economics, Amherst, Massachusetts.

Hassard, J. 1993. *Sociology and Organization Theory-Positivism, Paradigms and Postmodernity.* Cambridge: Cambridge University Press.

Helbing, D. and Balietti, S. 2010. Fundamental and Real-World Challenges in Economics. *Working paper.*

Johnson, L. 1983. Economic Paradigms: A Missing Dimension", *Journal of Economic Issues,* 17(4), pp. 1097-1107.

Kešeljević, A. 2014. Is economics scientific discipline loyal to its own starting points and fundamental principles? *Ekonomska istraživanja,* Vol. 27(1), pp. 46-54.

Komlos, J. 2019. *Real-World Economics: What Every Economics Student Needs to Know.* New York, Routledge.

Kowalski, T. and Shachmurove, Y. 2011. An Historical Walk through Recent Financial Crises. *PIER Working Paper,* Penn Institute for Economic Research, University of Pennsylvania.

Kristensen, P.H. 2001. Denmark an Experiment Laboratory of Industrial Organization. In *Zbornik The Corporative Study of Economics Organization*, Portorož, pp.17-84.

Kuhn, T. 1998. *Struktura znanstvenih revolucij*. Ljubljana: Krtina.

Lazear, E. 2000. Economic Imperialism. *Quarterly Journal of Economics* 115 (1): 99-146.

Lawson, T. 1997. *Economics and Reality*. London and New York: Routledge.

Lawson, T. 2017. *On Economics and Social Ontology.* Interview, 25 September 2017, Emmanuel College, Cambridge.

Leontief, W. 1971. Theoretical Assumptions and Nonobserved Facts. *The American Economic Review,* 61(1), pp. 1-7.

Maas H. 2014. *Economic methodology - A historical introduction*. London: Routledge.

Mäki, U. 2008. Economics Imperialism: Concept and Constraints. *Philosophy of the Social Sciences*, 9 (3), September 2009, 351-380.

Mäki, U. 2018. Rights and wrongs of economic modelling: Refining Rodrik. *Journal of Economic Methodology*, Vol. 25(3), pp. 218-236.

Mayhew, A. 2008. Foreword; Future Directions for Heterodox Economics. In *Future Directions for Heterodox Economics*, ed. Harvey, T., Robert, F. Garnett, R., The University of Michigan Press, pp. ix-x.

Misses, L. 1962. *The ultimate foundation of economic science. An essay on methods.* New York.

McCloskey, D. 1983. The Rhetoric of Economics. *Journal of Economic Literature,* 21(June): pp. 481-517.

McKinley, W., Mone, M. and Moon G. 1999. Determinants and Development of Schools in Organization Theory. *Academy of Management Review,* 24(4), pp. 634-648.

Negru, I. 2017. Modes of pluralism: critical commentary on roundtable dialogue on pluralism. *Int. J. Pluralism and Economics Education, Vol. 8, No. 2,* 193.

Ovsenik, J. 1999. *Stebri nove doktrine organizacije, managementa in organizacijskega obnašanja.* Kranj: Založba Moderna organizacija.

Parker, M. 1994. Life After Jean Francois. In *Postmodernism and Organizations*, ed. Hassard John, Parker Martin, London : Sage Publications, pp. 204-212.

Pheby, J. 1988. *Methodology and Economics*. London: Macmillan Press Ltd.

Radnitzky, G. and Bernholz, P. 1987. *Economic Imperalism.* New York: Pragon House Publishers.

Raveaud, G. 2010. A pluralist teaching of economics. In *Economic Pluralism,* ed. Garnett Robert et al., London: Routledge, pp. 250-261.

Rodrik, D. 2015. *Economics Rules: The Rights and Wrongs of the Dismal Science*, New York: Norton.

Stigler, G. 1984. Economics-the Imperial Science? *The Scandinavian Journal of Economics,* 86(3), pp. 301-313.

Turner, K., Pearce, D. and Bateman, I. 1994. *Environmental Economics - An elementary introduction*. Financial Times, Prentice Hall.

Ward, B. 1972. *What's Wrong with Economics?* New York: Basic Books.

Worswick, G.D. 1972. Is Progress in Economic Science Possible, *The Economic Journal,* 82(325), pp. 73-86.

Control Theory Without Controls[1]

Romar Correa

University of Mumbai

✉ romarcorrea10@gmail.com

Abstract

We draw on the insights of Wynne Godley & Francis Cripps (1983) and Martin Shubik (2004, 2012). The former provided a purely structural account of macroeconomics with no microfoundations. The latter offered a constructive critique of general equilibrium theory for the purpose of developing a theory of money and financial institutions. We join the two perspectives within the ambit of General Systems Theory (GST). Accordingly, we formulate and test for the stability of models of the capitalist system first (Godley & Cripps). Then, we compare and contrast General Equilibrium and 'Nash Equilibrium' solutions of the same capitalist economy (Shubik). The GST postulate connecting the two is that control variables or strategies are immanent or diffused within the system. We provide conditions under which the economy can be stable under debt-induced expenditure and conditions under which finance can be destabilising.

Keywords: structure and functioning; reduced form of a game

JEL: B52; E12

---

[1] The comments of two anonymous referees were instrumental in correcting errors and adding precision and focus to an earlier draft. I am entirely responsible for the final product.

Introduction

An open door to entry into off-mainstream accounts of the economic process is the role played by money in the system. The stories told in general equilibrium economics as well as the theoretical agenda professed there is entirely theory-driven, appealing to the model-building skills of its practitioners. No correspondence with empirical reality is sought. In contrast, the framework of Wynne Godley and Francis Cripps, 1983, (G&C, hereafter) grew out of their engagement with a Cambridge macroeconomic policy model of their time. Consequently, their system of definitions and equations consists of variables which are measurable. In fact, their framework is an offshoot of the development of National Income accounting, staying close to Keynes' orientation towards the study of the economy as a whole. They gave a twist to their representations reflecting their Keynesian persuasion in contrast to emphases laid on other relationships in standard models. All entries in their accounts are monetary and the connections between households and firms on the one hand and the Central Bank and the Treasury with commercial banks in between are made. Care is taken to distinguish between stocks and flows (changes in stocks). The distinction naturally leads to handling the current values of variables and one-period (at least) lagged values of the variables. Their array of identities and definitions are richer than most and we mix and match them. Difference equation systems emerge and the coefficients are "stock-flow norms", an innovative contribution to the subject by G&C. These are steady-state ratios between variables that are empirically robust. The importance of some might decline with time and new norms can emerge as the economy evolves. Different configurations throw up different pairs of agents and it is sufficient, though not necessary, to solve for their objectives, subject to the constraints posed by the economy.

Martin Shubik's class of models was not far behind in spelling out the institutional constraints under which people operated. However, he made their maximands explicit and solved for their optimal plans. All through, he was concerned with the different mechanisms by means of which societies dealt with monetary phenomena like "not enough cash". He studied defaults and punishments but was inspired by their role as empirical social sanctions.

Our task then is to preserve the structural sanctity of the capitalist economy and, at the same time, scrutinise the plans of consumers and producers as they maximise their payoffs subject to the rules and regulations imposed by the economy. The feedback operation must not be missed. The dynamical system under which workers and firms operate is generated by them by means of their actions. In turn, the structure determines their functioning. We have enunciated the underlying principle of Systems Theory.

We will examine cases where the identity of agents does not matter when solving out for the stability of social systems. In the typology of the great systems theorist and planner, János Kornai, systems theory goes hand-in-glove with the concept of control of material processes (Vahabi, 2017). The sequence of questions to be asked are: what is the ensemble of decision-making of subsystems required to secure social ends; what is the information required to feed the decisions to those ends and, finally, what are the appropriate motivations in the form of codes of conduct that must be installed. In the jargon of GST, supremal units and infimal units substitute for the planner and agents. Modern complex systems theory is more self-conscious about the use of the category subsystems instead of groups of people (Davis, 2018). The interaction between subsystems influences their choices as well as determines the contours of the overall system of which they are constituents. A final venerable tradition we need to recall is old Austrian economics. Especially with the scholarship of von Hayek, the economy was viewed as a "spontaneous order" emerging out of the choices made by myriad agents as

they operated with local information sets. No individuals or coalitions are in command. The economy is a negative feedback system. State-level information feeds back in a learning process.

A word on the formal language that follows. Mathematics in economics evokes the Bourbaki strategy of axiom-theorem-proof. Two practices ensue. The mathematicians relax the axioms and/or generalise the theorems. The economists incorporate features of the world through extending the set of axioms. The system is closed. In contrast, in the open systems strategy deployed here, categories are carved out of economy-wide data. The quantities are connected by arithmetic. They are identities. The dynamics in the relations might be more or less explicit or, as in our case, teased out of the material. The context is past and present and, in the case of government policy appearing in self-evident fashion, the future. The idea of 'emergence' is invoked to signify that the conglomeration of individual actions alone is insufficient to explain large-scale economic outcomes (Tubaro, 2009). Emergence connotes novelty, the appearance of something new, mysteriously fashioned out of existing data. The new phenomena cohere and are always generated in a context. The notion of 'institutional emergence' is connected (Elsner, 2015). Emergence has three key properties: supervenience, irreducibility, and downward causation (Festré, 2015, 2018). The drivers are self-organisation and non-intentionality. People operate by means of rules which are units of knowledge and thus the building blocks of wealth. Knowledge is tacit and is exemplified in focal points which are solutions of coordination problems. The reasoning is induction and not deduction. Identities become equations through the introduction of institutions. Different sets of equations are explored. The benefit in political economy is the emergence of classes (Lawson, 2015). Some sensitive observers today are deeply concerned about the evaporation of the productive classes and their replacement by a unified parasitic financial class. We will examine the implications of the introduction of a rentier class that anticipates revenues earned as capital gains. The motive is speculation as rents are earned on the

purchase and sale of shares and bonds and, recently, share buybacks (Michie, 2020). No attention is paid to bank borrowing and production. Invoking the concepts of Marx, we deal with classes *an sich* below and not "class-for-itself action". Secondly, in mainstream macroeconomics, market-clearing is a basic result. Studies in the existence and stability of general equilibrium are conducted with reference to this point. In contrast, notably with the orientation of Hyman Minsky, the capitalist economy is captured at any point of time in the form of interrelated balance sheets. All elements are continuously being perturbed. Scholars like Dani Rodrik speak of two or three balance sheets in an economy currently being out of sync without appreciating that all balance sheets in an economy are connected. It was left to stock-flow-consistent (sfc) macroeconomics to use the discipline of double-entry booking in a macroeconomic ledger to demonstrate that all the items had to sum to zero. A positive item cancelled out with the identical item with a negative sign. Stability or instability had to be proved with reference to real-monetary-financial connections.

The next section provides a sfc account of the macroeconomic process. We derive a two-by-two difference equation system by manipulating identities and definitions. The stability condition is spelled out. The state vector suggests two classes. In the following section we proceed to solve out for the dynamic optimisation problems of the two classes constrained by the difference equations of the earlier section. Both General Equilibrium and 'Nash Equilibrium' solutions are worked out.

The discrete charm of Godley and Cripps

We work with the sfc framework of G&C, 1983. The classic remains unparalleled in its lucidity and depth despite the profusion of work it gave birth to. One illustration of a constructive development is the connection with a Steindl-Minsky model that has recently been made (Gallo & Pereira Serra, 2020). The contribution to the Post Keynesian literature is the attention given to initial conditions in terms

of the level of existing debt and inventories. The notational conventional followed for change, taking inventories, *I*, as an illustration is $\Delta I \equiv I - I_{-1}$ where *I* denotes inventories at the beginning of the current period and I_{-1} stands for the stock of inventories at the end of the previous period. Denoting final sales, *FE*, as a combination of private sector purchases, *PE*, and government expenditure, *G*, *FE* $\equiv G + PE$, our first macroeconomic identity follows (G&C, 1983, p. 33, p. 102).

$$Y \equiv FE + \Delta I \qquad (1)$$

If inventories are financed by credit lines with banks, the total value of inventories in the economy will be equal to the debt of the production and distribution sector to banks (G&C, 1983, p. 73). Our first sfc norm is given by the steady-state money/income norm alpha. Denoting by *FA* the stock of money in the steady state, we have $FA = \alpha Y$.

Government borrowing from banks is *GD*. Net government income is *YG* where $YG = \theta Y$, and *Y* is national income with θ as the tax rate. We are in a position to offer the first fundamental theorem of macroeconomics: the private sector surplus (the left-hand side of the next equation) equals the government deficit (the right-hand side of the equation) (G&C, 1983, pp. 105-106). Noting that disposable income $YP = (1 - \theta)Y$ and denoting private sector debt by *PD*, we get the following important expression (G&C, 1983, pp. 105-106).

$$YP - (PE + \Delta I) = G - YG = \Delta FA - \Delta PD \qquad (2)$$

End-period private debt *PD* (G&C, 1983, p. 149) is believed to be connected with disposable income by a debt/income norm, beta. That is, $PD = \beta YP$. We denote the proportionate change in the value of inventories in each period by *g* ($\Delta I = gI$) (G&C, 1983, p. 95). The ratio of opening inventories, I_{-1}, to sales, *FE*, is γ and, in the case of the restriction of final expenditure to private expenditure, $PE = I_{-1}/\gamma'$. (The latter is our own contribution, illustrating the constructive possibility of sfc norms.)

Expressing equations 1 and 2 in difference equation form and reverting to a more familiar notation for time, we have the following dynamical system which is derived in an Appendix.

$$
\begin{bmatrix} YP_{t+1} \\ I_{t+1} \end{bmatrix} = \begin{bmatrix} 1 & \frac{1}{\beta}\left[\alpha g\left(g+\frac{1}{\gamma}\right) + \theta\left(g+\frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'}-\frac{1}{\gamma}\right)\right] \\ 1 & 1 - \frac{1}{\gamma} + \theta\left(g+\frac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} YP_t \\ I_t \end{bmatrix} \tag{3}
$$

The stability condition suggests the following. The fiscal deficit is at the heart of equation 2 but its components break up in the requirement. Now or never is government expenditure consisting both of *FE* reflected in *γ*, and *PE* reflected in *γ′*, at the root of resuscitation schemes for economies the world over. The sophistication of G&C extended to introducing money in the first few pages of their book without, even subsequently, referring to central banks or commercial banks in any detail. In our stability condition the money-income norm cancels out. Our mandate, however, compels an institutional fleshing out. Indeed, the elaboration is urgent as theorists and practitioners forecast the eventual demise of commercial banking. With that, credit disbursement in the form of idiosyncratic relationships between banks and entrepreneurs will fade away. It is natural, therefore, that some economists have even advocated a return to an elaborate form of nationalised banking. The institutional impetus is provided by the public deposit banks (PDBs) of the early 1600s which stopped the hyperinflation during the thirty years war (1618-1648) in its tracks (Schnabel & Shin, 2018). PDBs were similar to modern central banks insofar as their deposits were a platform for a cashless payment system. Transactions between account holders would be settled from one account to another or through bills of exchange. The proviso that all bills of exchange in excess of a figure had to be paid at the bank compelled merchants to open bank accounts.

The economy is not touched by finance yet and we can assume that Main Street, representing production on the one hand, and Wall Street do not cross. The structural backdrop to averting financial crises is the principle of the Chinese Wall shielding commercial banking from investment banking canonically embodied in the Glass-Steagall Act of 1933 in America (Tarullo, 2019). The resulting stability in borrowing and lending for producing and consuming goods and services called for no more than light-touch regulation for forty years. The Dodd-Frank Wall Street Reforms and Consumer Protection Act of 2010, while focusing on systemic risk, forewent the structural separation principle of the 1930s.

"Mathematical Institutional Economics"

The title of this section was coined by Shubik to propose a research agenda for the development of a rigorous political economy that was theoretical but not abstract. He critiqued neoclassical economics for removing itself from the reality of monetary and financial arrangements. Accordingly, his general equilibrium economics, while skeptical of the Walrasian strain, embraced Edgeworth. Thus, Shubik developed a vocabulary for the thrusts and parries of one agent and then the other as they moved from one corner or the other in the box made famous by Edgeworth. Different conditions will determine different equilibria, a result echoed by the 'varieties of capitalism' approach to political economy that incorporates rational choice theory in the strategic interaction between agents. However, their 'play' is filtered through institutions. Indeed, we will demonstrate that it is a matrix of dos and don'ts that determine behaviour and outcomes (Stockhammer & Ali, 2018).

We observe that two classes emerge naturally by the formulation. They are consumers (*YP*) and entrepreneurs (*I*). These agents will maximise their following utility and profit functions respectively subject to the constraint given by equation 3. We deploy the definition of dynamic games that treats the subject as a multi-

agent control problem. Observe that a 'reduced form' representation of the game emerges naturally. There are no strategies, only components of the state vector, income/wealth in the form of stocks/flows in the payoff functions. The state vector is given by (*YP*, *I*).

$$\sum_{t=1}^{T} u(YP_t, I_t) \ and \ \sum_{t=1}^{T} \pi(YP_t, I_t) \qquad (4)$$

We will substitute for the expression 'general equilibrium' to avoid confusion between the common connotation of the term and Shubik's special treatment. Our definition of a macroeconomic equilibrium (ME) is a vector (*YP**, *I**) such that the following inequalities hold.

$$u(YP^*, I^*) \geq u(YP^*, I) \geq u(YP, I^*) \qquad (5)$$
$$\pi(YP^*, I^*) \geq \pi(YP, I^*) \geq \pi(YP^*, I) \qquad (6)$$

In contrast, the 'Nash equilibrium' ('NE') (italics because there are no strategies) is implied in the next expressions.

$$u(YP^*, I^*) \geq u(YP, I^*) \qquad (7)$$
$$\pi(YP^*, I^*) \geq \pi(YP^*, I) \qquad (8)$$

In the case of the first definition, we provide a different representation of the spillovers that define general equilibrium. Usually, they are externalities, positive or negative, between markets. In our case, the elements of the state vector not determined by an agent must influence her payoffs. In the case of the 'Nash equilibrium', on the other hand, each agent is only interested in a portion of the state vector assuming the level of the other portion of concern to the other agent. Market clearing is not part of either definition. Secondly, shocks to technology and preferences will not figure below. We distance ourselves from the Real Business

Cycle literature in these senses (Gali, 2018). The extensions of those models continue to be fixated on equilibrium which are now stationary fluctuations caused by exogenous shocks. Frictions of different kinds are introduced so as to amplify the effects of the shocks. These New Keynesian assumptions are artificial and are no more than speed bumps on the road to equilibrium. Not subscribing to the research practice, we are able to capture the implications of asset price inflation. The potential instability that arises is endogenous. The economy is in disequilibrium in the short run (Renault, 2018). The stickiness of prices assumed by the French neo Keynesians, in contrast, is empirically evocative. Thus, real wages do not vary with unemployment, labour supply is unresponsive to the real wage. The prices of manufactured goods are insensitive to demand conditions. The economy is captured by queues, lengthening delivery dates, spillovers into substitute goods. Capacity is underutilised and producers accumulate inventories.

We proceed to calculate the ME and the 'NE' in the case of two regimes, in turn.

Real stability

The macroeconomic equilibrium

We distinguish the consumer and the entrepreneur by the superscripts *c* and *e* respectively and the shadow prices of the stocks in the current period is the familiar vector λ, superscripted to distinguish the two constraints summarised in equation 3. The Lagrangians for the problem are as follows.

$$\mathcal{L}^c = \sum_{t=1}^{T} \left\{ u(YP_t, I_t) + \right.$$

$$[\lambda_t^{c1}, \lambda_t^{c2}] \left(\begin{bmatrix} 1 & \frac{1}{\beta}\left[\alpha g\left(g+\frac{1}{\gamma}\right) + \theta\left(g+\frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'}-\frac{1}{\gamma}\right)\right] \\ 1 & 1-\frac{1}{\gamma}+\theta\left(g+\frac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} YP_t \\ I_t \end{bmatrix} - \begin{bmatrix} YP_{t+1} \\ I_{t+1} \end{bmatrix} \right) \left. \vphantom{\sum} \right\}$$

$$\mathcal{L}^e = \sum_{t=1}^{T} \left\{ \pi(YP_t, I_t) + [\lambda_t^{e1}, \lambda_t^{e2}] \left(\begin{bmatrix} 1 & \frac{1}{\beta}\left[\alpha g\left(g+\frac{1}{\gamma}\right) + \theta\left(g+\frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'}-\frac{1}{\gamma}\right)\right] \\ 1 & 1-\frac{1}{\gamma}+\theta\left(g+\frac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} YP_t \\ I_t \end{bmatrix} - \right. \right.$$

$$\left. \left. \begin{bmatrix} YP_{t+1} \\ I_{t+1} \end{bmatrix} \right) \right\} \tag{9}$$

The first order conditions for the state variables are given next.

$$\lambda_{t+1}^{c1} - \lambda_t^{c1} = -\left\{ u_{YP}(YP_t, I_t) \right.$$

$$\left. + \lambda_{t+1}^{c1}\left[1 + \frac{1}{\beta}\left[\alpha g\left(g+\frac{1}{\gamma}\right) + \theta\left(g+\frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'}-\frac{1}{\gamma}\right)\right]\right]\right\} \tag{10}$$

$$\lambda_{t+1}^{c2} - \lambda_t^{c2} = -\left\{ u_I(YP_t, I_t) + \lambda_{t+1}^{c2}\left[1 + 1 - \frac{1}{\gamma} + \theta\left(g+\frac{1}{\gamma}\right)\right]\right\} \tag{11}$$

$$\lambda_{t+1}^{e1} - \lambda_t^{e1} = -\left\{ \pi_{YP}(YP_t, I_t) \right.$$

$$\left. + \lambda_{t+1}^{e1}\left[1 + \frac{1}{\beta}\left[\alpha g\left(g+\frac{1}{\gamma}\right) + \theta\left(g+\frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'}-\frac{1}{\gamma}\right)\right]\right]\right\} \tag{12}$$

$$\lambda_{t+1}^{e2} - \lambda_t^{e2} = -\left\{ \pi_I(YP_t, I_t) + \lambda_{t+1}^{e2}\left[1 + 1 - \frac{1}{\gamma} + \theta\left(g+\frac{1}{\gamma}\right)\right]\right\} \tag{13}$$

Taking the derivatives with respect to the shadow prices we get the system equation 3, now to be solved out simultaneously with the above first-order conditions to derive the optimal values of the components of the state vector.

Each of the four equations above are linear and independent. The equilibria of the equations emerge naturally by recalling an optimality condition when solving out for the static problem of a representative agent. The marginal utility and profits with respect to the respective arguments must equal the shadow price of the respective constraints on the right-hand side. The left-hand side, then, will be zero.

The equilibrium is a sink if the following conditions hold. All solutions converge to the equilibrium point. If the inequality is reversed, the equilibrium solution is a source. All solutions diverge from the equilibrium point.

$$1 + \frac{1}{\beta}\left[\left(g + \frac{1}{\gamma}\right)(\alpha g + \theta) + \left(\frac{1}{\gamma'} - \frac{1}{\gamma}\right)\right] < -1 \qquad (14)$$

$$2 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right) < -1 \qquad (15)$$

Other things being equal, our equilibrium is a source. It is a sink if the value of *γ* is appropriately 'high'. Our earlier remarks about government expenditure are endorsed. We recognise the government as a built-in or automatic stabiliser. The perspective is a refreshing antidote to the new classical precept that a 'high' level of government expenditure is destabilising.

The 'Nash equilibrium'

In the case of the 'NE', each player optimises the value of the component of the state vector of own interest, holding the value of the other component of the state vector of interest to the opponent at the optimal level. Thus, the conditions now are as follows.

$$\lambda^{c1}_{t+1} - \lambda^{c1}_t = -\left\{ u_{YP}(YP_t, I_t) \right.$$

$$\left. + \lambda^{c1}_{t+1}\left[1 + \frac{1}{\beta}\left[\alpha g\left(g + \frac{1}{\gamma}\right) + \theta\left(g + \frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'} - \frac{1}{\gamma}\right)\right]\right]\right\} \qquad (16)$$

$$\lambda^{e1}_{t+1} - \lambda^{e1}_t = -\left\{ \pi_I(YP_t, I_t) + \lambda^{e2}_{t+1}\left[1 + 1 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right)\right]\right\} \qquad (17)$$

The earlier remarks carry over. Only, the number of constraints and multipliers are reduced and the marginal conditions for each agent vis-à-vis all elements of the state vector do not have to be computed. Clearly, while a general equilibrium is a Nash equilibrium, the opposite is not necessarily true.

Financial stability

Another flow identity introduced concerns the stock of financial assets, *A*. With this step, we need to introduce capital gains and losses in a revaluation term, *RVA*. The macroeconomic equation is $\Delta A = \Delta GD + \Delta PD + RVA$ (G&C, 1983, p. 274). We provide the following expression of the capital gains term *RVA*, $\Delta p_a A$, where *A* is the stock of financial assets and p_a the price.

Our master equation 2 translates to following expression.

$$YP - (PE + \Delta I) = G - YG = \Delta A - \Delta PD - \Delta pa.A \qquad (18)$$

The system reduces to the following matrix equation derived in the Appendix.

$$\begin{bmatrix} A_{t+1} \\ I_{t+1} \end{bmatrix} = \begin{bmatrix} 1 + \Delta p_a & \alpha g\left(g + \dfrac{1}{\gamma}\right) \\ 1 & 1 - \dfrac{1}{\gamma} + \theta\left(g + \dfrac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} A_t \\ I_t \end{bmatrix} \qquad (19)$$

The money/credit process is explicit this time in our terse stability condition. Tied to the money-income norm is the tax rate as a stabilising device. This stipulation is original given the various other reasons for 'high' income taxes. Secondly, the condition for stability underscores the well-known notion that the 'search for yield' is destabilising. The consequence is the Minsky prognosis that financial boom and bust cycles will recur with newer financial innovations and with capital gains following capital losses (Kregel, 2018). Stability is ensured by productivity gains

validating debt. When, instead, capital gains substitute for productivity, instability is endogenised.

We call the new character that owns and accumulates wealth the rentier. The term is functional and does not exclude the wage income which a household might earn. Now, the rentier, distinguished by the superscript *e*, and the entrepreneur will maximise their utility functions below subject to the dynamical system given by equation 18.

$$\sum_{t=1}^{N} u(A, I) \ and \ \sum_{t=1}^{N} \pi(A, I) \qquad (19)$$

The Lagrangians this time are

$$\mathcal{L}^r = \sum_{t=1}^{T} \left\{ u(A_t, I_t) + [\lambda_t^{r1}, \lambda_t^{r2}] \left(\begin{bmatrix} 1 + \Delta p_a & \alpha g\left(g + \frac{1}{\gamma}\right) \\ 1 & 1 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} A_t \\ I_t \end{bmatrix} - \begin{bmatrix} A_{t+1} \\ I_{t+1} \end{bmatrix} \right) \right\} \qquad (20)$$

$$\mathcal{L}^e = \sum_{t=1}^{T} \left\{ \pi(A_t, I_t) + [\lambda_t^{e1}, \lambda_t^{e2}] \left(\begin{bmatrix} 1 + \Delta p_a & \alpha g\left(g + \frac{1}{\gamma}\right) \\ 1 & 1 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right) \end{bmatrix} \begin{bmatrix} A_t \\ I_t \end{bmatrix} - \begin{bmatrix} A_{t+1} \\ I_{t+1} \end{bmatrix} \right) \right\} \qquad (21)$$

The macroeconomic equilibrium

Once again, the first order conditions for the ME are the following. The first order conditions for the state variables are:

$$\lambda_{t+1}^{r1} - \lambda_t^{r1} = -\left\{ u_A(A_t, I_t) + \lambda_{t+1}^{r1} \left[1 + \Delta p_a + \alpha g \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (22)$$

$$\lambda_{t+1}^{r2} - \lambda_t^{r2} = -\left\{ u_I(YP_t, I_t) + \lambda_{t+1}^{r2} \left[2 - \frac{1}{\gamma} + \theta \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (23)$$

$$\lambda_{t+1}^{e1} - \lambda_t^{e1} = -\left\{ \pi_A(YP_t, I_t) + \lambda_{t+1}^{e1} \left[1 + \Delta p_a + \alpha g \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (24)$$

$$\lambda_{t+1}^{e2} - \lambda_t^{e2} = -\left\{ \pi_I(YP_t, I_t) + \lambda_{t+1}^{e2} \left[2 - \frac{1}{\gamma} + \theta \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (25)$$

All our remarks made earlier carry over.

The 'Nash equilibrium'

Following in our earlier footsteps, the optimization conditions for the 'NE' are:

$$\lambda_{t+1}^{r1} - \lambda_t^{r1} = -\left\{ u_A(A_t, I_t) + \lambda_{t+1}^{r1} \left[1 + \Delta p_a + \alpha g \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (26)$$

$$\lambda_{t+1}^{e2} - \lambda_t^{e2} = -\left\{ \pi_I(YP_t, I_t) + \lambda_{t+1}^{e2} \left[2 - \frac{1}{\gamma} + \theta \left(g + \frac{1}{\gamma} \right) \right] \right\} \quad (27)$$

The discussion surrounding equilibrium solutions above is identical. Once more, the equilibrium is a sink if the following conditions hold. The equilibrium is a source if the inequalities are reversed.

$$1 + \Delta p_a + 1 + \alpha g \left(g + \frac{1}{\gamma} \right) < -1 \quad (28)$$

$$2 - \frac{1}{\gamma} + \theta \left(g + \frac{1}{\gamma} \right) < -1 \quad (29)$$

The requirement for a sink can be met with a massive collapse in asset values. A case for bursting bubbles in the form of 'high' and rising capital gains is made. In addition, as earlier, large-scale government expenditure would be the backstop. Other things being equal, however, the equilibrium is a source. So-called 'core meltdown risks' underpin securities markets in the US where, in both a relative and in an absolute sense, the provision of credit relies heavily on capital markets in contrast to bank lending. The modern route to bubbles and crashes, especially in the US, has been charted as follows (Duffie, 2019). Financial intermediation in US capital markets depends on large dealers who make markets by buying securities from investors who are potential sellers and selling them to investors who are potential buyers. The meltdown of 2008 was displayed in the innovation of the repo, a repurchase agreement which is a short-term debt. Before the crisis, Goldman Sachs, Morgan Stanley, Lehman, Bear Stearns, Merrill Lynch, secured hundreds of billions of dollars in overnight credit in the repo market. On each repo, a dealer transfers securities as collateral to its creditors in exchange for cash. When a repo matures the next morning, the collateral is returned to the dealer and the dealer must return the cash with interest. Market participants often held the securities provided to them by dealers in accounts with two "tri-party" agent banks, JP Morgan Chase and Bank of New York Mellon. In like manner, repo investors transferred their cash to the deposit accounts of the dealers at the same two banks. When the dealers' repos matured each morning and they repaid the cash investors, the dealers required intra-day financing to support their inventories of securities until fresh repos could be transacted at the end of the same day. This intra-day credit was provided by the aforementioned agent banks.

If a major dealer could not roll over its secured funding on a given day, a tri-party bank's balance sheet would become unbalanced by the risk of revaluations of hundreds of billions of dollars' worth of securities provided by that dealer as collateral. In that case, the tri-party bank would have an incentive to dump the

collateral securities. A fire sale would be contagious causing a dramatic drop in the prices of weaker collateral.

In sum, nonbanks were instrumental sources of credit for the real sector in the years preceding the last crisis. Their growth went along with an increase in debt financing. Short-term borrowing cumulated on the unfounded belief that it could be continuously rolled over. Can we devise norms to ameliorate these buildups and breakdowns? A norm that has been proposed to stabilise household debt is a loan-to-income ratio (Aikman et al, 2019).

Discussion

Modern sfc economics goes back to the work of Morris Copeland in the 1940s and 50s with his flow of funds matrices (Focardi, 2018). The questions that double-entry bookkeeping could answer included the following: When the total purchases of aggregate output go up, how does the stock of money increase? In a dynamic extension, what part does debt play in the cyclical trajectory of money flows? Later, scholars like Charles Goodhart developed the flow-of-funds equation wherein neither the private sector nor the government were accorded pride of place. Indeed, in the equation associated with Goodhart, the Public Sector Borrowing Requirement (PSBR) alone moves to the left-hand side, all the other elements to the right-hand side. The contemporary refinements of sfc economics include the incorporation of purchasing power in the definition of money, thereby holding fast to the empirical orientation of the model. When even labour is exchanged for money, a credit for purchasing commodities is acquired. Money requires an existing structure of ownership of goods supported by institutions. Money does not create ownership but facilitates the transfer of ownership. Secondly, analysis is conducted at the level of "subsystems" rather than individuals so as to continue to avoid committing the fallacy of composition that Keynes warned against. The particular example provided here is that high corporate profits and supernormal

profits in financial markets should have resulted in an increased demand for goods and services and inflation, post crisis. However, the absence of that result is due to the development of an asset bubble concurrent with money generation.

Another great scholar who melded institutional economics and game theory is Masahiko Aoki. History is salient here as is the focus on equilibria and the relative unimportance of players. The long-term experiences of members of a society are self-sustaining. In developments of his framework, agents are assumed to work with parsimonious models of the economic process in comprehending portions of the state vector (Mannara & Sacconi, 2019). Each agents is aware that other agents are, equally, cognising different elements of the evolving state of the world. Yet, Comparative Political Economy (CPE) of which he could be regarded as a co-founder has been found wanting on the ground of not incorporating financial bubbles and crashes in its repertoire of ideas (Schwartz & Tranoy, 2019). The reason advanced is the capitulation of the macro of the research agenda to the unwithstandable pull of micro, from the political economy of effective demand failures to the economics of supply-side economics. Thus, the common coin of concepts is 'governance' and 'optimal institutional forms'.

A crossing in our two roads is the anthropological definition of 'social structure' (Ballet, 2018). A social structure is a system of stable relationships between people based on steady-state norms. Also, in the absorption of empirical evidence and the collection of handheld and novel sources of historical data, our research strategy is not antithetical to "enculturation" which is a focus on the group rather than the individual (Mayhew, 2018). The ensemble of institutions people are born into are path dependent but also contingent. People can change them. After all, the future is subject to incalculable uncertainties propelling people to 'create paths'. Kaldor, along with Marx and Veblen, were especially eloquent on the creative functions of markets in this regard (Finch & McMaster, 2018; MacKinnon et al, 2018). Locked-in paths can be broken by "mindful deviation" by

70

knowledgeable actors. The new roads must be routes through capital accumulation involving, in turn, processes of production, circulation, and consumption. To that end, "social purpose" might have to be specified (Baker, 2018).

For instance, the services of alternative banking arrangements that are more stable can be sought (Karl, 2015). A variety of different models support a dual bottom line, individual profit and aggregate benefit. Interest rates are of less importance and the real economy is the focus of attention. Structured financial products and proprietary trading are eschewed. Inevitably they are specialist institutions steeped in nuanced information about their clients which enables them to make informed assessments of risk. Their credit monitoring skills are superior and they are proactive with advice particularly to new and inexperienced SMEs. From the other end of the transaction, people prefer alternative banks. The reputation risk is lower. Since their liability base is small depositors and they are mostly independent of the interbank market they are protected from contagion.

Conclusion

In the first few pages of their foundational classic, G&C introduce debt financing by households and governments. The identity in which it is embedded is linked with other fine-grained identities all connected by stock-flow norms that ensure that the economy is a coherent system. The assumption that borrowing as a precondition to generate income goes back to the classics with the concept of the wage fund as a given prior. It is a small but important step to postulate that a bank must be in attendance to advance the wage bill, and the wage fund becomes the money wage fund instead of a fund defined in terms of corn. Post Keynesians introduced behaviour later in the form of consumption functions driven by social practices. The search for a 'truer' investment function continues. Shubik preferred to operate with 'first principles'. The appeal of that choice could be made on the basis of an alternative way our study could have proceeded. Michał Kalecki

developed a model taking off from the less-familiar way of breaking up National Income, into Wages and Profits. Behind these categories are workers and capitalists, respectively, and it would not be unnatural to model the interaction between them as an antagonistic or a cooperative game played between the two classes. The appeal of G&C macro is that the words 'real' and 'nominal' are not used. Finance enters without fanfare. Workers and capitalists can be rentiers instead of producing goods and services. They maximise their payoffs defined on their information sets, and their choices at the same time determine the level of state information. We offer a general context to consider the stability requirements of 'real' and 'financial' regimes.

Appendix

We use equations 1 and 2 and the sfc norms introduced to derive equation 3. Rewriting equation 2 using the relevant sfc norms,

$$YP - \left(\frac{I_t}{\gamma'} + \Delta I\right) = G - \theta Y = \alpha \Delta Y - \beta \Delta YP \qquad (a)$$

The equation can be considered in its two parts and a dynamical system in *YP* and *I* reveals itself. (*Y* is national income subsuming all).

Thus, first,

$$G - \theta Y = \alpha \Delta Y - \beta \Delta YP$$

$$\therefore \frac{I}{\gamma} - \frac{I}{\gamma'} - \theta\left(\frac{I}{\gamma} + \Delta I\right) = \alpha\left(\frac{\Delta I}{\gamma} + g\Delta I\right) - \beta \Delta YP$$

$$\therefore \Delta YP = \left[\alpha g\left(g + \frac{1}{\gamma}\right)) + \theta\left(g + \frac{1}{\gamma}\right) + \left(\frac{1}{\gamma'} - \frac{1}{\gamma}\right)\right]\frac{I}{\beta} \qquad (b)$$

Second,

$$YP - \left(\frac{I_t}{\gamma'} + \Delta I\right) = G - \theta Y$$

$$\therefore YP - \left(\frac{I_t}{\gamma'} + \Delta I\right) = \frac{I}{\gamma} - \frac{I}{\gamma'} - \theta I\left(g + \frac{1}{\gamma}\right)$$

$$\therefore \Delta I = \left[\theta\left(g + \frac{1}{\gamma}\right) - \frac{1}{\gamma}\right]I + YP \qquad (c)$$

We employ the more familiar notations to write difference equations, $\Delta YP \equiv YP_{t+1} - YP_t$ and $\Delta I \equiv I_{t+1} - I_t$ to write equations b and c in the state-space representation of equation 1.

We proceed in familiar fashion to investigate the stability of the model. For the purpose, the Trace and Determinant of the coefficient matrix, call it *A*, must be calculated. Thus,

$$TrA = 2 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right) \qquad (d)$$

$$DetA = 1 - \frac{1}{\gamma} + \left(g + \frac{1}{\gamma}\right)\left(\theta - \frac{1}{\beta}\alpha g - \frac{1}{\beta}\theta\right) - \left(\frac{1}{\gamma'} - \frac{1}{\gamma}\right) \qquad (e)$$

The zero solution of the difference equation is said to be asymptotically stable if the following condition is satisfied (Zhang, 2006, p 269).

$$|TrA| < 1 + |DetA| < 2 \qquad (f)$$

In our terms this condition is expressed as

$$\left|2 - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right)\right| < \left|2 - \frac{1}{\gamma} + \left(\theta - \frac{1}{\beta}\theta - \frac{1}{\beta}\alpha g\right)\left(g + \frac{1}{\gamma}\right) - \frac{1}{\beta}\left(\frac{1}{\gamma'} - \frac{1}{\gamma}\right)\right| < 2 \quad (g)$$

Recalling that all the coefficients are proportions, numbers less than unity, the condition will be met with robust values of the coefficients in the denominator of the expression.

We now derive equation 6. For the purpose, we rewrite the appropriate portion of 5.

$$G - \theta Y = \Delta A - \Delta PD - \Delta p_a A \qquad (h)$$

We also recall that ΔFA = ΔGD + ΔPD. Substituting into the equation above,

$$\Delta A = \alpha \Delta Y + \Delta p_a A$$

$$\therefore \Delta A = \alpha g \left(g + \frac{1}{\gamma}\right) I + \Delta p_a A \qquad (i)$$

Combining c and i in matrix form, we get equation 6.

Our stability condition now translates to

$$\left|1 + 1 + \Delta p_a - \frac{1}{\gamma} + \theta\left(g + \frac{1}{\gamma}\right)\right|$$

$$< 1 + \left|1 + \Delta p_a - \left(\frac{1 + p_a}{\gamma}\right) + [(1 + p_a)\theta - \alpha g]\left(g + \frac{1}{\gamma}\right)\right| < 2 \qquad (j)$$

The complication here is that Δp_a can take a positive value (a capital gain) or negative value (a capital loss). In both events, we find that only the value $\Delta p_a = 0$ meets our stability condition (under weak inequalities) and with $\theta > \alpha g$.

References

Aikman, D. Bridges, J. Kashyap, A. and Siegert, C. 2019. Would Macroprudential Regulation Have Prevented the Last Crisis? *Journal of Economic Perspectives*, 33 (1), pp. 107-130.

Baker, A. 2018. Macroprudential regimes and the politics of social purpose, *Review of International Political Economy*, 25 (3), pp. 293-316.

Ballet, J., Anthropology and Economics: The Argument for a Microeconomic Anthropology. *Cahiers du GREThA n⁰ 2018-14*, Bordeaux, France.

Davis, J. B. 2018. Ethics and Economics: A complex systems approach. *Department of Economics, College of Business Administration, Marquette University*, *Working Paper* No. 2018-01, Wisconsin, USA.

Duffie, D. 2019. Prone to Fail: The Pre-Crisis Financial System. *Journal of Economic Perspectives*, 33 (1), pp. 81-106.

Elsner, W. 2015. Policy Implications of Economic Complexity and Complexity Economics. *MPRA Paper* No. 63252 posted 28 March 2015.

Festré, Agnès, 2015. Michael Polanyi's economics: a strange rapprochement. *GREDEG Working Paper* No. 2015-36, France.

_____, 2018. Hayek on expectations: The interplay between two complex systems. *GREDEG Working Paper* No. 2018-28, France.

Finch, J. H. and McMaster, R. 2018. History matters: on the mystifying appeal of Bowles and Gintis *Cambridge Journal of Economics*, 42 (2), pp. 285-308.

Focardi, S. M. 2018. *Money*. London & New York: Routledge.

Gallo, E. and Pereira Serra, G. 2020. Inventories, Debt Financing and Investment Decisions: A Bayesian Analysis for the US Economy. *Department of Economics, New School of Economic Research, Working Paper* No. 05/2020, New York.

Gali, J. 2018. The State of New Keynesian Economics: A Partial Assessment. *NBER Working Paper* No. 24845, National Bureau of Economic Research, Cambridge, MA.

Godley, W. and Cripps, F. 1983. *Macroeconomics*. Oxford: Oxford University Press.

Karl, M. (2015). Are ethical and social banks less risky? Evidence from a new dataset. *WWW(Welfare Wealth Work)FOREUROPE Working Paper* No. 96, Vienna, Austria.

Kregel, J. 2018. Preventing the Last Crisis: Minsky's forgotten lessons ten years after Lehmann. *Levy Economics Institute of Bard College Policy Note* No. 5, New York.

Lawson, T. 2015. Comparing Conceptions of Social Ontology: Emergent Social Entities and/or Institutional Facts? *University of Cambridge, Cambridge Working Paper in Economics* 1514. Cambridge, England.

MacKinnon, D. Dawley, S. Pike, A. and Cumbers, A. 2018. Rethinking Path Creation: A Geographical Political Economy Approach. *Papers in Evolutionary Economic Geography*, # 18.25, Utrecht University, Urban & Regional research Centre, The Netherlands.

Mayhew, A., 2018. An Introduction to Institutional Economics: Tools for Understanding Evolving Economies, *The American Economist*, 63 (1), pp. 3-17.

Manara, V. C. and Sacconi, L. 2019. Institutions, Frames, and Social Contract Reasoning. *EconomEtica Working Paper* No. 71, Milan, Italy.

Michie, J. 2020. The degeneration of capitalism from a system of production to a speculative orgy, *International review of Applied Economics*, 34 (20), pp. 147-151.

Renault, M. 2018. Edmond Malinvaud's criticisms of the New Classical Economics: Restating the Nature and the Rationale of the Old Keynesians' Opposition. *Department of Economics, University of São Paulo, FEA-USP Working Paper* No. 2018-21, Brazil.

Schnabel, I. and Shin, H.S. 2018. Money and trust: lessons from the 1620s for money in the digital age. *BIS Working Paper* No 698, Basle, Switzerland.

Schwartz, H. M. and Tranoy, B.S. 2019. Thinking about Thinking about Comparative Political Economy: From Macro to Micro and Back. *Politics and Society*, 47 (1), pp. 23-54.

Shubik, M. 2004. *The Theory of Money and Financial Institutions, volumes 1 & 2*. Massachusetts: the MIT Press.

_____. 2012. *The Theory of Money and Financial Institutions, volume 3*. Massachusetts: the MIT Press.

Stockhammer, E. and Ali, S.M. 2018. Varieties of Capitalism and post-Keynesian economics on Eurocrisis. *Post-Keynesian Economics Society Working Paper* No. 1813, UK

Tubaro, P. 2009. Agent-based Computational Economics: A Methodological Appraisal. *Université Paris X Nanterre, Document de Travail* No. 2009-42, Paris.

Tarullo, D. K. 2019. Financial Reputation: Still Unsettled a Decade After the Crisis. *Journal of Economic Perspectives*, 33 (1), pp. 61-80.

Vahabi, M. 2017. János Kornai and General Equilibrium Theory. *Document de travail du CEPN (Centre d'économie de l'Université Paris Nord)* No. 2017-16, Paris.

Zhang, W-B. 2006. *Discrete Dynamical Systems, Bifurcations and Chaos in Economics*. Amsterdam: Elsevier.

Controversies Regarding the TTIP Agreement in the Academic Literature

Maik Huettinger

ISM - University of Management and Economics, Vilnius

✉ maihue@ism.lt

Aras Zirgulis

ISM - University of Management and Economics, Vilnius

✉ arazir@ism.lt

Abstract

The main academic studies evaluating the impact of the Transatlantic Trade and Investment Partnership (TTIP) agreement are critically reviewed. The focus of this paper is on analysing to what degree the models which are predominantly used, are actually able to predict what they promise. This is done by decoding their methodologies and by discussing critical misconceptions caused by incorrect interpretations of results. The findings indicate that most of the studies analysed, are based on fragile and highly questionable assumptions. We argue that the predictions of each model can be tailored according to the preferred outcome of the modeller, which calls into question the legitimacy of this type of policy analysis in general. Finally, three policy options are suggested, aiming to unite the different views on TTIP.

Introduction

Free-Trade Agreements (FTA) can lead to vast improvements of living standards. However, the loss in national sovereignty and control over one's economy is a cost, which along with the potential for job displacements and declining terms of trade, are also unpleasant realities of international trade. The question of how to measure the costs and benefits of international trade is a relatively new and important part of the job of the modern economist.

In the area of applied international trade studies, there are two prevailing approaches: using econometric models or General Equilibrium models. Ideally, the modeller should be someone uninterested in the outcome of the model. If the modeller is interested in the output of the model being a certain way, it is possible to include (or exclude) assumptions which push the results in the desired direction. This possibility of model abuse is a topic seldom mentioned in the literature.

This paper will present the main academic studies by decoding their methodologies and by discussing critical misconceptions caused by incorrect interpretations of results. We hope that this will clarify many misunderstandings and stereotypes held by decision makers. The aim of this paper is not to criticise FTAs per-se, but to show the inadequacies of the currently used models that analyse the benefits and risks of trade agreements.

Overview of the main studies on TTIP

The main studies on TTIP may be loosely divided into two groups based on their policy outcome recommendations. Most studies favour the implementation of TTIP and have been conducted by the London based Centre for Economic Policy Research (CEPR), the French CEPII, and by the team of Gabriel Felbermayr (Fontagné, Gourdon & Jean, 2013; Francois & Pindyuk, 2013; Felbermayr, Heid & Lehwald, 2013b). However, one major study (Jeronim Capaldo, 2015) is critical of the other works and, hence, TTIP.

What these studies have in common is that they suggest different policy scenarios - based on a reduction of tariff and non-tariff barriers. The studies which find positive economic outcomes for TTIP are based on the CGE (Computable General Equilibrium) or SG (Structural Gravity) models. Possible gains in wealth are based on the assumption that specialisation and efficiency improvements allow an increase in productivity. The main Neo-classical assumptions, like the notion of full employment, perfect competition, and rational behaving actors are also staples of the CGE models. As the CEPR and the CEPII studies both work with the same datasets, their results are very similar (Breuss, 2014). In contrast, the model produced by Capaldo uses the United Nations Global Policy Model (GPM) which is based on Keynesian assumptions and finds differing results.

The Centre for Economic Policy Research Studies

A well-known study titled 'Reducing Transatlantic Barriers to Trade and Investment - An Economic Assessment' prepared by the Centre of Policy Research (CEPR) (Francois & Pindyuk, 2013) for the European Commission is considered, by many critics, to be biased due to a possible conflict of interest (Beck, 2014). The CEPR study is based on the ECORYS study (Berden et al., 2009b), which focuses on the estimation of non-tariff barriers (NTB). The core of the ECORYS study is a business survey, which asks decision makers in corporations to what extent they believe that NTBs negatively influence their activities. With the help of a gravity model, the ECORYS study calculates the costs of NTBs. The CEPR study is only one of the ECORYS satellite studies, but it is probably the most influential. In addition to the CEPR study, others have used the ECORYS database, but they have, instead, focused on the effects of the TTIP agreement on one single EU member state (Berden et al., 2009a; Francois & Pindyuk, 2013; Kinnman & Hagberg, 2012; Plaisier et al., 2012; CEPR, 2013). According to Pelkmans et al. (2014), the main differences between these studies are the number of scenarios provided, the intensity of NTBs in estimations, and the calculations of static and dynamic effects. In another study, the Bertelsmann foundation provides an impact estimation on each state of the United States of America (Atlantic Council, 2013). This study assumes higher spending of consumers (due to lower prices) as an engine for prosperity and

employment.

While the ECORYS study provides seven scenarios, the authors of the CEPR study simulate the effects for five different scenarios (Francois et al., 2015). The latter one assume a full liberalisation and removal of NTBs as very unlikely, and organises the more likely scenarios into three limited and two ambitious scenarios. The three limited scenarios are: (a) a 98 per cent tariff cut; (b) a 10 per cent reduction of NTBs for services; (c) a 25 per cent reduction of NTBs in public procurement. In the case where decision makers choose deeper integration, the authors suggest the following, more ambitious scenarios: (d) a 98 per cent tariff cut, a 10 per cent reduction of NTBs for services and goods, plus a 25 per cent reduction of NTBs in public procurement; (e) a 100 per cent tariff cut, 25 per cent reduction of NTBs for services, plus a 50 per cent reduction of NTBs in public procurement. The 25 per cent were defined as NTBs which are actionable and which would be reduced as a result of the TTIP agreement.

For the three limited scenarios (a, b, c), Francois et al. (2015) predict only a small impact on GDP growth rates between 2017-2027. For (a) they vary between 0,1 per cent (EU) and 0,04 per cent (USA); for (b) between 0,02 per cent (EU) and 0,03 per cent (USA); for (c) they vary between 0,02 per cent (EU) and 0,01 per cent (USA). The results of the two ambitious scenarios (d, e), suggest increased GDP growth of between 0,27 per cent-0,48 per cent (EU) and 0,21 per cent-0,39 per cent (USA). Both scenarios also suggest yearly welfare gains for a 4-person household in the EU of €306-€545 and €336-€655 for the USA. That would translate to €119 billion a year for the EU and €95 billion a year for the USA in total economic gains. According to CEPR, these figures are, to a large extent, the result of increased export activities between the EU (6 per cent) and the USA (8 per cent). The study suggests that the labour market will be benefited and that there will only be negligible effects on labour displacement. Moreover, the effects of this free-trade area would result in an increase of global income by roughly €100 billion. A possible reason for this is the assumed spill-over effects on third countries - such as a 20 per cent decrease of NTBs.

In March 2017, the CEPR presented a final ECORYS study to the European Commission (Bouman et al., 2017). The study refers to the CEPR Framework of 2013, as being 'the most suitable approach to date for analysing the potential impact of TTIP'. The authors have, therefore, updated the database of the old framework and extended it from 2027 to 2030. Nevertheless, two major changes in their approach are noteworthy:

First, they provide the expected effects of TTIP on various national macro-economic variables (wage inequality, labour displacement and consumer prices), as well as on sectorial employment. This is particularly interesting, as they admit for the first time (indirectly) that TTIP not only creates 'winners', but also many 'losers'. E.g., the study predicts that the electrical machinery and metal production sectors in the EU, and the motor vehicle and the tobacco/ beverages sectors in the US will suffer.

Second, the authors seem to comprehend the extensive criticism many of their controversial assumptions have created. Large parts of the updated study try to carefully explain, defend and soften their initial argumentation. Not only do they provide an extensive overview of competing studies, they even emphasise issues such as 'human rights' and intensively address other limitations of their approach.

The Felbermayr Studies

The Felbermayr studies (Felbermayr et al. 2013a, Felbermayr, Heid & Lehwald, 2013b, Gabriel Felbermayr et al., 2015) have probably received the most attention from all of the economic impact studies. The reason for this is that the studies predict very large economic gains arising from the TTIP agreement - e.g. 25 times higher GDP growth rates than those predicted by the CEPR studies. Unlike the CEPR studies, the Felbermayr studies do not entirely rely on the ECORYS/GTAP dataset and instead use a combination of three different methods to calculate the effects of TTIP (Bekkers and Rojas-Romagosa, 2016). One of the major differences to the CEPR and CEPII studies is, that they do not try to assess the effects of a reduction of trade costs on trade flows, but try to evaluate what reduction in trade costs

can result in beforehand estimated levels of trade flaws (Raza et al., 2014a). In addition, a 'New-New' Trade theory model is chosen to allow predictions of aggregated productivity change due to the inclusion of heterogeneous firms in the model (Melitz, 2003). As they include frictional/search unemployment in their model, this approach enables the estimation of employment changes.

In the more optimistic IFO study (Felbermayr et al., 2013a) Felbermayr provides three different scenarios ('Tariff Scenario' (I); 'NTB Scenario' (II) and 'Common Market' (III)). In the earlier Bertelsmann study (Felbermayr, Heid & Lehwald, 2013b) he provides two scenarios ('Tariff Scenario' (IV) and 'Comprehensive Liberalisation Scenario' (V)), which are partially overlapping. Whereas studies I and IV only consider the removal of tariff barriers, study III practically assumes that the United States would become a part of the European Union.

The effects for the first two scenarios (I/II) are mostly insignificant (e.g. for Germany a 0,13 per cent (I) / 1,6 per cent (II) increase of real income and a decrease of unemployment of 2 100 (I)/25 220 (II) people) (Felbermayr, Heid & Lehwald, 2013b). The more optimistic IFO study even suggests that in Germany there will be an increase in income of 0,54 per cent (IV) and an addition of 45 000 new jobs. For the common market scenario (III), the Felbermayr calculations are very optimistic as they assume (due to the TTIP) an increase of the trade flows between the EU and the USA by 80 per cent (for exports from Germany to USA - 262 per cent) (Felbermayr et al., 2013a). Depending on the scenario, the authors forecast the creation of up to 2 million new jobs or a 13,4 per cent increase of real income per capita for the USA and 5 per cent for the EU. Nevertheless, Prof. Felbermayr has stated in Monitor/WDR (2014) that the TTIP is not mainly about job gains - as these effects are minimal even in the 'most ambitious scenario'. Felbermayr stresses further, that these studies are of an academic nature, and tries to emphasise that the general effects of the TTIP are positive. He considers misinterpretations of the findings as a matter of the information policy of various political decision makers and institutions.

The Fontagne (CEPII) study

The Fontagné, Gourdon, & Jean (2013) study is not based on the ECORYS study, but chooses to measure the NTBs by ad-valorem equivalent (AVE) estimation. As the service sector is not subject to tariffs, the study relies on the data from Fontagné, Guillin, & Mitaritonna (2011) for nine service sectors in 65 countries. For the merchandise trade, Fontagne relies on the estimates provided by Kee, Nicita, and Olarreaga (2009). This dataset is often criticised, as being outdated and was entirely collected before the Global Financial Crisis. This results in different estimations of costs of NTBs for EU-US trade as compared to the ECORYS study. Whereas the agricultural sector is seen for both regions as being more protected, the NTBs for manufacturing and particularly services are estimated to be significantly lower.

Fontagné, Gourdon, and Jean (2013) provide four different scenarios, varying by the degree of reduction in trade restrictiveness of NTBs by sector, tariff liberalisation, and the relationship with third party countries. In addition, a fifth 'Reference Scenario' was included as a robustness check. All of the scenarios indicate a positive impact on exports and GDP growth of a TTIP. However, the results differ significantly between scenarios. In general, it can be said that the removal of NTBs is more important than tariff cuts, and that the USA benefits in each scenario significantly more than the European Union. The sector which is expected to benefit (grow) most from a trade agreement is the agricultural one, while the service sector will be affected much less. The Fontagne study also estimates changes in real income and, depending on the scenario, the results indicate a marginal increase somewhere from 0,0 per cent up to 0,3 per cent until 2025. The study also shows negative effects of the trade treaty - e.g. it estimates a 1,6 per cent decrease of real income in the EU Agricultural sector as a result of the TTIP agreement. Moreover, it also predicts negative spill-over effects on third party countries.

Capaldo study

In contrast to the previous studies, a study by Capaldo (2015) uses a Keynesian model to show that TTIP would lead to a fall in many economic indicators within the EU. Capaldo (2015) uses the United Nations Global Policy Model (GPM), which differs from CGE models mainly by adding Keynesian assumptions. This is perhaps not surprising as it was originally developed at Cambridge University, the home of John Maynard Keynes (Cripps & Izurieta, 2014). These Keynesian features include sticky prices, unemployment, and income inequality affecting spending - which are assumptions not included in CGE models. The GPM consists of historical time series data combined with a computational model, which generates scenarios and estimates model parameters. Countries or country group behaviour is assumed to be homogenous and countries interact with each other over the medium/long term through dynamic trade and financial structures programmed into the model. Capaldo (2015) claims that the GPM is superior to previous CGE models because the full employment assumption is replaced with the Keynesian idea of effective demand. In addition, the GPM explicitly models the macroeconomic processes of different world regions, while earlier CGE models had simplified by implicitly using observed data (e.g. the percentage of national income spent on imports).

Capaldo (2015) employs the GPM to test the impact of TTIP in the context of extended periods of austerity and slow growth in the EU and the US. In this gloomy scenario, any crisis experienced in one trade bloc will lead to a decrease in net exports → decrease in GDP → decrease in labour income and employment → increase in inequality and decrease in governmental spending. In response to a crisis, countries will not coordinate fiscal policies but are predicted to engage in competitive currency devaluations. The model ultimately predicts that 600 000 jobs will be lost in the EU combined with increasing income inequality, lower wages for workers, and higher financial instability. In addition, the model finds that net exports will decline in all of the EU. For example, by 2025, exports will decrease by 2.07 per cent in northern Europe. The logic provided by the author is that stagnation in the EU, fostered by austerity, will lead to declining demand for high value European goods, pushing manufactures towards producing lower value-added products. Since a high percentage of

European exports are currently high value-added goods, the crowding out effect will lower European exports.

Criticism of TTIP studies

Several opinion papers warning about the risks of the TTIP have been published in the last decade. Most of them focus on the problems of harmonizing the US and the EU, particularly when it comes to health, consumer protection, and social and legal issues. This has raised ongoing concerns by NGO's and consumer protection groups. The existing academic studies, on the other hand, try to focus on the economic consequences such trade agreements might have on households. Their findings have suggested conflicting results, leading to a growing debate about the degree to which the TTIP will affect both economies. Many opponents of the TTIP use these inconsistencies to question the overall benefits of the suggested trade liberalisation. The studies are criticized from two different camps. Some of the criticism concentrates on the interpretation of the findings and the intentions, others on unrealistic assumptions and limitations of the models.

One of the more famous examples for the first case involves the former EU Commissioner Karel De Gucht, who mistakenly believed that the GDP growth numbers of the CEPR Study are calculated on an annual basis - and not the total for a period of 10 years (Monitor/WDR, 2014). Beckert (2013) suggests that such studies represent an important exercise in the 'management of fictional expectations'. The creation of overly optimistic simulations, relying on the ability of the two entities to reduce regulatory barriers, serves as a tool for pro-liberalisation advocates to pursue their agenda (De Ville & Siles-Brügge, 2015). This idea is closely linked to the 'institutional hypothesis', suggesting that powerful groups in society may influence economic institutions to pursue their interests (North, 1991). Unlike in the case of TPP, national and transnational business leaders were far more united in the TTIP negotiations, allowing them to speak with a common voice (Ravenhill, 2017).

Other critics, such as Dean Baker (2014) question the conclusions made by some of the

academic studies: 'Implying that a deal that raises GDP by 0.4 per cent or 0.5 per cent 13 years out means job-creating opportunities for workers on both continents is just dishonest. The increment to annual growth is on the order of 0.03 per cent points. Good luck finding that in the data.' According to Baker, the study should never have been used to suggest that TTIP creates jobs. In fact, the authors of the CEPR study clearly state that it will not lead to an increase of employment, as the CGE model chosen assumes full employment. In general, the model makes overly optimistic predictions about the ability to implement the 'full package', in order to serve the pro-liberalisation agenda of the advocates of TTIP (De Ville & Siles-Brügge, 2015).

When it comes to the criticism to the assumptions and limitations, it may be helpful to separate the various methodologies used. As mentioned before, the CEPR, the Felbermayr Studies as well as the CEPII studies are using CGE/SG models for their simulations. The main difference among the CGE models is that the first one applies the GTPA model, the second and the third one the MIRAGE model. Both methods are in principle very similar to each other and the differences are rather marginal (Raza et al., 2014a). Both models basically assume that in all regions there is a single representative composite household (eg. Francois et al. (2015) assume in their model each and every household in the US and the EU consists of 4 people). Moreover, all firms employ only domestic production factors and perfect competition is assumed in all agricultural sectors. Eventually, all prices on goods and factors adjust until all markets are simultaneously in equilibrium and real wages will fall until full employment is obtained. Surprisingly, the models assume the government does effectively not exist (subsumed into representative households) and the budget deficit is set as constant. Saving rates of the representative households are constant; capital cannot move between sectors or countries (MIRAGE model).

The key differences which appear to result in very different outcomes are the assumptions made about trade costs (reduction of NTBs), elasticities of substitution and the scenarios chosen. Despite assuming different degrees of removability of NTB, the CEPR and the CEPII basically rely on the estimates of external studies, specifically the quantification of NTBs when

it comes to the trade costs (Berden et al., 2009b). This is problematic in many ways. First of all, the ECORYS (used for the CEPR) method defines NTBs very differently than standard approaches which are commonly applied (Raza et al., 2014a). For instance, it excludes quotas as NTBs but includes domestic regulations and laws. Second, the entire ECORYS dataset is based on a single survey (questionnaire) which was sent to corporations, with 5 500 replies received. The dataset faces substantial self-selection bias due to the data gathering protocol. For example, respondents were asked to: 'Consider exporting to the US (EU), keeping in mind you are in the domestic market. If 0 represents a completely 'free trade' environment, and 100 represents an entirely closed market due to NTBs, what value between 0 – 100 would you use to describe the overall level of restrictiveness of the US (EU) market to your export product (service) in this sector?'. Despite the question of whether these corporate respondents are in fact qualified and experienced enough to make comparative judgements (business perceptions on trade restrictions vs. actual trade costs), it also raises the issue of representativeness. Most likely only companies which are engaged heavily in EU-US trade took the time to respond. To assume that each and every company in Europe and the US faces the same NTBs, is highly dubious. Raza et al. (2014a) suggests that firms actually might have misunderstand some of the questions, making the entire survey questionable. Moreover, the conceptualization might introduce an upward bias (the higher firms estimate the NTBs, the higher are the potential benefits from its reduction). The CEPII study on the other hand, relies on NTBs by ad-valorem equivalent (AVE) estimation, taken from Kee et al. (2009) and Fontagné, Gourdon, & Jean (2013)). The estimations of the NTBs (based on the UNCTAD-TRAINS NTM database) are much higher than the one from the ECPORYS, but cover more sectors (Bekkers and Rojas-Romagosa, 2016).

When it comes to the question of elasticities of substitution, it is interesting to note that the ones that are used in these CGE models are higher than reasonable macroeconomic elasticities. In other words, the gains of reducing the NTBs are too optimistic and unlikely to obtain.

Besides the reliance on the ECORYS data, the scenario time frame of 2027 seems to be

randomly chosen and poorly justified. Pelkmans et al. (2014) suggest that the CEPR assumes that the negotiations were already finished by 2017 and will be fully implemented by 2027. Francois et al. (2015) explains his decision in the following way: 'The results are reported with respect to an economic benchmark projected out to the year 2027, which implies that they capture the impact of the agreement a full ten years after the implementation, providing insights into the longer-term impact of policy changes'. Another criticism of the CEPR study by Raza et al. (2014a) is that the model does not consider negative scenarios involving economic growth (e.g. due to an increase of prices). Moreover, the CEPR study indicates that in the ambitious scenario the job displacement of workers in the European Union would be a minimum of 1,3 million people. However, as the model assumes full employment, flexible prices, and high mobility of the workforce, all the dismissed workers would be immediately absorbed into the economy.

The Felbermayr studies use a different approach and assume that the creation of a EU-US trade agreement would create large trade creation effects, welfare gains and would reduce trade barriers dramatically (Pelkmans et al., 2014). Despite the assumption of an 80 per cent increase in trade, the possible effects also seem implausible. For example, as the US gets only 3,5 per cent of its GDP from exports to the EU (at very low tariffs already), a 13 per cent increase in US GDP is improbable. One of the reasons for overly optimistic expected outcomes may be found in the very generous definition of trade barriers which are subject to removability (Raza et al., 2014a). The Felbermayr studies also fail to take firm heterogeneity into account, randomly sets substitution elasticity at 8 (without estimating it) and use a top-down approach for estimating the NTBs that is too simplistic and generic (Bekkers and Rojas-Romagosa, 2016). In other words, Felbermayr assumes that the effects of TTIP will be very similar to other free trade agreements of the past. In general, studies using this top-down estimation of NTBs arrive at higher cost reductions than studies with bottom-up approaches (such as CEPR or CEPII). The assumption that NTBs reductions of about 30% are neither reliable nor in line with the average trade cost calculations of the CEPR study of around 3%. Pelkmans et al. (2014) reject the projections that Canada might face a negative spill-over effect of 9 per cent of its GDP. Such dramatic changes seem very unlikely,

90

particularly as Canada is a part of NAFTA. The projections of labour gains are in doubt as well, as it is based on data for only 28 OECD countries.

Capaldo (2015) heavily criticises the reliance on the full employment assumption, which he questions by the observation that unemployment levels in Europe have remained high during the last decade. In addition, the idea that workers who lose their jobs in one sector may quickly transition to work in other sectors is challenged by Polaski (2006). Even if workers displaced from one sector find employment in another, they may suffer from lower wages due to skill-set mismatch, which would make the entire economy worse off. Capaldo (2015) criticises the CGE models' assumptions that countries have fixed trade shares with one another. He argues that the CGE models have incorporated trade shares too simplistically and have not included 'trade diversion' whereby changes in trade between two trading partners affect trade shares of other countries or regions as well. In addition, the CEPR study predicts positive spill-over effects to third party countries, while other sources see very likely negative effects on third party countries (Felbermayr, Heid & Lehwald, 2013b; Capaldo 2015).

There are several issues with the Capaldo (2015) study. First, the outcome of the model strongly rests on the dubious assumption that any negative shock from the US to the EU will result in a downward economic spiral for the EU because of their lack of a central fiscal authority to engage in deficit spending, and the Maastricht treaty spending limitations. Contrary to this claim, there is ample evidence that countries which implement austerity policies can have substantial economic recoveries (Staehr, 2013). A study by Mirdala (2009) which tests for the impact of expansionary fiscal policy in several central European countries finds that the effects of Keynesian stimulus were modest or non-existent. Thus, the strong Keynesian assumptions of the model as applied to Europe are at odds with some of the empiric cases. Furthermore, the Maastricht spending limitations have already been broken with impunity before.

Maria Persson (2015) claims that the Capaldo study lacks replicability due to the limited

description of the methods used. He also claims that Capaldo completely ignores a key facet of what any TTIP study should be about, namely the effect of TTIP on trade volumes. A final issue with the Capaldo (2015) study is that the model is designed to include Keynesian assumptions, while also assuming that European countries will 'not reverse their commitments to fiscal austerity'. These assumptions practically guarantee that the model will produce results showing negative economic consequences, irrespective of the TTIP agreement.

Are Economists to blame? A more heterodox approach as a solution?

Many observers are puzzled why the TTIP-Negotiations have provoked such a strong opposition from civic groups. In some European Nations, it was the first time that hundreds of thousands of people protested on the streets against a possible new trade agreement. To some extent, the success of the BREXIT campaign, as well as the election of President Donald Trump, can be attributed to the free trade question. Young (2016) suggests that the main reason for the societal tension is that the ongoing TTIP negotiations have higher salience than other FTAs. In any case, society seems to be more divided than ever, being aware that corporate vested interests together with politicians and academics are willing to deliver favourable impact assessments. Therefore, we asked ourselves, are economists whose econometric studies are often based on unrealistic assumptions to blame? In this chapter we will firstly present supporters and opponents of free trade and globalization; and we will try to draft a more heterodox approach, which might be able to connect both sides. We will discuss to what extent the TTIP agreement is actually a FTA and finally, we will present our proposal for future TTIP negotiations.

In general, most economists suggest that free-trade largely benefits society (Prasch, 1996). This view is based on Ricardo's Theory of Competitive Advantage, the Heckscher–Ohlin Model (Heckscher & Ohlin, 1933) and its extension, the Stolper–Samuelson theorem (1941), claiming that despite the fact that individual factors of production can lose out (capital vs. labour), the gains of trade will always compensate for these losses. Opponents of FTAs fear

that unregulated trade may destabilise an economic system, which was once designed to balance the interests of various stakeholders. Institutionalists such as Friedrich List (1856) or John R. Commons (1934) suggested, that tariff and non-tariff barriers are a useful instrument to protect innovation and technology and, therefore, support the welfare of the nation. However, in a globalised world, the question of technology-transfer protection becomes less relevant, as multinational-corporations (MNCs) dominate trade flows. Technology spillovers occur mainly from subsidiaries of multinationals to domestic firms (Findlay, 1978; Ozturk, 2007). As a result, it turns more into a policy decision of the individual country as to what extent they decide to open themselves up to FDI. Of high interest for multinational enterprises is the host countries' protection of intellectual property rights (IPRs). In the case of weak IPR standards, FDI may not necessarily fail to materialise, however it may alter the composition of FDI flows at the industry, as well as the firm level (Saggi, 2002). MNCs lobby governments of their home countries to champion strict global IPR standards. Until the early 1990s, there was a widespread belief that Globalisation was going to benefit everyone. Today, many scholars challenge this myth by emphasizing the increasing gap between wealthier and poorer countries (Stiglitz 2002; 2007; Chase-Dunn, 1998). Robinson (1977) concluded that the analysis of Ricardo mainly aimed at creating a system which reflects the interest of the strongest competitor (at this time the United Kingdom), as this one does not have to fear competition in domestic markets. Free trade doctrine, in practice, is a subtler form of Mercantilism, helping the ones who wants to export. As suggested by the 'race to the bottom' concept, more expensive sets of regulations of advanced nations are considered as a cost disadvantage for investors (Raza et al., 2014b). Developing countries are, therefore, forced to reduce labour and environmental standards, in order to offer attractive conditions to maintain or attract capital.

Palley (2008) suggests a more mixed picture of the impact of trade agreements, and might therefore have the potential to converge the positions of neo-classical trade theory and institutionalist trade theory. On the one hand, some scholars strongly favour trade and base their analysis on the conventional microeconomic driven trade theory. On the other hand, many scholars question the neo-classical win-win assumption, emphasise the role of

potential technology transfers by multi-national corporations and the negative outcome of increasing returns to scale on trade relationships. Eventually, they suggest that economic policy should focus on setting the right climate, conditions and institutions. This view is supported by many representatives of the new institutional economics school of thought, which link economic growth to the degree to which the potential hazards of trade are able to be controlled by institutions which are set up to stabilise the economic climate (Klein, 2000).

In principle, free trade-agreements are not inherently a danger to an economy, as no consumer can be against the free access of products (however, this rationale may be questioned by the current US-Administration). According to neoclassical economics, history has shown that countries which do have access to these benefits of free-trade, provide higher living standards to their citizens than other countries. Nevertheless, depending on the development stage, free-trade agreements may also have negative or zero effects on the wealth of a country (Sarkar, 2008; Gunnar, 1956). Neoclassical economists are convinced that trade will lead to convergence among trade partners, however Kaldor (1980) postulated instead that free trade can lead to a polarisation between successful and unsuccessful economies in which success in competitive performance feeds on itself and losers become immiserated by trade. Despite following the principle of free-trade, contemporary FTAs are as far away from the principle of free trade, as a BB gun is from a smart bomb. In essence, free-trade is easy to define. There are no-tariff barriers, no non-tariff barriers, and there will be no discrimination for the products and services of trade partners. In reality however, each FTA is an extensive and detailed contract which has been negotiated between the trade partners for many years with thousands of exceptions. Thus, the debate should rather be about the question of to what extent the TTIP reflects the core idea of a FTA and/or does it already have elements of a Common Market or Customs Union. What makes the situation even more tricky–the main discussion is not about the general benefits of the TTIP for consumers (such as having easier access to a variety of products and services), rather policy decision makers try to focus on the effects specific changes of trade regulations have on economic variables such as unemployment, welfare, economic growth or even innovation. It is evident that FTAs will increase the flow of goods, but this does not automatically mean that

the higher flow of goods will result in higher employment. Chasse (2015) argued that FTAs have not improved the positions of workers, but have helped to widen the income gap and resulted in concerns about free trade. To some degree, this seems unfounded, as one should rather blame the complexity of the 'free-trade rules' which were set up by the institutions in charge. Therefore, this does also not challenge. Commons' (1908) argument, that tariffs do not benefit workers of protected industries. Employment can only rise when consumption increases (Krugman, 2009). This is very unlikely in the case of the TTIP agreement, as consumers of both regions already have reasonable access to the products they need, and additional consumption will depend on the general level of economic development. In reply, TTIP proponents suggest that a reduction of tariff and non-tariff barriers will automatically create benefits (or that the benefits always exceed the costs), resulting in higher income and thus higher consumption. As already shown in the analysis above, such increases in income are only marginal - not justifying such enormous changes in regulations and safety standards.

Considering the entire new geopolitical situation, one may assume 'TTIP is dead'. The authors, however, believe that in the long-run, a kind of TTIP 2.0 may be developed. According to the arguments discussed above, the authors suggest the following: (1) The TTIP 2.0 should be promoted as a strengthening of the ties between the two major trade blocks (the US and the EU), which share a common history, culture and have a similar understanding when it comes to the question of free-markets. The creation of a common trade zone will increase the power of the two blocks to set worldwide standards. Moreover, it might be the last time in history when the United States together with the European Union will have enough power to influence global standards. Particularly when it comes to the existing relatively high environmental, health and safety standards of both regions, the global impact might be significant. (2) The emphasis of any new treaty should be on the harmonisation of technical (industry) standards, reciprocity and the reduction of non-tariff barriers, where little conflict is present. Indeed, it makes little sense that there are different regulations and standards regarding the colour of rear blinker lights. However, the TTIP 2.0 should (at this stage) not focus on the harmonisation of the standards which involve regulations when it comes to food safety standards, investment protection and other areas of conflict. Newly established

commissions should be established, which should work on harmonisation in the long run. (3) The communication strategy of the European Union and the USA should shift from solely promoting possible economic benefits of the transatlantic trade agreement, to the points listed above. The literature review has shown that the assumptions made in the CGE models are unrealistic and any impact on economic welfare cannot be predicted. One good example of a successful trade block/common market is the European Union.

Conclusions

This article has critically reviewed the main studies which are used in the contemporary debate about the Transatlantic Trade and Investment Partnership (TTIP) Agreement. In the first part, four of the main approaches (CEPR, Felbermayr, Fontagne and Capaldo) were presented and discussed. In the following part the criticisms of these studies were evaluated and presented. The article concludes with a request for a more heterodox view on the question of a possible TTIP 2.0 Agreement.

The aim of this paper was not to engage in an emotional debate on whether such a trade agreement will be a danger or a benefit for the societies of the participating countries. It is likely that less regulation will bring both regions closer together. However, the extent to which this is desired by its people or its decision makers is questionable.

TTIP proponents - such as the European Commission or the last US administration, have funded various studies to back their political decisions. Most of these emphasise the economic benefits of a FTA between the European Union and the United States of America. However, we have argued that, at this stage, it would be impossible to make any predictions on how a TTIP would impact the GDP of the United States or the European Union.

The analysis has shown that, due to its severe limitations and assumptions, the econometric models which are used in forecasting (CGE Models/SG Models) are not adequate. Particularly, the question of full employment and the ability of the markets to allocate

production on a global scale is often questioned (Palley, 2003). One of the concerns raised in this paper is the scientific objectivity of the scholars who prepared the various econometric studies, which were sponsored by non-neutral institutions. In general, all studies on this topic will be biased, as scholars intentionally or non-intentionally opt for a methodology which is the most appreciated by their peers. Predicting the future has been tempting since the beginning mankind, and very few academic disciplines have been able to resist.

The focus on economic impact has to be interpreted as a PR/communication strategy of the European Commission. Most likely, it aims to override concerns of various stakeholder groups. Despite being emotional, many of these concerns have to be taken into account. Regarding regulations, it is very likely that in particular disputes, the lowest standard of one of the two entities will be considered the common standard. This would result in a decrease of standards indeed. Both regions are equally developed (unlike in the case of North-South Trade Agreements) and regulations are often considered as a way to balance the interests of all stakeholders. The political, economic and legal system of both regions has produced a unique system of regulations which are not inferior to one another. In particular, the European 'precautionary principle' collides with the US-American idea of the 'aftercare principle', where products can be placed on the market as long as they pose no scientifically proven danger. Openly acknowledging this problem - and not denying it - may be a first step of policy decision makers. Further works should try to emphasise more realistic assumptions (such as the existence of unemployment, exchange rate risks or trade imbalances) or at least try to apply more sophisticated models (eg. agent-based modelling).

[1]This paper was finalised after the British 'BREXIT' referendum. However, as no details are clear at this stage (e.g. if the UK would remain a part of the common market), the impact of this decision was not discussed

[2]For more details: http://bpp.mit.edu/

References

Atlantic Council. 2013. *TTIP and the Fifty States: Jobs and Growth from Coast to Coast*. Washington: The Atlantic Council, the Bertelsmann Foundation, and the British Embassy in Washington.

Baker, D. 2014. *Why Is It So Acceptable to Lie to Promote Trade Deals?* Centre for Economic and Policy Research. Retrieved from http://cepr.net/blogs/beat-the-press/why-is-it-so-acceptable-to-lie-to-promote-trade-deals http://cepr.net/blogs/beat-the-press/why-is-it-so-acceptable-to-lie-to-promote-trade-deals (accessed September 2019)

Beck, S. 2014. Assessing TTIP and Its Supporting Studies. TTIP: Possible Negotiating Outcomes and Consequences. In *The Transatlantic Trade and Investment Partnership (TTIP): Implications for Labor,* ed. Christoph Scherer. Munich. Rainer Hampp Verlag.

Beckert, J. 2013. Imagined futures: fictional expectations in the economy. *Theory and Society* 42 (3), pp. 219-240.

Berden, K., Plaisier, N., Francois, J. and Mulder, A. 2009a. The Impact of Free Trade Agreements in the OECD: The Impact of an EU-US FTA, EU-Japan FTA and EU-Australia/New Zealand FTA. Ecorys. http://www. rijksoverheid. nl/documenten-en-publicaties/rapporten/2010/03/08/report-the-impact-of-free-tradeagreements-in-the-oecd-the-impact-of-an-eu-us-fta-eujapan-fta-and-eu-australia-new-zealand-fta.html   (accessed September 2019)

Berden, K., Francois, J. Thelle, M., Wymenga, P. and Tamminen, S. 2009b. Non-tariff measures in EU-US trade and investment–An economic analysis. Ecorys. http://trade.ec.europa.eu/doclib/docs/2009/december/tradoc_145613.pdf   (accessed September 2019)

Bekkers, E. and Rojas-Romagosa, H. 2016. Quantitative trade models and the economic assessment of TTIP. https://www.gtap.agecon.purdue.edu/resources/download/8068.pdf.

Breuss, F. 2014. TTIP und ihre Auswirkungen auf Österreich: Ein kritischer Literaturüberblick (No. 468), *WIFO Working Papers.*

Bouman, S. et al. 2017. SIA in support of the negotiations on a Transatlantic Trade and

Investment Partnership (TTIP), *Final Report prepared for the European Commission, Luxembourg.*

Capaldo, J. 2015. The trans-atlantic trade and investment partnership: European disintegration, unemployment and instability. *Economia & lavoro,* 49 (2), pp. 35-56.

Chase-Dunn, C.K. 1998. *Global formation: Structures of the world-economy.* Lanham: Rowman & Littlefield.

Chasse, J.D. 2008. Trade agreements and labor problems: the current bearing of a commons proposal. *Journal of Economic Issues,* 42 (4), pp. 1123-1144.

Commons, J.R. 1934. *Institutional Economics.* New York: The Macmillan Company.

Commons, J.R. 1908. Tariff Revision and Protection for American Labor. *The ANNALS of the American Academy of Political and Social Science,* 32 (2), pp. 51-56.

Cripps, F. and Izurieta, A. 2014. The UN Global Policy Model: Technical Description. UNCTAD. http://unctad.org/en/PublicationsLibrary/tdr2014_GPM_TechnicalDescription.pdf (accessed September 2019)

De Ville, F. and Siles-Brügge, G. 2015. The transatlantic trade and investment partnership and the role of computable general equilibrium modelling: an exercise in 'mnaging fictional expectations. *New Political Economy,* 20 (5), pp. 653-678.

Felbermayr, G., Heid, B., Larch, M. and Yalcin, E. 2015. Macroeconomic potentials of transatlantic free trade: A high resolution perspective for Europe and the world. *Economic Policy,* 30 (83), pp. 491-537.

Felbermayr, G., Larch, M., Krüger, F., Flach, L., Yalcin, E. and Benz, S. 2013a. Dimensionen und Auswirkungen eines Freihandelsabkommens zwischen der EU und den USA. *ifo Forschungsberichte (No. 62).*

Felbermayr, G., Heid, B. and Lehwald, S. 2013b. *Transatlantic trade and investment partnership (TTIP). Who benefits from a free trade deal? Part 1: Macroeconomic effects*. Guetersloh: Bertelsmann Foundation.

Findlay, R. 1978. Relative backwardness, direct foreign investment, and the transfer of

technology: a simple dynamic model. *The Quarterly Journal of Economics,* 92 (1), pp. 1-16.

Fontagné, L., Guillin, A. and Mitaritonna, C. 2011. Estimations of tariff equivalents for the services sectors. CEPII. http://www.cepii.fr/CEPII/en/publications/wp/abstract.asp?NoDoc=3855 (accessed September 2019)

Fontagné, L., Gourdon, J. and Jean, S. 2013. Transatlantic trade: whither partnership, which economic consequences? CEPII. http://www.cepii.fr/pdf_pub/pb/2013/pb2013-01.pdf (accessed September 2019)

Francois, J. and Pindyuk, O. 2013. Modelling the Effects of Free Trade Agreements between the EU and Canada, USA and Moldova/Georgia/Armenia on the Austrian Economy: Model Simulations for Trade Policy Analysis. *FIW Research Reports (No. 2012/13-03)*

Francois, J., Manchin, M., Norberg, H., Pindyuk, O. and Tomberger, P. 2015. Reducing transatlantic barriers to trade and investment: An economic assessment. *Working Paper (No. 1503).*

Gunnar, M. 1956. *An International Economy: Problems and Prospects.* London: Harper.

Heckscher, E.F. and Ohlin, B.G. 1933. *Interregional and international trade*. Cambridge: Harvard University Press

Kaldor, N. 1980. The foundations of free trade theory and their implications for the current world recession. *In Unemployment in Western Countries*, ed. E. Malinvaud and J.P. Fitoussi C. London and Basingstoke: The Macmillan Press Ltd.

Kee, L.H., Nicita, A. and Olarreaga, M. 2009. Estimating trade restrictiveness indices. *The Economic Journal,* 119 (534), pp. 172-199.

Kinnman, S. and Hagberg, T. 2012. Potential effects from an EU–US free trade agreement–Sweden in focus. National Board of Trade. https://www.kommers.se/documents/dokumentarkiv/publikationer/2012/rapporter/potential-effects-from-an-eu-us%20-free-trade-agreement.pdf (accessed September 2019)

Klein, P.G. 2000. New institutional economics.

http://ecsocman.hse.ru/data/865/177/1218/0530book.pdf (accessed September 2019)

Krugman, P.R. 2009. *A country is not a company.* Boston: Harvard Business Press.

List, F. 1856. *National system of political economy.* Philadelphia: JB Lippincott & Company.

Melitz, M.J. 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica,* 71 (6), pp. 1695-1725.

Mirdala, R. 2009. Effects of fiscal policy shocks in the European transition economies. *Journal of Applied Research in Finance,* 1 (2), pp. 141-155.

Monitor/WDR 2014. Freihandelsabkommen: Das Märchen vom Jobmotor. http://www.ardmediathek.de/tv/Monitor/Freihandelsabkommen-Das-Märchen-vom-Job/Das-Erste/Video?bcastId=438224&documentId=38432372 (accessed September 2019)

North, D.C. 1991. Institutions STÖR. *The Journal of Economic Perspectives,* 5 (1), pp. 97-112.

Ozturk, I. 2007. Foreign Direct Investment–Growth Nexus: A Review of The Recent Literature. *International Journal of Applied Econometrics and Quantitative Studies,* 4 (2), pp. 79-98.

Palley, T.I. 2008. Institutionalism and new trade theory: rethinking comparative advantage and trade policy. *Journal of Economic Issues* 42 (1), pp. 195-208.

Palley, T.I. 2003. International Trade, Macroeconomics, and Exchange Rates: Re-examining the Foundations of Trade Policy, *Paper presented at the conference Globalization and the Myths of Free Trade.*

Pelkmans, J., Lejour, A., Schrefler, L., Mustilli, F. and Timini, J. 2014. The Impact of TTIP: The underlying economic model and comparisons. http://ssrn.com/abstract=2510301 (accessed September 2019)

Persson, M. 2015. Swedish academic casts critical eye on TTIP study. http://arc.trade/en/article/swedish-academic-casts-critcal-eye-ttip-study (accessed September 2019)

Plaisier, N., Mulder, A., Vermeulen, J. and Berden, K. 2012. Study on EU--US HL Group–Final Report. Rotterdam: Ecorys.

Prasch, R.E. 1996. Reassessing the theory of comparative advantage. Review of Political Economy, 8 (1), pp. 37-56.

Polaski, S. 2006. Winners and losers. Impact of the Doha Round on developing countries. New York: Carnegie Endowment Int. Peace

Raza, W., Grumiller, J., Taylor L., Troester B. and von Arnim, R. 2014a. ASSESS_TTIP: Assessing the claimed benefits of the Transatlantic Trade and Investment Partnership." Policy Note No. 10/2014. Austrian Foundation for Development Research (ÖFSE). http://www.oefse.at/en/publications/detail/publication/show/Publication/ASSESS-TTIP-Assessing-the-Claimed-Benefits-of-the-Transatlantic-Trade-and-Investment-Partnership/ (accessed September 2019)

Raza, W., Grumiller, J., Taylor L., Troester B. and von Arnim, R. 2014b. TTIP–A GOOD DEAL? Schwartz Center for Economic Policy Analysis (The New School). http://www.economicpolicyresearch.org/images/docs/research/globalization_trade/Taylor_Policy_Note_1.9.15_FINAL.pdf (accessed September 2019)

Robinson, J. 1977. What are the Questions? *Journal of Economic Literature*, 15 (4), pp. 1318-1339.

Ravenhill, J. 2017. The political economy of the Trans-Pacific Partnership: a '21st century trade agreement? *New Political Economy,* 22 (5), pp. 573-594.

Saggi, K. 2002. Trade, foreign direct investment, and international technology transfer: A survey. *The World Bank Research Observer,* 17 (2), pp. 191-235.

Sarkar, P. 2008. Trade openness and growth: is there any link? *Journal of economic issues,* 42 (3), pp. 763-785.

Staehr, K. 2013. Austerity in the Baltic states during the global financial crisis. *Intereconomics,* 48 (5), pp. 293-302.

Stiglitz, J.E. 2002. *Globalization and its Discontents*. New York: Norton.

Stiglitz, J.E. 2007. *Making globalization work.* London: Norton & Company.

Stolper, W.F. and Samuelson, P.A. 1941. Protection and real wages. *The Review of Economic*

Studies, 9 (1), pp. 58-73.

Young, A.R. 2016. Not your parents' trade politics: the Transatlantic Trade and Investment Partnership negotiations. *Review of International Political Economy,* 23 (3), pp. 345-378.

A Complex but Interesting Relation: Keynes, Mathematics, and Statistics

Jesus G. Muñoz Bandala

Center for Economic Research, ITAM

✉ jesusmunoz_ban@yahoo.com

Abstract

The objective of this methodological paper is to examine a historical milestone in economic method to aid to detect how economics is done today. The chosen author is Keynes and the selected methodological theme is the role of mathematics-statistics in economics. Keynes´s relationship with mathematics and statistics was always complex. His organicist notions aided him to denounce what he saw as wrong, and then he accepted some practical uses of his theories. The introduction describes Keynes's route towards his stance on the use of mathematics, the background of classical probability and certainty, and the intellectual stance of Keynes the statistical. Section 1 explains how Keynes influenced the development of national accounts and econometrics, rejecting since the beginning any manifestation of unrestricted faith in the latter, including his debates. Section 2 outlines how he built a separate notion of probability, moving away from the orthodox conceptions. Keynes saw probability as an objective relation between two statements with the weight of the argument at the core of his argumentation. Section 3 describes the relation between Keynes and Ramsey who influenced Keynes conception of probability as Maynard moved away from crass objectivism to logical objectivism and a partial subjectivism. The conclusion is that Keynes preached a rational use of mathematics-statistics. Like in

the cases of capitalism or economic theorizing, he denounced what he advocated in order to improve it. Perhaps the originality of this article lies in the philosophical perspectives resorted to for illuminating Keynes's controversies. A parallel practical purpose is to highlight Keynes's methodological insight: No researcher must take any method before being aware of its strengths and limitations.

Introduction

> Too large a proportion of recent 'mathematical' economics are merely concoctions… (Keynes, 1936, *GT*, *CW* 7, pp. 298).
> When statistics do not make sense, I find it generally wiser to prefer sense to statistics. (Keynes, 1940, JMK to E. Rothbard, 21 January).

Keynes was an economist generating novel notions in the fields of both mathematics and statistics, especially about their uses in economics. Hence this paper deals with Keynes's s guidelines for the use of quantitative methods which is based on his philosophical core, after outlining his historical background, which is the purpose of this Section.

Keynes's route to mathematics

Keynes was an acute and innovative political and moral philosopher between 1899 and 1919. He wrote several epistemological pieces during that period, outstanding amongst them A Treatise on Probability (1908) [1921]. Between 1919 and 1930 he was a top-level civil servant in both the war and postwar realms in Britain, although he found the time to write the non-mathematical A Tract on Monetary Reform (1923). In 1930 Keynes wrote A Treatise on Money making use of two fundamental equations to describe the ways to arrive at an equilibrium level in both the price level and earnings, but he soon discarded them since output was still a constant. He needed a more qualitative approach.

In 1940 Keynes penned the influential book (for our purposes) How to Pay for the War (1940), in which he discussed the basics of national accounts, originally set in the preface of the General Theory of Employment, Interest and Money or GT (1936). Thereafter Keynes got involved in controversies about the uses of mathematics and

statistics in economic analysis and policies, oftentimes preferring a qualitative approach.

The context of Classical probability

Classical literature on probability reigned when Keynes appeared. The classical and the frequentist statisticians belong to the objectivist vision of probability, whereas Keynes defended an special objective discrete version of logical – not mathematical – probability, which also possesses subjective elements, since logics proceeds from human cognition.

Keynes may have also embraced the conception of uncertainty, which was enunciated by Heisenberg (1901-1976) in quantum physics in 1927. The indeterminacy principle set limits to precision in knowledge wherein errors are non-systematic[1].

Keynes's experience on uncertainty came from both intuition and his professional practice. Keynes the practitioner in the 1930s applied the notion of uncertainty to macroeconomic and financial events. Without uncertainty nothing would be at stake in financial markets.

Short-term investments and policies are uncertain but manageable. Keynes contradictorily recommended long-period investments but not policies. Table 1 is a summary of the intellectual context of Keynes's stance on empirical measurement, providing the background to all approaches to be explained.

---

[1] Heisenberg, Werner. (1930). 1949. The Physical Principles of Quantum Theory, Hoyt F. C.: Dover.

Table 1: Context of ideas

	Statistics	Econometrics	Mathematics	Expectations
Classical	Classical and frequentist 'Pr': Objective 'Pr'	Tinbergen's time series; attention to results	Quantitative analyses	Certain: Classical and Neoclassical economists
Keynes	Logical objective and subjective Pr	Initial attention, exceptions, and caution about excessive use	Quantitative and qualitative analyses; careful model choice. Unproved addictive formulas	Uncertain and non-ergodic

Source: Author's elaboration.

a) Keynes's stance in debates

The classical notion of probability is objective in an infinite sample. All events have the same probability to occur unless something is defective. For instant, the cardinal probability of obtaining a six after throwing a dice is 1/6. This limpidness however, only occurs in pure mathematics or perhaps in physical atomistic phenomena, wherein knowledge reveals nothing and no human action is conducive.

In contrast, Keynes adopted in the "Adding-up problem" (1904) the doctrine of organic units as outlined by G. E. Moore, who in turn took this conception from Hegel. An organic unity is one wherein the whole is different from the sum of its parts. Moore

said that good is indefinable. Keynes then tried to sum goodness by adding up individual goods. This meant a rejection of methodological individualism. Keynes thus enunciated such macroeconomics principles as the fallacy of composition, which allows room for uncertainty (1936). The formula $f(x + y) = f(x) + f(y)$ only holds in special cases.

In "The principles of probability" (1908), Keynes attempted to extend the reach of logical argument by including those cases in which the conclusion is partly entailed by the premises. He also made an effort to align probability to ordinary discourse (to get the problem involved into a practical course of action).

In addition, real evidence is not identical to conclusive evidence. Either cogency or irrelevance differs from the dichotomy proof-not proof. The core of these insights is that probability is indefinable, but objective in a finite sample which allows room for decision making. If the game is about choice, the conception of the weight of the argument arises.

The weight of evidence is the rational tenet which makes people apt to decide when to stop the process of acquiring information. This means that numbers do not prove by themselves the veracity of a statement.

In *A Treatise on Probability* (1921) Keynes set the foundations of statistical inference in an unconventional manner. Probability is for him a logical ordinal concept about propositions between enunciates, which are objective and subjective. He urged to no convert probabilities into numerical probabilities, at least not all of them. No mathematical expectations are valid, whatever, since the future is not a continuation of the past. Probability is thus akin to similarity, becoming the foundation of radical uncertainty.

The notion of evidential weight was applicable to investment behaviors in Chapter 12 of *GT*. Both intuition and the adequate processing of information are relevant for taking decisions. It also has to do with both moral risk and rational judgment on conduct. Rod O'Donnell (1989[2]) and Athol Fitzgibbons (1988[3]), among others, consider that Keynes's approach to probability sets the behavioral, epistemological and ontological bases of the *GT.*

Our hypothesis is that, like in the case of capitalism or economic theories, Keynes denounced what he advocated in order to improve it. Section 1 deepens Keynes's insights on improvement.

Keynes's Empiricism: National Accounts and View of Econometrics

Some heuristic constructs of the Classical Economy have been criticized by many authors for being too abstract, especially those related to micro-demand theory. Conversely, Keynes's reputation partly rests on the operationality of his macro-models.

In particular, he made use of two quantitative targets for conducting empirical[4] investigation: national accounts, and econometrics and its debates. This analysis is the purpose of Section 1. In an Appendix to *How to Pay for the War* (1940), set the bases for undertaking a numerical account of its elements: consumption, investment, public expenditure, exports and imports as well as savings. These accounting models still dominate income determination and development policies in empirical

---

[2] O'Donnell, Rod (1889). Keynes, Philosophy and Economics (1989), Chapter 9.
[3] Fitzgibbons, Athol (1988). Keynes's Vision: A New Political Economy, Oxford: Oxford University Press.
[4] In the view of most members of the 'Locke Connection' only what can be measured is useful for undertaking decisions.

macroeconomics. According to Tily (2009[5]), in terms of national accounts, Keynes was a "theoretician, compiler, supporter and user" (Tily, 2009, Abstract).

The development of national accounts was further advanced by Colin Clarke (1905-1989), Simon Kuznets (1901-1988), James Meade (1907-1995) and Richard Stone (1913-1991), mainly in the late 1920s and the 1930s. Keynes collaborated with Clarke in the early 1930s. The first system of national accounts functions was that of the United States, being in operation since 1947. Keynes also left his imprint on the design of public budget statements. Uncertainty does not appear as an item in national accounts, but perhaps it may be measured in future interest rates or exchange rates, bearing in mind that national accounts stimulate the compilation of data on financial and socio-economic variables.

Realism and Econometrics

Keynes firstly criticized the pioneering models of Jan Tinbergen (1903-1994) in 1939[6]. He subsequently welcomed the use of econometrics for treating variables included in national accounts. This was especially true from 1943 on, when he moved from philosophy to expediency.

This type of research emerged from the theoretical scheme offered in *GT* about the components of aggregate demand or output. However, Keynes was methodologically opposed to econometrics because he believed in organic unities and in historical time –as opposed to logical time.

---

[5] Tily, Geoff (2009). "John Maynard Keynes and the development of national accounts in Britain, 1895-1941." The Review of Income and Wealth 55(2), pp. 331-59.
[6] Lawrence Klein (1920-2013) would claim that this empirical type of exercises aided to validate the Keynesian Revolution.

Keynes's critique is about the stability of the representative equations throughout both time and space. Other problems are those related to the selection of variables or their manipulation. He contended that a previous analysis of circumstances must be conducted.

Keynes maintained that induction is always difficult for justifying his aversion to the plain use of econometrics. His critique was that the behavior of variables throughout sub-periods is neither uniform nor homogeneous[7]. Keynes was concerned about the road not only about the end.

For him, human and social behaviors are mostly discontinuous and asymmetrical. Hence, Keynes rejected the unexamined use of mathematics and statistics for explanatory purposes. But he never supported the ruling out of econometrics. Shackle backed Keynes by stating that ignorance of the true Gaussian probability distribution might prevent economists from gaining knowledge in a dynamic environment. In this sense, both classical and frequentist probabilities are consistent with certainty.

What Keynes rejected the most was the use of mathematical formalism. Formalism may be related to the notion of economics as a set of atomistic mathematical formulas. Keynes argued that neither atomic nor closed systems exist in economies. He stated that accurate predictions cannot be the outcome of models based on Classical probabilities (*TP*, Chapter 5), certainty (*TP*, Chapter 8).

Econometrics measures the extent of dependence between explanatory and dependent variables under the assumption that certainty is useful for prediction. However, as the world is continuously changing, risk is not useful.

---

[7] Locke believed like Newton in the existence of uniform and homogeneous movements.

The anti-priori econometrician opposed the automatic assumption that *Y* is a function of *X* without previously resorting to economic theory or to plain facts. This stance was also related to the choice of contextual narratives over logical economic interpretations.

The debates

The Keynes-Tinbergen debate occurred between 1938 and 1940. Keynes ascertained there that results have little value since methods must be tested beforehand. Tinbergen answered in a Friedmanite[8] style that results are the 'definitive' proof.

Keynes also conducted a critique of econometrics not only in terms of the assumption of independence between two variables but also wondering why the relationship between *X* and *Y* must be linear.

Keynes evaluated the twin assumptions of homogeneity in variables (whether *X* and *Y* are comparable) and their synchronized movements (whether *ΔX* is comparable to *ΔY*). This also was a critique of Walras's economics. There systems of linear equations about *n* markets explained by *n* variables provide results without considering uncertainty.

Moreover, it was necessary according to Keynes to know beforehand what the causes for choosing variables and parameters are, and to identify whether they are measurable. This is true today when many researchers oftentimes lack manageable data.

---

[8] Friedman was not concerned about assumptions but about results but was also against excessive formalism in economics.

Another critique was that econometrics measures equations with path dependence and lags (explaining *Xt* as function of *Xt-n*), but it is obvious that a variable behavior is influenced by its past path.

The most important critique of econometrics is however, that Tinbergen conducted inductive generalizations (from *X* to *Y*). Keynes's view - partly derived from Hume's skepticism - was that no intermediate steps must be taken for granted.

Keynes ascertained that observations must be scattered across subsequent periods, thus the analyst must consider both stable and unstable moments. The number of observations must be large, and the exogenous and endogenous variables (*X* and *Y*, respectively) must be identified by way of economic analysis.

Tjalling Koopmans (1903-1985) provided in 1941 a more systematic logic of the methods employed, perhaps recognizing the role of the expectations and the state of confidence in macroeconomics.

Trygve Haavelmo (1911-1999) eschewed many of these methodological problems in 1943. Thus, Keynes's critique in his communication with Harrod (Keynes, 1938e) contended that generalizations are difficult to believe and that prediction is an uncertain task. This is the mathematical version of his phrase: In the long-period we all are dead.

In Neo-classical models, econometrics relies on axioms and certainty. But no axioms exist in social science since phenomena are organic, according to Keynes. Uncertainty is absent in the IS-LM model, but also in conventional econometrics since the heterogeneity of variances might be present.

Uncertainty is also normally neglected as it breaks the Classical Gaussian statistical core[9]. Conversely, for Keynes errors are systematic and qualitative.

He conducted along the way a critical assessment of Edgeworth's work, who attempted to quantify economic events in the way physics is mathematized. He also defined economic science as a mode of thought, which means that it is more than the advocacy for a manual comprised of rigid rules (Keynes, 1938e).

However, Keynes conceived in *GT* his psychological consumption function ($C = Ca + bY$; where Y is output or income, and *Ca* is autonomous consumption) in mathematical and aprioristic terms, the marginal efficiency of capital in marginal terms and the money demand function in deterministic terms.

Finally, Keynes required econometric assumptions to be precise. This vision arose from his attempts to unify theoretical and empirical approaches in terms of the struggle against unemployment and polarized cycles, leaving a message of epistemic and practical moderation, which is now outlined.

The Epistemology of A Treatise on Probability (TP) (1921)

This Section deepens Keynes's conception of probability as a logical (objective) relationship between propositions rather than between numbers or events. The purpose is to demonstrate how Keynes's core in statistics is different from the Classical.

A Newer Conception of Probability

---

[9] This mistake is committed by conventional financers who do not distinguish between risk and uncertainty.

Keynes wrote in *TP* that decisions do not rely on mathematical expectations. He departed from Hume's claim that induction is an insufficient method for knowing something by departing from its premises. Thus, Keynes was involved in the study of the logical steps by connecting assumptions and implications in proposals.

Keynes contributed to the foundation of logical probability coming from a morals source: he did not believe in Moore's individual act-consequentialism. For Keynes's, Moore conception had a bearing on choice, but one which must not be reduced to the calculation of quantities or the aprioristic expectation of results.

Keynes believed in human logic rather than in formal logic (Fitzgibbons, 2001), so uncertainty and expectations were highly relevant in decision-making. In that sense he opposed the rational apriorism of both Descartes and Kant, the continental route from truth to cogency.

Keynes would be on the side of the Locke Connection embedded in the usage of empiricism, but after giving a pre-eminent role to thoughts about options.

Revisiting notions of Probability

The first but ultimate approaches to probability are the Classical and the frequentist, suggested by Jacob Bernoulli[10] (1654-1705) and by Pierre Simon Laplace[11] (1749-1827), both of them being based on the principle of insufficient reason. Events can happen without opposition, with almost 50 percent probability, and repetitions can occur under similar conditions.

[10] Bernoulli, Jacob (1713). Ars Conjectandi. Opus Phostumum, Basel: Thurnisii Frates.
[11] Laplace, Pierre S. (1820) [1923]. Théorie Analytique des Probailités, Paris: Courier.

No choices exist, since sampling is mechanical. In a distribution, numerical probabilities (1/*n*; *n* = number of events) approach the mean, and variances (σ^2) are small and infrequent. The Classical economists believed in this scheme since for them the system is self-regulating. Both Classical visions assume homogeneity in events. The addition of probabilities of occurrence within a single event must amount to one.

The second approach to probability was suggested by John Venn[12] (1834-1923), who was not foreign to Keynes's family. It is akin to the Classical view, but related to the limit of relative frequencies of occurrences of an event (for instance, in dices experiments).

It results in a sampling that must approach 50-50%. This method is about probabilities between events rather than between numbers, being suitable to the physical world rather to an ideal platonic world as in the Classical approach. Events in this view are ergodic (repetitious) in Davidson's terminology (Davidson, 2003[13]).

Enter Keynes

Keynes would propose a third option. He criticized static standpoints in the examination of probability in social events. His perception of probability was purely logical at that moment (see Section 3).

Keynes suggested the use of a non-additive and non-linear approach for measuring probability with a mathematical foundation, but it was not a mathematical

---

[12] Venn, John (1866). The Logic of Chance, 1st ed., London and Cambridge: MacMillan.
[13] Davidson, Paul (2003). "Is 'mathematical science' an oxymoron when used to describe economics", JPKE.

relationship. Still he made probabilities function in a way that is fitting for decision making.

A logical probability between propositions (hence related to human knowledge) is 'frequently' non-numerical, but ordinal. For Keynes, epistemic (objective) probability was at that moment associated with inductive and intuitive (subjective) probability.

Keynes thus suggested a third approach: the logical-objective interpretation of probability. Here events exhibit asymmetries and heterogeneities arising from distinct objects and results of either observation or experimentation.

That is, sampling is non repetitious in the sense that conditions are different in each experiment (as happens in the social sciences). Truth is independent of opinion. The idea for a decision-maker is to draw conclusions from premises, assuming strong grounds: the weight of evidence (to be explained below).

Hume attacked induction by affirming that the number of samples in an experiment is finite, and hence it does not allow us to tell if a result is definitive at any given point, as subsequent observations or experiments might deny former truths.

Keynes justified validity in statements by means of induction, but this would lead to overstated subjectivism, although he did not realize this at the beginning. He aimed to solve the problem of inability of inferences in induction by stating that probability possesses varying degrees of evidence.

Thereafter Keynes contended that if evidence is augmented in any proposal, probabilities increase so that induction might be justifiable, albeit provisionally.

Keynes would later include a subjective dimension (Section 3). At a later stage he would validate inferences by resorting to convention both in 1936 and 1938[14]. This is the milieu of the notions on probability.

Deepening matters

In Keynes's logical initial approach, the roles of intuition, certainty, convention and context were relevant to examine the role of induction. However, for him, the cause-effect dichotomy was also related to both sensation and association.

Hence no empirical reality could be the foundation of a universal law, since Hume affirmed that the relationship between cause and effect is the result of custom leading to the blind application of universal laws for the verifiability of results.

Intuition is a faculty that must be followed by intelligence, for the sake of capturing the dynamics of organic unities. But induction is *a-posteriori* knowledge, being asymmetrical. Thus, the inductive method is akin to uncertainty.

Probability theory was for Keynes based on degrees of belief as the tool for inductive logic. His probability thus was cardinal, wherein induction drove and made causal reasoning flexible. The process of reasoning was also based on analogy.

Probability and expectations (based on organic unities and uncertainty) are interrelated. Keynes thus challenged Hume's skepticism by ascertaining that the mind is active in perception, attempting to ground knowledge starting with probability. This is 1921 but the road was paved for eventually arriving at a partial subjective view of probability (Section 3).

---

[14] It reflected a change of view as in 'My Early Beliefs' (1938), wherein he accepted traditional views.

Returning to objectivism, the first step to obtain knowledge is to consider all events as probable so that the notion of probability must be widened. In his effort to embed the foundations of probability to logical prescriptions, he stated that probability must capture the degree of belief in a proposition, given inconclusive evidence.

The second step was to destroy the applicability of the frequentist quantitative approach by contending that numbers do not explain the essence of propositions. Heuristic explanations based on numbers are only suitable for deterministic cases confined to closed systems.

This was his reasoning process about human conduct under limited knowledge. The repercussion is that probability, the logical relationship between hypothesis and evidence, provides only partial veracity. He thus progressed from finding the truth to grounding knowledge, albeit only in method since knowledge always varies.

Keynes versus Classical probability

Probability is hence the degree to which arguments are provisionally conclusive. Heretofore probability is visualized as non-deterministic. This is why functions in probability[15] are different from those belonging to other statistical procedures such as hypothesis testing[16].

But probability was also a degree of rational belief. Thus Keynes's conception represented a step beyond both pure intuition and pure induction, since these two

---

[15] Hence, Keynes advocates discretion in the use of policies, discarding (deterministic) rules.

[16] Keynes is critical of statistics for its reliance on the interrelated premises of atomism in variables, data independence, random errors, and that the present is a continuation of the past. No Gaussian curve of probabilities exists for him.

methods of knowledge are intrinsically aprioristic, despite their Kantian or Cartesian sophistications.

In the basic relationship between hypothesis (premise "*a*") and conclusion (evidence "*h*"), the issue is how to conduct a valid inference process, the so-called Humean problem.

Keynes extended the reach of this process by asserting that all phenomena can add new information at every instant. Probability then is non-demonstrative, being thus correlated to uncertainty. *TP* explained the root of Keynes's complex and fuzzy epistemology;he did not claim at that stage that universal induction yields certainty.

Induction is the estimation of the validity of observations as evidence for a proposition. But since social science faces the problem of generalization from observations, a proposition can never be definitively demonstrated. Induction is only valid in a universe with finite probabilities, which is seldom the case in real life.

Keynes initially advocated for intuitionist epistemology since he considered it more relevant to knowledge acquisition than Locke's or Moore's sense experience.

Thus, he overcame the basic paradigms of understanding: the empiricist, wherein external coherence, post-interpretation, and open systems play a vital role; and the aprioristic, wherein internal coherence, pre-interpretation, closed systems, invariant laws, and analogies prevail as they do in the physical sciences.

Further, in 1921 Keynes did not believe in the unsophisticated Benthamist utilitarian calculus, which is a form of action grounded in the Classical frequentist approach. In *TP*, Keynes contended that probabilities clarify how agents may conduct decision

making under uncertainty, thereby criticizing Mill's categorization of cardinal hedonism.

His logical consideration became the benchmark for detecting the appropriateness of actions in an interdisciplinary context, but good choices must have an ethical background. For Moore common sense was grounded in certainty, while for Keynes it was based on probability.

Hence, *TP* offers insights about the nature of the spontaneous actions conducted by animal spirits, who may avoid unexpected results by measuring logical probabilities. Keynes's probability was thus linked to efficacy.

Intuition bears the distinction of not being susceptible to proofs. But Keynes rejected illogical or inherited arguments and categories in *TP*. Instead, he placed individual judgment (discretion) at the core of decision making at the expense of rules.

Moreover, judgments and beliefs based on probability must be connected to action, unlike in Moore's metaphysical vision. Perhaps Moore considered that probability cannot be connected to applied knowledge due to the existence of certainty in closed systems.

Additional views on Keynes's notion of probability

According to Zappia (2012[17]), *TP* attempts to avoid physicalism in knowledge and to give sense to moral principles. A second critique Keynes had of the frequentist approach is associated with the magnitude of the probability of the argument.

---

[17] Zappia, Carlo (2012). "Re-reading Keynes after the crisis: probability and decision," Department of Economics University of Siena 646.

Information must be both efficiently obtained and processed, and the difference between a probability assessment and its degree of confidence cannot be found in conventional statistical approaches.

Confidence is at a higher level of epistemic knowledge than frequency[18]. For Zappia (ibid.) the third part of Keynes's criticism was his refusal to use mathematical expectations as they ignore the weight of evidence. Not all events possess the same level of frequency ($\sigma^2 s$ fluctuate across experiments).

Whenever information is vague the frequentist approach is inappropriate. Keynes relies on qualitative orders, wherein non-numerical probabilities (representing most events in real life) are analogous to probability weights. This heuristic understanding leads to moderation.

For Zappia (2012), normal probabilities are represented by the formula: E = pA, whilst Keynes's formula was: E = cA, where *E* = expectations; *A* = event; *p* = probability; *q* = non-probability; c = p/1+q. Thus, Keynes classified the maximization of expected utilities as a special case and as transient one. Further, expected value is a valid guide only when confidence is at a maximum.

Keynes thus employed degrees of belief in the place of what used to be called a-priori possibilities. Keynes went further because the degree of belief covers a spectrum rather than being restricted to the dual decision of the robotic world[19], or to numbers.

---

[18] Keynes still sustains in 1921 that individuals undertake personal choices, just like in the "atomist" Classical and Marshallian schools, without internalizing information on social conditions and preferences.
[19] The black-and-white view of the world corresponds to either physical facts or paranoid minds.

Since the degree of belief assumes intensities of intentionality in a world dominated by uncertainty, his contentions in 1921 presupposed a flexible conception of both time and space.

The 'Apostle' William Ernest Johnson (1858-1931) influenced Keynes with respect to inference. But Johnson assumed homogeneity among events and emphasized the relevance of calculus. He referred to exchangeable sequences of random variables, meaning that there only is a finite sequence of them, like in atomism.

Obviously, this contention set limits to the use of independent and identically-distributed random variables (σ is constant in an experiment) and the inductive hypothesis could fail. This procedure may provide invalid results in the presence of organicism and its elements: heterogeneity and asymmetry.

In his youth, Keynes relied on the principle of indifference when designing the scheme of logical probabilities among proposals, but this was corrected when he considered the weight of evidence. People do not make mechanical choices.

Under this scheme the rules of probability are logical deductions from one's own perspective rather than from deterministic axioms in closed systems. To sum up, for Keynes proposals must be logically related in order to make sense under uncertainty. But humans do not always employ logic and something was still missing. He would turn to subjectivism. From that point forward he would be in favor of inter-subjective objectivism as explained in Section 3.

A brief interlude

Yet from another perspective Keynes's notion of uncertainty is relevant in epistemic terms. A core is the philosophical basis of a school and defines its positive heuristics,

both of which comprise his Scientific Research Program which can be either progressive or degenerative.

Keynes's core in Lakatosian terms (Lakatos, 1974, 1983[20]) claims reform by means of his system characterized by organicism, irrationality, animal spirits, qualitative analyses, non regulating systems, and a new definition of economics as the science of decision taking under uncertainty rather than under scarcity.

Returning to his letter to Harrod (Keynes, 1938e), there Keynes offered a contradictory definition of economics. Economics was both a branch of logic and a moral science. This part of Keynes's core is compatible with both his modification of the notion of probability and rejection of the indiscriminate use of mathematics.

Frank Plumper Ramsey (1903-1930)

The contribution of the late 'Apostle' Frank P. Ramsey (1903-1930) to Keynes's work on probability was vital. Ramsey convinced Keynes of the relevance of the subjective dimension for the selection of those criteria apt for decision making in an uncertain realm.

Ramsey criticized Keynes's purely logical -objective- approach to probability. This stance is considered a healthy underpinning of Keynes's objective and subjective approach to probabilities calculus.

Ramsey criticized Keynes's Kantian-type logical probability relations, since even in the light of objective facts individuals may attribute different probabilities to distinct

---

[20] Lakatos, Imre (1974) [1983]. La Metodología de los Programas Científicos, Madrid: Alianza Editorial.

events. Ramsey was correct. Keynes however was right in realizing that probability is related to the logic of proposals.

Since information is uncertain, all humans can do is being reasonable in an irrational world. But Keynes's uncertain factors affecting human behavior might be captured by understanding the subjectivity embedded in probability choices. This was Ramsey's advice. For García Duarte (2007), Ramsey's distinction between formal and human logic[21] had an influence on Keynes. Ramsey was, arguably, more interested in perceptions than in evidence both as the origin and proof of knowledge.

On reflection, Keynes accepted Ramsey's subjective notion of probability in the weight of the argument, since even though objective knowledge was related to rational judgment, both introspection and values mattered as well. The individual mind was an organic unity for Keynes.

But individual thought may still be receptive to other thoughts according to both inter-subjectivity and the principle of uniformity. Yet individuals are dissimilar in experience and circumstance generating unexpected behaviors and intentions as the result of events.

Keynes hence questioned the theory of the representative individual in economics but accepted it as the unit of analysis in probability, epistemology and ethics in 1921. Keynes the eternal compromiser wondered again at this epoch what was the sense of the roles of intuition and induction.

Eventually he embraced to a certain extent Ramsey's subjective approach believing that logical associations of proposals deny the possibility that algorithms may

---

[21] It is captured in the notion of conventions for him since 1936.

represent the way in which human beings think beyond utility maximization. Human choices are qualitative, as exemplified by degrees of belief.

Ramsey had written about uncertainty based on subjective probability when he was a member of the 'Apostles' (1921-1929). According to García Duarte (2007), Ramsey wrote his first criticism of TP in 1922 on philosophical judgment, based on Moore.

For Ramsey, the best alternative to rigid mathematics was to gamble with expectation; in other words, he championed a subjective ex-post approach to probability. In reciprocity, Keynes explained to Ramsey the advantages of intuition.

Radical uncertainty makes economies unstable and prevents them from rapid recoveries, because insufficient knowledge translates into a lack of efficacy, and the remedy is to rely on probability.

Hence, for some writers the foundation of Keynes's economic thinking was outlined in TP as a reaction against Moore's notions of common sense, utilitarianism, rationality, and his implicit belief in frequentist probability.

Keynes argued that the Classical and the frequentist approaches were non-applicable in a complex world. Keynes's weight of the argument is backed in the theory of groups, which renders it inter-subjective.

Finally, Ramsey recommended that mathematics needed not to be used at each and every opportunity. For him, the results delivered by numerical models must be simple, interesting and not obvious. He wrote that evidential weight, information and knowledge could arise at a reasonable price.

Conclusion

Keynes preached the rational use of mathematics, whereas his conception of probability was innovative. Although Keynes opposed the unrestricted use of econometrics as a general rule, he made that science to become more advanced through his creation of macroeconomics.

The implication is that either unexamined econometric formulations or a-prioristical mathematical applied economics rests on shaky foundations in terms of unexamined applicability, not of rationality.

Our contribution is that Keynes´s attitude to mathematics is the same to those he made to rationalism, individualism, fixed rules or logical time: he urged either reserve or moderation, and hence methodological reform.

It is shown here that Keynes's notions of probability, econometrics and mathematics reflect his Lakatosian core. Keynes's notions are hereby linked with other events in Keynes's life. The attempt to unify his philosophy may clarify his reform to the use of quantification.

Some conventional uses of mathematics on the part of Keynes were highlighted here as an additional contribution, for example his marginal propensity to consume, but those were the exceptions confirming the rule. He might have undertaken this approach in *GT* for the sake of simplicity.

The practical implication of this analysis is to use mathematics moderately and rely on observation, facts, logic, experience and economic theory before doing statistics.

The ongoing debate about the relevance of mathematics in economics between Davidson and O'Donnell is whether the bases of ergodicity (non repetitious, discontinuous events) are ontological or epistemological. Our view is that Keynes´s view was epistemological, but both perspectives are interrelated.

The debate about the use of mathematics is alive. For example, all stock exchanges quantify longitudinal behaviours, but ignore differences in financial penetration the social meaning of finance, or the weight of evidence.

Finally most students of economics must cope with many courses on mathematics at the beginning of their careers. The advice is to do math, especially discrete mathematics, but not solely math.

References

García-Duarte, P. 2014. Frank Ramsey (October 7, 2014). The Palgrave Companion to Cambridge Economics, (forthcoming). Available at SSRN: https://ssrn.com/abstract02506786.

Keynes, J.M. (1921) 2004. A Treatise on Probability, NY: Dover Publications. ISBN 978-0-486-49580-4.

Keynes, J.M. (1921) 2015. *A Treatise on Probability*. In *The Essential Keynes*, introduced and edited by Robert Skidelsky, Chapter 5, London: Penguin.

Keynes, J.M. 1940. How to Pay for the War. Digital Libray of India Item 2015.49957, archive.org.detail.

Keynes, J.M. 2007. "Professor Tinbergen's method," *Voprossy Economiki*, N. P. Redakstya zhurnala "Voporosy Economiki", vol. 4.

Keynes, J.M. (1904). 2015. "The adding-up problem" In *The Essential Keynes*, introduced and edited by Robert Skidelsky, Chapter 3, London: Penguin.

Keynes, J.M. (1908). 2015. "The principles of probability" KP 20D. In *The Essential Keynes*, introduced and edited by Robert Skidelsky, Chapter 3, London: Penguin.

Social and Solidarity Economy: A Quest for Appropriate Quantitative Methods[1]

Irene Sotiropoulou

Energy and Environment Institute, University of Hull

✉ irene.sotiropoulou@gmail.com

Abstract

The paper sets the conceptual and practical framework for the use of quantitative methods in research in Social and Solidarity Economy (SSE). The quantitative methods we have in economics at the moment are not appropriate for understanding SSE in terms of quantity and this creates limitations for understanding the activity but mostly for knowledge exchanges between researchers and practitioners. The quest for appropriate quantitative methods has been an emergent trend in several fields of activism, policy making and research, like gender equality, indigenous environmental knowledge but mostly sustainability, both environmental and social. Within this general framework, the papers focuses on SSE activities that do not use official currency, like: parallel currencies, exchange networks, free bazaars and online networks, and various solidarity initiatives, like social kitchens, social clinics or collective cultivations.

The people involved in the SSE choose to explore quantities that go unnoticed in mainstream quantitative methods. Their discourse and practice is full of quantitative understandings, which are basic for the entire activity to take place and be successful in its terms, but they elude completely the quantitative understandings and methods we have at the moment in economics or other social sciences. The paper draws examples from international literature but mostly from the author's research on this type of economic activity in Greece. The author has experimented through her research with the concept of quantity, the alternative ways of collecting quantitative data and constructing questionnaire/survey questions and the possibilities of using other approaches of quantity in economic research.

Keywords: quantitative methods, Social and Solidarity Economy, grassroots initiatives

JEL codes: B4, B5, C00, P4, P5

Introduction

The paper sets a conceptual and practical framework for the use of quantitative methods in research in Social and Solidarity Economy (SSE). Using examples from field research findings and from social movements, I explore how other perceptions of quantity and measurement are practiced within a variety of communities that (try to) defy the settings of the mainstream economy.

The main issue is that the quantitative methods we have in economics at the moment are not appropriate for understanding SSE in terms of quantity. This lack of appropriate quantitative methods creates various limitations for deepening our knowledge of SSE. It also prevents us from improving the knowledge exchanges with SSE activists and practitioners, as well as with other decision-makers and stakeholders of the SSE.

The next section presents the quest for appropriate quantitative methods in literature and practice, and section three examines the SSE initiatives that do not use official currency and constitute the subject matter of this paper. Section four examines the quantitative tools that are available till the moment for understanding the quantitative aspects of those grassroots SSE initiatives and section five presents some explorations in appropriate quantitative methodologies. How the field research findings create a need for appropriate quantitative tools is discussed in section six and the directions for further research are presented in section seven.

The quest for appropriate quantitative methods in literature and practice

Feminist theory has been the most prolific source of critique concerning how quantity is perceived in contemporary capitalist societies. In patriarchal societies particularly in capitalist patriarchal societies, quantification and valuation of economic activity is constructed in ways that erase essential contributions to the survival of human societies. Work for production and social

reproduction, usually done by women and other discriminated social groups, is considered to lack value. When it is accepted that it has value(because the same work needs to be paid for in the market), this value is the minimum possible, leading whole sections of the labouring population to underpayment, poverty, overwork and deplorable working conditions. Similarly, the contributions by nature are erased through the same technique, i.e. attributing no or very low value to nature's offers and work, and through the assumption that nature is a passive entity that requires human work to become productive.

This assumption is also assigned to women and other exploited social groups, through their association with nature. The poor, the colonised peoples, the indigenous peoples, the people who do not abide with the heteronormative rules of patriarchy, are considered unable to produce adequately on their own, but need the intervention, supervision and management by the "truly productive" economic man (middle class, white/Western European descent, heteronormatively behaving, without social responsibilities) who alone is "burdened" with making nature and the subordinate groups productive. Through this construction, the labour of the economic man is deemed productive, i.e. creates and is entitled to value and accumulation of wealth (Waring 1999; Won Werlhof 2007; Picchio 2005; Scholz 2014; Dalla Costa & James 1975; Federici 2013; Eisenstein 1979; Bennholdt-Thomson et al 1988; Albritton 2003).

Environmental and ecological economics have tried to address those issues, each field with their own assumptions, which are linked more or less to how capitalist patriarchal economies can cope with the fact that environmental degradation and the abuse of nature cannot be resolved through the contemporary economic system. Although ecological economics have taken a more radical stance of critique to capitalist profit-seeking at the expense of nature, they also ended up to understand values of nature as possible to be calculated in human currency. They were under pressure to do this in order to have natural resources compared to the values of other socially-constructed

assets. The ecological services approach and the notion of natural capital took the argument even further, allowing for metricisation of nature according to the quantifications that mainstream economics and capitalist markets recognise (Daly and Farley 2011; Burkett 2006; Goerner et al 2009).

Approaches full of potential, though, come from local communities who have a strong tradition of non-capitalist and non-Western European societal backgrounds and histories, like the societies in New Zealand, Bhutan or Canada. In some cases, they use values other than capitalist and/or patriarchal ones as prominent criteria to assess economic activity. In other cases they try to combine local values with mainstream (monetary) valuations. Social movements who resist the degradation of their areas by extraction industries also enter boldly the discussion of what value is (Anielski 2007; Anielski and Soskolne 2002; Alkire et al 2012; Colman 2008; MacPherson 2014; Sotiropoulou 2016c).

In all those cases, we have seen attempts to represent quantitatively and account for values that are marginalised in the mainstream economy. My position is for using other valuations than the capitalist-patriarchal ones. From our historical experience so far, devaluing and/or monetising nature or basic reproduction activities led to a severe social reproduction crisis on global level and have not resolved environmental problems that were supposed to be efficiently handled through market-based solutions (Barker & Feiner 2010; Caffentzis 2002; Ehrenreich 2002; Kurz 2014; Peterson 1997; 2010; Trenkle 2014; Burkett 2006). Accounting for the value of the oceans in USD, for example, does not make oceans more respectable or more valuable for capitalism and patriarchy. Instead, it makes them quite comparable to the much higher monetised value of financial assets held by wealthy countries and corporations. Capitalism-patriarchy-oriented valuations do not account for the fact that without alive oceanic ecosystems, human societies cannot survive (Eisenstein 2016; Burkett 2006).

We always need to bear in mind that quantification and measurement are, within certain frameworks, linked to violence (Graeber 2011). Non-quantification and vagueness might also be linked to violence. For example, not measuring medicine quantities used for treatment or avoiding measuring, even in approximation, the quantities of water, soil, seeds and labour used in cultivation might lead to dangers unsuccessful medical treatment and lost harvests. It is important, therefore, to take into account the context of each social relation, the character and aim of each use of quantification and the specific conditions of the beings and social relations that quantities are supposed to represent (Espeland & Stevens 2008; Olsen 2007).

SSE initiatives that do not use official currency

Within this general framework, the paper focuses on SSE activities that do not use official currency or use it to a very limited extent, which for the purposes of this paper I call "non-mainstream modes of production, transaction and distribution". Some of those ways of production and distribution arrange productive efforts in ways that allow people to organise their production collectively and to share their produce among themselves and with other people. In some cases, the sharing takes place without asking immediately for any reward. In other cases, the contribution back to the community or to the people who offered their produce and effort, is arranged to take place according to rules which allow variability of the new contributions. The quantifications used by SSE initiatives that avoid official currencies is one more example of social movements wanting to redefine values in ways that do not harm nature and human communities (Daskalaki et al 2018; Sotiropoulou 2016b, 2017).

The types of the activities examined are the following: Parallel currencies are those accounting units that are created by the users themselves and they are used in their transactions instead of the official currency. Time banks are a type of parallel currency where the accounting unit is an hour of time, irrespective of the content of the work involved. Exchange networks are collective

arrangements where people transact without the use of a collectively set accounting unit or without the use of accounting unit at all. Free bazaars and free networks are initiatives where people give to other people things that they do not need and they take things they need. Solidarity structures like social kitchens, clinics or educational initiatives are those which produce and provide for free necessities like food, healthcare and education, through collective arrangements of people who work together to make this provision possible to their communities. Similar organising is used in collective cultivation groups, where people cultivate land together and share their produce in the same manner (Sotiropoulou 2012a; 2016a; 2016b).

There are also other solidarity activities during emergency situations, like grassroots efforts to support refugees and people who have been affected by severe disasters. In this latter case, the effort is not strictly localised by definition, as resources and support need to be mobilised from one area or region to another.

Quantitative tools that are available for SSE that does not use official currency

It is understandable, when the discussion or debate is about SSE, that decision-makers first demand to know the economic volume of the activity. By asking about economic volume, they usually expect numbers in official currency. Decision-makers got accustomed to use GDP as the main way to understand the economic activity and prosperity of a society. Therefore everything needs to be related to GDP and some other basic indicators, like poverty line, unemployment and employment rates (Waring 1999; Anielski 2007; Colman 2008). In that way, SSE is forced to be reduced to those same indicators in order to become a "legitimate" topic of public discourse.

As it has been explained in the previous sections, the problem is that GDP, unemployment rates and other indicators of capitalist-patriarchal valuations are

inherently flawed. This means, that SSE is incorrectly assessed in quantitative terms, because its participants do not seek profit or even if they do (like a small farmer trying to sell her fruit in a parallel currency market) this is actually subsistence-oriented. Subsistence orientation of profit making means that the producers might make a profit that will be invested in her own and her family's survival, just like small farmers do, even when they appear to "seek profit" in an official/capitalist money market (Bennholdt-Thomsen and Mies 1999). The reason is that SSE includes activities who aim to social reproduction and not to accumulation of capital. Not accumulating capital in a capitalist-patriarchal economy means by definition less value assigned to the labour of the people involved in the activity, less income for them, and less share in the GDP.

This is even more acute in the case of SSE activity that is done without monetary (in official currency) or any other reward, because their work is both reproduction work and not monetised. Moreover, using official currency units for accounting activities that do not use official currency or they are structured beyond the strict rule of immediate and/or exact remuneration/reciprocity, distorts both the understanding of the economic activity and the researchers' ability to support or cooperate with SSE practitioners. This becomes an even bigger issue especially when the practitioners ask for expert support or when they want to negotiate with authorities and decision-makers.

What the SSE activity that does not use official currency can teach us, is that we can avoid the impasse the ecological economics have created for itself. We can start valuating and quantifying our SSE activities starting from what we think is of great value to us, to nature and our communities. We can definitely think of quantity and measuring in ways that respect our principles and serve the aims of the activity itself. That does not mean that all grassroots SSE initiatives are always successful in avoiding mainstream quantification and injustices. It does not mean either that non-mainstream quantifications alone are enough to shield SSE from exploitation practices and unfair valuations from being reproduced under the umbrella of non-profit seeking. However, grassroots SSE

initiatives include a wide range of economic activities where other, more socially and environmentally just valuations and quantifications can be tried, experimented with, refined, critically assessed and improved.

Accounting or measuring in official currency can only be a tool for comparisons, because the mainstream economy where the official currency is used, is full of inequalities and exploitation structures. For example, we can compare prices of economic activity in official and in parallel currency to check whether parallel currency schemes provide the benefits they aim at. This is an approach that is used very effectively to check the purported benefits of nature-friendly practices when performed in a capitalist setting (Seyfang 1997; Konstantinidis 2018; Sotiropoulou 2015a).

Nevertheless, many aspects of the SSE activity without official currency cannot be perceived through currency terms at all. The value of food donated to a social kitchen by people who cultivate organically not for selling but for their own consumption, cannot be assessed in market terms. Participants in my research kept telling me that they stopped considering the mainstream market for their produce because their produce was such good quality, that they had to either sell it at a very high price, accessible to very wealthy customers only, or sell it at bulk prices corresponding to much lower quality products. As a consequence, they preferred to distribute their produce as a gift or within grassroots SSE networks.

Another example is the effort contributed by participants to their group and to the initiative they are part of. How do we understand this effort in terms of quantity? Using hours would give us one important but quite reductionist tool, especially because a lot of grassroots work is done in parallel with other activities of each participant. No doubt, a time-use survey is yet to be done concerning this economic activity. What about the character of the effort contributed? Being involved with a grassroots economic initiative might entail not only contributions in kind; but also labour of all types, plus "political work"

to keep the initiative running, attend assemblies or negotiate with other members, other groups or local authorities; and emotional-affective work, which exists in all types of human activity, but in this case, given the heterogeneity of backgrounds of the people involved, it is increased and intensified (Sotiropoulou 2016a).

Several types of labour being performed at the same time have been one of the major setbacks or accounting problems of time-use surveys (Budlender et al 2008). Additionally, the people in grassroots SSE initiatives understand time in various ways, linked to seasonality of production or to the variation of life cycles. In most cases this understanding diverges from the mainstream (capitalist) perceptions of time. Quantifying SSE labour in terms of hour-time does not make justice to those various grassroots approaches and to their understanding of time. It does even less justice to the physical and mental exhaustion such involvement brings. Much less does it appreciate the skills needed in order that a person be effective and well-coordinated with the other members of the group. We cannot reduce an entire production and distribution process or mode into one of its aspects only, even if this aspect is as important as time.

The efforts of creating quantitative tools for assessing local and/or indigenous well-being can be a very good source for SSE to get ideas from. It can be one of the tools to be used in order to assess whether for example, a social clinic has truly helped the local community's health conditions without deteriorating the living standards of the health workers who might perform two work shifts (one in paid job, one in the social clinic) in order to keep the people in their communities healthy. Quantifying well-being is not something that I do not see with reluctance, given that the general social-economic framework is capitalist patriarchy. Moreover, given the specificity of the SSE initiatives, each one of them would need certain only, and possibly adapted, quantity-approaching tools rather than the general community well-being tools that have been constructed without having SSE in mind. However, there is a lot of potential in those approaches, if not for other reason, but for examining whether the use of

each indicator led to better decision-making for the people whose life aspects are represented by a specific well-being criterion.

Explorations in appropriate quantitative methodology related to SSE initiatives

I share the critique against the mathematisation of economics and how the quantification of social sciences has distorted not only the data analysis as such but also the formulation of questions of social research. Therefore, the qualitative methods and the anthropological or ethnographic approach of this economic activity seemed appropriate, and it still is adequate and necessary for researching the SSE. Qualitative methods revealed a quantitative world that does not exist in economic textbooks and when a glimpse of it exists in anthropology or other social sciences, it is marginalised as non-economic or, if economic, as non-quantifiable in economic terms (Waring 1999).

However, qualitative methods themselves are not enough. This I learned very early in the field because the issues of methodologically and conceptually understanding quantity in grassroots initiatives appeared from the very beginning in my research. The lack of a related debate in parallel currency literature and the under-researched field of contemporary non-monetary economic activity just made my quest even more difficult.

The more I am working on this field, the more I am persuaded that there is a dire need for appropriate quantitative methods. With appropriate quantitative methods, I mean methods and approaches to research quantitative aspects of the activity under examination that would reflect the realities of the grassroots economic initiatives themselves. Those approaches and methods would (or should) also be useful for the communities themselves to use in case they want to have a better picture of their own activity and answer their own questions with or without mediators from academia.

After a lot of reflection I decided since 2009 to follow the path of quantification and measurement that my research participants were using. That was a very tricky path and the decision did not make the research any easier, quite the opposite: it left it and me without quantitative tools to use, and with amounts of data that might mean a lot or not much, depending on the quantitative analysis one can do out of them. What this decision made clear though, has been the variety of approaches and ways of thinking that people involved in non-mainstream transaction and production modes have to understand quantity (Sotiropoulou 2012a, 127-68, 169-244).

As interim solutions, I opted for

a) The creation of a questionnaire survey for my PhD research that asks questions about quantitative aspects of the grassroots economic initiatives, in ways that the participants themselves had depicted as meaningful. The survey (in Annex C of the dissertation and available online) gave back 331 filled-in questionnaires (Sotiropoulou 2012a, 169-244, 315-36).

b) The collection of price data from the open markets of parallel currency scheme for about 17 months. I did the price data collection myself. I was also trying to specify the amount of hours people needed to produce what they were selling and whether they needed other inputs, especially inputs from the mainstream economy (Sotiropoulou 2015a).

c) I also started "following" the quantities as "taught" by the participants and developed practices of counting in many ways and understanding quantity in various manners. This gave me a variety of data and examples of methodological ambiguity. It also persuaded me that there are no ready-made answers and solution, therefore I needed to reflect and study more on possible quantitative tools for the SSE activities.

The case for fuzzy statistics and non-linear, fractal approaches to grassroots economic activity

Seeing my research to lack effective analytical tools of quantitative nature, I turned into exploring the possibility to use fuzzy statistics or fractal mathematics. One reason is that understanding quantities as those described in this paper was impossible though the mainstream economic quantification tools that are based on official currency monetization of the economic activity. Those same tools required precision in that same official currency and other quantities (like the weight of the produce allocated through the grassroots initiatives) that was impossible to acquire as data. In most grassroots economic initiatives precision is used in a completely different way than the mainstream economy. When needed, precision is discarded, particularly when the aim of the transaction or the aim of the initiative will get compromised by the quest for precision, like it happens with free bazaars or collective cultivation projects.

The other reason is that the economic impact of each of the activities examined here needs to be explored not as a fraction of GDP but as linked to the aims of the grassroots initiatives themselves. Consequently, one cannot use linear-structured approaches to economic quantity, because the aims of each initiative might be different. At the same time, each initiative might have several aims that the use of quantitative perceptions by the initiative members try to achieve without discarding any out of them. Risk of every economic activity for nature and communities is one of the major impacts that one should also always account for, as well. Fractal mathematics in combination with fuzzy or vague data could help to check whether an economic activity or phenomenon entails risks for its actors or for the environment while having a focus on the other productive aims of the activity. It seems that grassroots economic organising is very risk-aware (at the end of the day, they organise because they face risks in the mainstream economy) but economics has not integrated this awareness on methodological level yet (Zadeh 1965; Smithson & Verkuilen 2006; Taleb 2010; 2012; 2018; Mandelbrot 1983; Mandelbrot and Taleb 2006; Lilly 2010; Mandelbrot and Hudson, 2007).

For example, the fuzzy number of "about 200 families" provided by the grassroots initiative members as the number of people who receive a meal everyday by a social kitchen does not represent the chances those meals give to people to stay alive and healthy, to go to work the other day after their unemployment spell, or, to keep their kid healthy enough to go to school. . To all that, one would add the social bonds being re-negotiated in the community and the mainstream and non-mainstream economic activity that becomes possible because of people working in grassroots SSE. At the same time, one would "account" in some way for social groups that might be excluded or perhaps exploited because of mismanagement or structural discriminations that the mainstream economic quantitative methods are not anyway fit to capture. Whether they participate in a grassroots group or they are excluded, this has important implications about the economic impact of the activity and the realisation of the aims of the group.

Nevertheless, one would consider to use fuzzy data hypothesis testing in case one would like to work with grassroots initiatives in terms of collective decision-making. In other words, hypothesis testing as it is usually employed in economics will not work properly to understand phenomena outside the mainstream economy, about which there are not adequate official nor extensive statistical data. It is not possible at this stage of knowledge in the field to form hypotheses that would represent a valid question to be refuted or to be possible to be refuted. Yet, there is a possibility to use fuzzy statistics for decision-making through hypotheses that would check constraints or possibility of important problems that a decision can be linked to (Grzegorzewski 2000; Wu 2009; Filzmoser and Viertl 2004). In that sense, the risk factor, and even more the unknown risk factor is something that would need again to be taken into account, especially because the grassroots communities have no luxury to experiment with the limited resources they have available. This is also one of the reasons that the use of sophisticated quantitative methods is not easy to be

done without a well-founded reason that would be justified by the community's request and anticipated benefit[2].

All this information is lost if we use the formal statistics/quantitative tools that economics offers today. The first reason is that the equilibrium models used in economics cannot represent any notion of complex ever-changing social systems. The second reason is that people are not machines, and nature is not a mechanical environment either. That means, their interactions cannot be represented with the mechanistic models used in mainstream economics (Taleb 2010; 2012; 2018; Mandebrot and Hudson 2007; Burkett 2006; Georgescu-Roegen 1971).

Discussion: Unsettling findings demanding new methodological pathways

In reality, what the non-mainstream grassroots economic initiatives aspire to is to make sure that people have access to goods and services that are fundamental for their physical and social survival. It is not a coincidence that the membership in the initiatives represents individuals in appearance only: behind and beside every registered member, there is a household and more than one interconnected households of family members, relatives, friends and neighbours.

---

[2] I am very critical with action research done on the initiative of researchers. Only when there is a request for collaboration where the communities themselves want to create a change or experiment with an activity, the researcher can suggest changes or experiments that the community can undertake. Even in that case, the community should not be burdened with gathering data that they do not need for their purposes but the researcher needs to show off that she/he employed a sophisticated research method. In other words, researchers need to employ certain methods only when it is appropriate, necessary. Researchers also have to choose the least burdensome solution for the community who wants to pursue some improvement goals. This does not create a load of research outputs the way academic community might wish for but it creates a long-term relation between academia and communities based on respect and cooperation.

In terms of class position and gender, most of the people are low or very low income, women are more numerous than men, and the educational level is high. In terms of ethnic background, some initiatives have an extended participation and contribution by people who do not originate in Greece. Other initiatives seem not to have attracted many people who originate in other countries, although all (with no exception) initiatives state explicitly that they welcome all people irrespective of origin, language, religion or other background (Sotiropoulou 2012a, 81-126, 169-244; 2014a; 2016a)[3].

In this type of economic activity people prioritise food production, healthcare, education. Cultural activities also exist and are very much cherished but it seems that the priority and the major part of the collective effort is directed to cover what we usually call "necessities". By "necessities" it is meant the basic reproduction work that will make sure that the people involved will survive as both biological and social beings in a protected ecosystem, while having their efforts and skills appreciated, used and developed (Sotiropoulou 2011a; 2016a; 2016b; 2015b; 2017).

Under the harsh conditions created by the enhancement of neoliberal policies in Greece, having social clinics shows clearly how different quantifications work in different economic settings. In social clinics healthcare is provided without asking for the ID card of the patient[4] and the strict measuring is used in the

---

[3] It is a huge question how and why some initiatives are more mixed in terms of origin of people and some are not. I associate the differences in the structure of each initiative to the quantification each activity entails. It is more common to see an active policy to translate main documents and announcements in several other languages than Greek in initiatives like free bazaars and solidarity initiatives like social kitchens and social clinics rather than in parallel currencies. It is also obvious that the rules of each activity prevent many people with immigrantbackground from participating. For example, the people who are unemployed immigrants, and in danger to be arrested by the police for expired residence permit, cannot practically register with a parallel currency, even if they want to. They however, can participate in a bazaar or collective cultivation or a social kitchen, where registration is not needed.

[4] Social clinics have been grassroots SSE initiatives that provide health care to immigrant and refugee patients who have no access to the formal healthcare system. Although doctors in public hospitals have stated that they deny to give information about patients without residence permits to the police, the law is harsh (and with racist connotations indeed) and literally sends all undocumented migrant patients who might be found out to the police stations or even worse,

amount of medicinal substances for treating a condition but not in calculating the cost of the service provided. This is a materially expressed reversal of both capitalist patriarchal valuations but also of the entire mainstream concept concerning where quantification is important to be used and where it is not. The services of social clinics or the free sharing of traditional seeds have been assigned a price of zero in SSE activity, but their values are thought to be beyond measure. Actually, the zero price is a signal that measures are not enough in some cases, for example, in ensuring a stable harvest and sound ecosystem or in supporting people's health (Sotiropoulou 2016a; 2017).

In many cases, even in parallel currency schemes, but also in other SSE initiatives where precision of measurement is less used, we find people exchanging with "generous measures". They rovide more quantity of the product offered, or they perform non-monetary exchanges or gift-giving in parallel to an exchange (Sotiropoulou 2011a; 2012a; 2012b; 2015a; 2016b).

Grassroots SSE activity shows that we cannot use capitalist patriarchal understandings of quantity, much less of value, and be able to reproduce effectively ourselves, the people around us and nature. Grassroots measuring practices are re-negotiated all the time to cover everyday needs, to face hardships or to experiment with new economic arrangements. In addition, digital technologies that did not exist some decades ago may facilitate a practice that existed but was invisible (at least to mass media and researchers), or may engender new or modified practices. In other words, we witness new quantity approaches in the making, and possibly new approaches in machine use, that are yet to be explored in both practice and theory (Sotiropoulou 2011b; 2012b; 2014b).

---

to concentration camps. Social clinics, by not asking for IDs provide some safety to the migrant patients, although, unfortunately, they cannot provide the full range of healthcare that a patient may need. In Greece, even people who have lived in the country for many years lose their residence permits if they stay unemployed for some time, and, as a consequence, become undocumented migrants without full access to healthcare.

This is the reason for which we need to start our quantitative methodological exploration from the way the SSE initiatives think and act. This is necessary especially if we want to support those initiatives with our research and/or enable the communities to conduct the research they want, with the assessment criteria they think of as important and meaningful.

This need becomes even more urgent if one takes into account the fact that SSE initiatives, even the most grassroots and far-from-mainstream ones, have to tackle serious issues arising from their activity. One set of issues refers to replication of capitalist ideas, perceptions and practices within the initiatives, despite of the good intentions of the participants to avoid them. Examples are the transfer of mainstream economy pricing levels into parallel currency schemes, or the replication of devaluation of food production even in initiatives that do not assign any prices on their activity (Sotiropoulou 2015a; 2016a).

In all initiatives, the class position of the people who participate is not easy to be superseded or hidden as an important factor that defines the chances of each person to participate in the initiative, and much more to cover their needs through it. Very low-income people might not have any means of production for them to be able to participate in any initiative, or the best participation they might be able to perform is to be receivers in a sharing initiative, like a bazaar, a social kitchen or a social clinic. Even if this participation is not inhibited, low income people end up to be more or less trapped in one more economic situation of underpayment, precariousness and absolute poverty (Sotiropoulou 2012c; 2015a; 2016a).

Another set of issues is the patriarchal violence that emerges in SSE initiatives and is expressed not only in (rare) violence incidents, but also in production or sharing/transaction arrangements that are at the expense of women, of people who originate outside Europe, or other social groups who are subordinate in capitalist patriarchy. Other ways of measuring can also become ways of exploitation that existed before or in parallel with capitalism – and this is

something that research participants, in particular the older ones, pointed out (Sotiropoulou 2013; 2016a; 2019).

A third set of issues are those who would exist even if, in some way, capitalism and patriarchy disappeared all of sudden. For example, if someone goes to a free bazaar and sweeps most (in-good-condition) stuff , this in reality prevents other people who might just need one or two items from covering their needs. The same behaviour becomes even more problematic if it happens in a social kitchen, where someone might sweep one of the shelves full of packs of food (like pasta, rice, beans) that were meant to be cooked for the next week. In those cases, the problem, as defined by the participants of the initiatives, is not that someone takes without giving back or takes without asking for permission - the problem is quantity itself. Those incidents of massive appropriation have a completely different quality from appropriating the absolutely necessary. The problem is directly linked to the essential quantities (how much one needs, how much one takes) of the activity.

Even if one wanted to leave the activity develop without quantitative analysis, wishing to refrain from quantifying solidarity and community spirit, one cannot avoid encountering with issues like those described in this section. It is one thing to analyse discourse that might be well-intentioned and reflects aims and wishes of the grassroots initiatives. It is another thing to analyse how much work women and men do respectively in an initiative or whether food producers keep being underpaid in a parallel currency scheme, despite of the principles of the initiative.

Directions for further research

For the critical work that needs to be done by both the SSE communities and the researchers who work with them, quantity is an absolutely essential aspect that needs to be taken into account, just like qualitative aspects need to be taken into account in a quantitative analysis. It is very important therefore, to provide

more tools to the SSE initiatives themselves but also to researchers who do research about this type of economic activity, exactly because we need to address all those issues emerging from the activity, whether positive or problematic.

This cannot be done by one researcher only, not only by academia, but through a collective effort where the SSE initiatives will have the leading role, in defining which quantities are important to them and what other quantities they would like to be able to know for achieving their aims. Economics is just one discipline among many who could have a role in this methodological quest. Other social sciences, humanities, environmental and life sciences, mathematics, physics are able and are needed to provide ideas, experiences and quantitative tools that could be used in SSE, probably after adaptation and modification.

Finally, it is important to take into account that not all quantitative tools are appropriate for all SSE initiatives all over the world. The national accounts system showed this. The "one size fits all" approach leads to injustices and misrepresentations, if not to neo-colonial mismeasurements that benefit those who hold more economic power. Therefore, appropriate quantitative methods for SSE would have variety in form and approach and would be relevant and useful to each community or SSE group. This paper is part of the debates described and it gave examples of in-the-field activity with intention to contribute to this needed methodological plurality.

References

Albritton, R. 2003. Marx's value theory and subjectivity. In *Value and the world economy today – Production, finance and globalization*, ed. Westra, R. and Zuege, A. Houndmills, UK: Palgrave Macmillan, pp. 205-24.

Alkire, S., Ura, K., Wangdi, K. and Zangmo, T.. 2012. An extensive analysis of GNH Index. Centre for Bhutan Studies, May 2012.

Anielski, M. 2007. *The economics of happiness – Building genuine wealth*. Gabriola Island: Canada.

Anielski, M. and Soskolne, C.L.. 2002. Genuine Progress Indicator (GPI) Accounting: Relating Ecological Integrity to Human Health and Well-being. In *Just Ecological Integrity: The Ethics of Maintaining Planetary Life* ed. Miller, P. and Westra, L.. Lanham & Oxford: Rowman & Littlefield Publishers Inc., pp. 83-97.

Barker, D.K. and Feiner, S.F. 2010. As the World Turns: Globalization, Consumption, and the Feminization of Work. *Rethinking Marxism: A Journal of Economics, Culture & Society,* 22 (2), pp. 246-52.

Bennholdt-Thomsen, V. and Mies, M. 1999. *The subsistence perspective*. Transl. Camiller, P., Mies, M. and Weih, G.. London & New York: Zed Books, & Spinifex Press, Australia.

Bennholdt-Thomson, V., Mies, M. and Von Werlhof, C.. 1988. *Women: The last colony*. Zed Books.

Budlender, D., Esquivel, V., Folbre, N. and Hirway, I.. 2008. Explorations: Time-use surveys in the South. *Feminist Economics,* 14 (3-July), pp. 107-52

Burkett, P. 2006. *Marxism and ecological economics – Toward a red and green Political Economy*. Leiden & Boston: Brill.

Caffentzis, G. 2002. On the notion of a crisis of social reproduction: A theoretical review. *The Commoner,* 5 (Autumn), pp. 1-22.

Dalla Costa, M. and James, S. 1975. *The power of women and the subversion of the community.* Bristol, UK: Falling Wall Press and individuals from Women's Movement in England and Italy.

Colman, R. 2008. Measuring genuine progress: Indicators, accounts and policy. GPIAtlantic – Measuring sustainable development – Application of the Genuine Progress Index to Nova Scotia, December 2008.

Daskalaki, M., Fotaki, M. and Sotiropoulou, I. 2018. Performing Values Practices and Grassroots Organizing: The Case of Solidarity Economy Initiatives in Greece. *Organization Studies*, Online first, pp. 1-25.

Daly, H.E. and Farley, J. 2011. *Ecological economics – Principles and applications*. Washington – Covelo – London: Island Press.

Ehrenreich, B. 2002. *Nickel and Dimed – Undercover in low-wage USA*. London: Granta Books.

Eisenstein, C. 2016. The oceans are not worth $24 trillion. Credit: www.rtcc.org, Accessed on 22.5.2016 from www.opendemocracy.org website.

Eisenstein, Z.R. ed. 1979. *Capitalist patriarchy and the case for socialist feminism*. New York & London: Monthly Review Press.

Federici, S. 2013. *Revolucion en punto cero: Trabajo domestico, reproduccion y luchas feministas*, trans. by Scriptorium (Fernandez-Cuervos C. and Martin-Ponz P.) Traficantes de Sueños-Mapas.

Filzmoser, P. & Viertl, R. 2004. Testing hypotheses with fuzzy data: The fuzzy p-value. *Metrika*, 59, pp. 21-29.

Georgescu-Roegen, N. 1971. *The entropy law and the economic process*. Harvard University Press.

Goerner, S., Gomez, R., Lietaer, B. and Ulanowicz, R.E. 2009. Quantifying sustainability: Resilience, efficiency and the return of information theory. *Ecological Complexity*, 9, pp. 27-36.

Graeber, D. 2011. *Debt – The first 5000 years*. New York: Melville House Publishing.

Grzegorzewski, P. 2000. Testing statistical hypotheses with vague data. *Fuzzy Sets & Systems*, 112, pp. 501-510.

Konstantinidis, C. 2018. Capitalism in green disguise: The Political Economy of organic in the European Union. *Review of Radical Political Economics,* 50(4), pp. 830-52.

Konstantinidis, C. and Vlachou, A. 2017. Appropriating nature in crisis-ridden Greece Part 1: The rationale of capitalist restructuring. *Capitalism Nature Socialism* 28 (4), pp. 48-61.

Kurz, R. 2014. The crisis of exchange value: Science as productive force, productive labor and capitalist reproduction. In *Marxism and the critique of value*, ed. Brown, N., Larsen, N., Nilgen, M. and Robinson J.. Chicago IL: M-C-M' Publishing, pp. 17-76.

Lilly, J.H. 2010. *Fuzzy control and identification*. Hoboken NJ: John Wiley & Sons.

MacPherson, L. 2014. Te Kupenga 2013 (English) – corrected. Statistics New Zealand – Tatauranga Aotearoa, accessible at http://archive.stats.govt.nz/browse_for_stats/people_and_communities/maori/te-kupenga.aspx

Mandelbrot, B. 1983 [1977, 1982]. *The fractal geometry of nature*. New York: Freeman & Co.

Mandebrot, B. and Hudson, R. 2007. *The (mis)behavior of markets*. New York: Basic Books – Perseus Books.

Mandelbrot, B. and Taleb, N.N. 2006. A focus on the exceptions that prove the rule. Financial Times, 23 March 2006.

Olsen, W. 2007. Pluralist methodology for development economics: The example of moral economy of Indian labour markets. *Journal of Economic Methodology*, 14 (1), pp. 57-82.

Peterson, S.V. 1997. Whose crisis? Early and post-modern masculinism" In *Innovation and transformation in International Studies,* ed. Gill S. and Mittelman

J.H. Cambridge-New York-Melbourne: Cambridge University Press, pp. 185-202.

Peterson, S.V. 2010. A long view of globalization and crisis. *Globalizations,* 7 (1-2), pp. 187-202.

Picchio, A. ed. 2005. *Unpaid work and the economy: a gender analysis of the standards of living*. Routledge.

Scholz, R. 2014. Patriarchy and commodity society: Gender without the body. In *Marxism and the critique of value*, ed. Brown, N., Larsen, N., Nilgen, M. and Robinson, J. Chicago IL: M-C-M' Publishing, pp. 123-42.

Seyfang, G. 1997. Examining Local Currency Systems: A Social Audit Approach. *International Journal of Community Currency Research,* 1.

Smithson, M. and Verkuilen, J. 2006. *Fuzzy set theory – Applications in the social sciences*. Thousand Oaks – London – New Delhi: Sage Publications.

Sotiropoulou, I. 2011a. How environmental awareness can be practical and funny while puzzling economists: exchange networks, parallel currencies & free bazaars in Greece. *Journal of Innovation Economics,* 2 (8), pp. 89-117.

Sotiropoulou, I. 2011b. Transactions without euro in times of crisis: coincidence, affinity or challenge?. Conference *"Europe and Greece beyond the economic crisis"*, (10-11.11.2011) Messolonghi, Greece. Technological Institute of Messolonghi.

Sotiropoulou, I. 2012a. *Exchange networks and parallel currencies: Theoretical approaches and the case of Greece*. PhD thesis, Department of Economics – University of Crete, Rethymno.

Sotiropoulou, I. 2012b. Economic activity without official currency in Greece: The * hypothesis. *International Journal of Community Currency Research,* 16, pp. D70-79.

Sotiropoulou, I. 2012c. Marketing a vintage carpet in a free bazaar and other stories on/off value. *3rd International Conference in Political Economy "Political*

Economy and the outlook of capitalism" (5-8.7.2012) Paris, France. AHE, IIPPE
& FAPE.

Sotiropoulou, I. 2013. Terms of the Cretan dialect for non-monetary
transactions. In *Hellenic Language and Terminology, Conference Proceedings*,
ed. Valeontis, C. Athens: ELETO, pp. 281-93.

Sotiropoulou, I. 2014a. Women in alternative economy, or What do women do
without official currency? *Women's Studies International Forum,* 47, pp. 339-
348.

Sotiropoulou, I. 2014b. Information and communication technologies in
transactions: a question reversed. *Online magazine Απόψεις/Views/Apopseis*,
Special Issue: Actions of social self organisation and internet, pp. 41-46.

Sotiropoulou, I. 2015a. Prices in parallel currency: The case of the exchange
network of Chania. *International Journal of Community Currency Research,* 19,
Special Issue, pp. D128-136.

Sotiropoulou, I. 2015b. Everyday practices in Greece in the shadow of property:
Urban domination subverted (?). In *Untamed Urbanisms*, ed. Allen, A., Lampis,
A. and Swilling, M. London & New York: Taylor & Francis- Routledge, pp. 270-
83.

Sotiropoulou, I. 2016a. Solidarity, grassroots initiatives and power relations.
World Economic Review, 6, pp. 44-59.

Sotiropoulou, I. 2016b. Collective viewings of value(s) and the struggle for what
is valuable: The case of grassroots initiatives. *World Review of Political
Economy*, 7 (1), pp. 56-84.

Sotiropoulou, I. 2016c. Nature, gold and the struggles for value(s). 13th Annual
Historical Materialism Conference (10-13.11.2016), London.

Sotiropoulou, I. 2017. Absolute values, zero prices: An economic paradox as
class war weapon. 10th International Critical Management Studies Conference
"Time for another revolution?", 35th Stream: *Political Economy, Value &*

Valuation: Advancing contemporary critiques of capitalism and exploring alternatives. Liverpool 3-5.7.2017.

Sotiropoulou, I. 2019. Research and the elephant in the room: encountering with violence in fieldwork concerning unpaid labour. In *Handbook of Research Methods on the Quality of Working Lives*, ed. Wheatley, D. London: Edward Elgar Publishing, pp. 79-93.

Taleb, N.N. 2010. *The Black Swan – The impact of the highly improbable*. New York: Random House.

Taleb, N.N. 2012. *Antifragile – How to live in a world we don't understand*. New York & London: Penguin Books.

Taleb, N.N. 2018. *Skin in the game – Hidden asymmetries in daily life*. New York: Random House.

Trenkle, N. 2014. Value and crisis: Basic questions. In *Marxism and the critique of value*, ed. Brown, N., Larsen, N., Nilgen, M. and Robinson, J.. Chicago IL: M-C-M' Publishing, pp. 1-16.

Von Werlhof, C. 2007. No critique of capitalism without a critique of patriarchy! Why the left is no alternative. *Capitalism Nature Socialism,* 18 (1), pp. 13-27.

Waring, M. 1999. *Counting for nothing – What men value and what women are worth*, 2nd ed. Toronto, Buffalo: University of Toronto Press.

Wu, C-W. 2009. Decision-making in testing process performance with fussy data. *European Journal of Operational Research*, 193, pp. 499-509. Zadeh, L.A. 1965. Fuzzy sets. *Information and control,* 8, pp. 338-53.

The Wealth of (Some) Nations: Imperialism and the Mechanics of Value Transfer

Zak Cope

Book review by **Ivan Rubinić**

Faculty of Law, University of Rijeka

✉ irubinic1@pravri.hr

Abstract

The Wealth of (Some) Nations by Zak Cope provides arguments in support of the claim that new age imperialism, originating from primitive accumulation and disguised by the freedom of exchange, serves as the dominant force that allows the affluent countries to exploit the destitute. Cope builds his theory through an intricate nexus of a colonial tribute, monopolies, and unequal exchange, and confirms that the imperialism, as the permanent stage of capitalism, thrives due to the un-equivalent cross-country value transfers. In his evocative display of findings, Cope asserts that the legitimacy of the imperialist system is controversially derived from the vested interest shared among the capitalists and the labour aristocracy. Consequently, the demise of the international labour solidarity exists at the root cause of the ongoing crisis of the left-wing social movements. Undoubtedly, this intriguing study is an indispensable read for all interested in the imperialist dynamics of the capitalist societies that, in the age of globalization, deserves special consideration.

JEL: E11, F54, F62, P16

Introduction

The latest provocative piece on the global political economy of imperialism, released by the well renowned outlet of independent publishing, Pluto Press, is Zak Cope's "The Wealth of (Some) Nations". With an evident reference to Adam Smith's masterwork (1999), Cope moves beyond the conceptualization of the wealth of nations as the proliferation of commodities at lower prices, and through the inclusion of imperialism, shifts the focus to the indictment of the economic laws that allow the global production of wealth to be disjointed from its geographical distribution (Ricci, 2019). To capture this distributional asymmetry, Cope acknowledges the need for a system that allows the multi-layer investigation, inclusive of the property anterior to price, and thus turns to the unfairly marginalized and relevant labour theory of value.

In such an environment, the wealth of nations, under the capitalist mode of production, appears as a collection of commodities (Marx, 1990) in their materialized form. With the employment of the labour theory of value, the physical wealth can be expressed through the value system, as the labour time socially necessary to produce it (Fine and Saad-Filho, 2016), and through the price system, as its monetary counterpart. The interaction between the two, through the social relations underpinning the capitalist production, reveals the origins of class structure. This becomes the groundwork for the inner-country inequality where, the process of labour force exploitation triggers the discrepancy between the price that the wage worker receives and the value they produce. This yields the surplus value which is, in the form of profit, appropriated by the capitalist class. The described asymmetry, brings about the inner-country unequal exchange between the labourers who create more value than what the capitalist are reimbursing them. In line with Rubinić and Tajnikar (2019a, 2019b), it is precisely the latter that constitutes the cornerstone of Cope's method, claiming that the abovementioned inner-country class antagonism can be extended to the cross-country level, where the exploitative relations between social classes can be transmuted, by interaction, to the exploitative relations between nations.

On this foundation, Cope builds a detailed theoretical account on the preposition that the application of the cross-country exploitative relations must be studied as the function of the imperialist transfer of value. Whereby, he defines imperialism as the phenomena enabling the affluent countries to systemically derive unrequited transfer of resources from the less developed parts of the world. The imperialism is thus perceived as the system which expansion is conditional upon the expropriation of the value from the exploited nations and which, in contrast to the orthodox school of thought, utilizes the international trade as the principle vessel that facilitates the cross-country un-equivalent value transfer. Based on this, Cope sees imperialism as the system which is inherently inseparable from capitalism and is regarded not as the highest period of capitalism (Lenin, 1970), but factually represents the permanent stage of the capitalist mode of production.

This publication represents a painfully necessary departure from the mainstream agent-driven. It furnishes a narrative that re-establishes the class structure at the focal point, regarding distribution of the nations' wealth, and revives the place that class importance, in terms of economic inequality, rightfully deserves. The book is divided into four parts in which the author displays an extensive study of the political economy of imperialism which, in addition to the economic sphere, covers the matter from the historical and political viewpoints. Having said that, the principal purpose of this review is to provide the exposition of those parts of the book that bear the highest importance to the scope of this economic journal.

Fundamental Mechanics of the Value Transfer

The geographical value transfer implies that the produced value is realized, through international trade, within a country other than the country of origin. By applying such rationale on the standard core-periphery division, in agreement with dependency theory (e.g., Dos Santos, 1970), it can be concluded that the periphery is becoming a supplier of the surplus value for the more developed, and in this sense, imperialist core countries. The mechanics of the global value transfer, through the "brain drain", illicit capital flows, trade restrictions, price dumping, debt repayments, and disadvantageous

terms of trade, places the periphery in an unfavourable position *vis-à-*vis the core, and is, in accordance to Cope, determined by the three main institutes: colonial tribute, monopoly rent, and unequal exchange.

The role of colonialism regarding the value transfer rests upon the acquisition of control over foreign territories, manifested through the colonial tribute. In that respect, Cope points out two shocking and historically distant examples by Hickel (2017). The first one, by the turn of the nineteenth century, was the silver plundered from South America by Spain, estimated today at around 165 trillion US $. The second being the uncompensated slave labour, benefiting the United States until 1865 and estimated to be worth 97 trillion US $. These and numerous other examples flooded the imperialist countries with enormous wealth and effectively served as a wide-scale primitive accumulation of capital. The colonies were additionally used as a source from which their rulers extracted the imperial rent, which enabled the continuation of the accumulation by dispossession (Harvey, 2007). The colonial administrators used the abundant resources of their colonies and the indigenous workers' cheap labour power. They monopolized the right to trade with the foreign territories and consequently utilized the dependency theory, under which the development of the colony can occur only as the reflection of the colonisers' expansion. Regardless of the minor exceptions to this extractive behaviour, ensuring the imperialist' constant influx of value was therefore conditional upon holding the development of their colonies as the hostage of the geographical value transfer.

The second institute, the prime example of economic imperialism, is the monopoly rent. Defined as the difference between the price of production and the actual market price (Amin, 2011), the monopoly rent acknowledges the importance of the monopolistic associations, differentiation of commodities, and patent rights, and debunks the myths of perfect competition and a global level playing field. Generally speaking, this environment allows the monopoly firm to obtain a low purchase price and establish a high selling price. Through the monopolistic power, the more developed firms and their host countries can exercise the economic dominance over their less developed competitors. The monopolistic power enables its holder to either produce the unique

commodity, or to produce the commodity below the socially necessary labour input, thus guaranteeing the monopolists' extra surplus value and extra profits. In terms of geographical value transfer, the monopoly rent is obtained through trade between the developed country, with a large contingent of monopoly firms, and the less-developed country, usually abundant with raw materials, cheaper labour, and nascent industries. This is especially relevant within the present-day, globalized and highly concentrated world where, as stated by Nolan (2012), the global market share of large commercial aircrafts belongs to two firms, and four livestock breeding companies have 99% of the world's market. Hence, the monopoly rent stems from the commodity exchange where less of the core's embodied labour is exchanged for more of the peripheral labour, and transfers the values towards the imperialist countries.

From a formal standpoint, the above-stated institutes generate the unequal value transfers, within the name of the last institute, the unequal exchange becomes terminologically formalized. Given that Emmanuel's (1972) Unequal Exchange represents the seminal work within the domain of the imperialist trade, it comes as no surprise that it has a central place in Cope's study. Emmanuel's conceptual framework evolves around two types of value transferring mechanisms. The first is the unequal exchange in a strict sense, derived from the cross-country wage labour differentials. This type is facilitated through significantly lower labour costs, which underestimate the amount of labour embodied within the peripheral commodities that are being exchanged for the commodities of the core countries with a lesser amount of embodied labour, priced at a much higher rate. The second type is the unequal exchange in a broad sense. This type results from the cross-country differences in the capital intensities and transfers the values toward the countries with high capital-intensive industries. This is the case since the commodities produced with more capital (relative to labour) have less of the embodied labour than what is the case with their counterparts from the less intensive periphery. When it comes to the unequal exchange, Cope emphasises the germane example of Li (2016), who shows that the unfavourable terms of (labour) trade ensure that China, through international trade, realizes only over half of the labour invested in the production of its commodities, and only over one tenth through the exchange with the United States. Thus, we may

conclude that the processes described initiate the geographical value transfer and allow the imperialist countries to lock the periphery in the relations of the unequal exchange.

Quantification of the Imperialist Value Transfer

Cope defines the imperialist economy as an entity with a net positive value transfer, that is, an entity which imports more value than it creates. By the same token, the existence of an imperialist country is the prerequisite for the exploitation of less developed countries that renders them net exporters of value. Once the mechanics of the value transfer have been theoretically established, Cope advances with the measurement of the imperialist rent in the world economy.

Chronologically speaking, Cope departs from the drain of value from the Americas, Africa, and Asia, to Europe. In light of this, he emphasises that the colonial tribute was the backbone of the commercial epoch and the imperialist capital accumulation. The colonial tribute was, to the large extent, the outcome of the positive difference between the selling price of the colonies' exports and a much higher selling price of the same commodities on the colonisers' markets. The colonial administrators benefited from low wages from their overseas territories, which ensured them the ability to maintain high profits concurrent with the payment of high wages for their domestic labour force. Accordingly, the high wages and relatively low-priced foreign imports has led to the colonisers' countries labour embourgeoisement that has, in turn, resulted in a rising demand for the colonisers' commodities, thus initiating the positive spiral. Conversely, provided that the value transfer is a zero sum game, the adverse effects of this growth spiral were outsourced to the colonies. Once established, such an economic order was sustained even when the decolonisation took place. Then, the colonial tribute was substituted with the less apparent, but by no means less extractive, imperialist rent.

The quantification of the imperialist rent departs from the market-based accounting comprised of net recorded transfers, illicit financial outflows, and transfer pricing. By referring to the third party sources, Cope asserts that there exists a sizeable outflow of

payments from the global South towards the global North. The estimated loss of capital due to the net recorded transfers was 325 billion US $ in 2012, due to the illicit financial outflows was between 620 and 970 billion US $ in 2014, and due to the transfer pricing was approximately 365 billion annually. However, since these transfers represent standardised measures, relying solely on them would be misleading because it would omit a crucial part of the outflow connected to the value system. That is to say, relying exclusively on the price system would underestimate the total amount of the value extracted from the global South.

In order to remedy this shortcoming, Cope displays an unequal exchange economic model that provides a clear example of the total extent of the value exported from the periphery to the core. The results are indicating that the unequal exchange, due to the under-priced peripheral export was 420 billion US $, whereas the unequal exchange due to the overpriced core's exports was 780 billion US $. Accordingly, Cope demonstrates that the total magnitude of the unrecorded value transfers due to the unequal exchange amounted to 1.2 trillion US $ annually. However, if the analysis is modified by assuming that the cross-country productivity differential is negligible, which is the equivalent of saying that the labour can travel freely between countries, the unequal exchange value transfer jumps to a staggering 2.8 trillion US $. In any case, the resultant transfer of values confirms the previous claims and provides empirical content to the genuine economic interests behind the preposition of the mainstream narrative in which all parties draw benefits from the international trade. Hence, the unequal exchange exhibits the imperialist rent and shows that even if the global South gains through the exchange, this occurs only as the fraction of the asymmetrical benefits that are reaped by the global North. In this sense, the unequal exchange guarantees the reproduction of the existing country-level exploitative relations and the continuation of the imperialist dominance.

In addition, this study quantifies the extent of the value displacement in today's global economy. Cope points out the significance of the foreign direct investments regarding the capital exports which guarantee, mostly through the transfer payments, the imperialist repatriated profits. He estimates that the foreign direct investments ensure

the developed countries' capitalists to employ over one-third of its total industrial workforce within the developing countries' industries. Furthermore, Cope measures the value outflow from the global South to the global North via the production factors' remuneration. In this respect, conservative estimate suggests that no less than the three-quarters of the developed countries' capitalist class profits are appropriated from the developing countries. In terms of wages, the source of global value transfer stems from earnings differentials. The average wage of the developed country's worker is calculated to be 40 thousand US $, while his counterpart from the developing country receives a mere 8 thousand US $. Considering that approximately 10 percent of the developing industrial workforce is employed by the capitalists from the developed countries, the geographical labour force discrimination, both in terms of inequality of output and inequality of opportunity, becomes self-evident.

The cumulative effects of all elements encompassed by this study are subsequently accounted for as the function of the labour force exploitation. It is concluded that the distinct cross-country labour exploitation rates disproportionately affect the peripheral workers, who suffer through exchange. Cope wraps up the measurement of global un-equivalent exchange in an innovative way, by summarizing the effects of this phenomena through a disparity between global production and global consumption. Consequently, in a environment liberated from the labour exploitation, those producing the value would consume the fruits of their efforts, in their entirety. As expected, not only is this not the case but additionally, the country-level divergence between the contribution to the total (world) production and the respective share in the global consumption varies beyond the extent that can be explained through the prism of the skill-biased technological change and returns to skills.

Labour Aristocracy and the Left-Wing Political Downfall

At the point where most of his peers conclude, Cope begins with the dissection of the taboo subject for the leftist movements, the social stratification and the emergence of the labour aristocracy. This logical extension of the research attempts to answer how the distribution of value manifests within the net winning countries, i.e., seeks to

investigate whether the affluent beneficiaries are the capitalists, the labourers, the consumers, or some combination of the latter.

On these grounds, primarily incentivized by the core-periphery wage differentials, Cope sets out to investigate whether the colonial tribute, monopoly rent, and imperialist rent provide the material basis for the formation of the labour stratification. Where the latter is established on a labour class split between the aristocracy and the proletariat. Relatedly, the labour aristocracy is defined as the group of wage-earners with relatively high earnings and a decent standard of living that far exceeds that of the proletariat, seen as the working class comprised of labourers whose wage reimbursement is lower than the value they produce. Generally speaking, within the context of the hitherto findings, Cope seeks to link the embourgeoisement of the imperialist labour class with the unfavourable position of the peripheral (proletariat) labour class. In order to do that, Cope introduces the concept of the metropolitan labour aristocracy which represents a section of the labour class whose relatively high standard of living is sustained through the exploitation of the peripheral wage labourers.

Cope presents impressive historical evidence for the claim that the metropolitan labour aristocracy is fundamentally anchored to the superexploitation of the global periphery. It must be stated that the superexploitation is conceptualised, not necessarily as a payment of below-subsistence wages, but as the exploitation that greatly surpasses the average (global) levels. Hence, the high returns to labour within the global North come at the expense of the employed within the global South. Therefore, in order to compensate the metropolitan labourers at a higher wage than the value they produce, the imperialist capitalists' must find a source for the extraction of superprofits. In other words, the superprofits are preconditions for the existence of the superwages. The described dynamics prove that the affluent countries' workers are drawing benefits from the global value transfer inflicted by the unequal exchange. Consequently, the peripheral workers are being (indirectly) exploited by their metropolitan colleagues, who are additionally benefiting, not only on the grounds of higher wages, but from the abundant consumption, higher purchasing power, and higher levels of the public sector services.

The severity of this conclusion yields enormous economic and political implications, especially when considering the frequency of which the metropolitan superwage monopoly is protected by the military power. Consequentially, it is no wonder that this detrimental by-product administers a fatal blow to the concept of the international solidarity of classes. The fact that the metropolitan workers are enjoying high living standards as a result of the peripheral superexploitation refutes the existence of the shared interests of the global labour class. Therefore, it becomes self-evident that the imperialist policy designers are seeking to preserve this, globally exploitative, *status quo* through the political paradigms designed to *divide et impera*. That is, the imperialists are seeking a refuge within the global labour stratification utilized to maintain a current state of affairs through ignorant approval of the metropolitan labour class resting on a preposition that: *"It is difficult to get a man to understand something, when his salary depends on his not understanding it"* (Sinclair, 1994, p. 109).

In this sense, the capitalists are bribing the labour aristocracy by sharing a fraction of their unequal exchange gains, and by tying the long term interests of the metropolitan labour class to the capital's performance (through pension funds). Cope investigates this controversy from the political viewpoint in the most objective way, without excluding the individual movements from their respective responsibility. This is achieved through a detailed exposition of the historical progress of the left-wing politics which is supplemented with an intriguing comparison of the physical quality of life in capitalist and socialist countries. Thereupon, Cope's lengthily explanation paradoxically concludes that the un-equivalent global value transfer is welcomed, and implicitly embraced by the wide strata of the left-wing social movements. The former includes, among others, democratic imperialists, socialist imperialists, social-imperialist Marxists, and the left-nationalists alike. This is to suggest the inability of the present day left-wing political movements to adequately cope with the international labour solidarity and the class struggle, conditioned upon the need to comply with the interest of their national electorate. From a global perspective, the recent downfall of the leftist politics which, at best, produce the national chauvinism of the labour governments, is

generally connected to the fact that the it has little to offer besides a supranational pattern of a hypocritical idealism.

Conclusion

"The Wealth of (Some) Nations" is a noteworthy addition to the heterodox literature that extends the existing knowledgebase from four viewpoints. First, through re-establishment of the relevance of the labour theory of value regarding the distributional inequalities, Cope rehabilitates the principal role of class antagonism. Second, by utilizing the concepts of colonial tribute, monopoly rent, and unequal exchange, Cope explains the imperialist rent and provides the most extensive theoretical account of the value transfer. Third, through empirical models and statistical data, Cope quantifies the imperialist rent and exposes the economic rewards at stake. Finally, Cope's journey into the uncharted theoretical landscape unveils the genuine beneficiaries of the un-equivalent geographical value transfers.

That being said, Cope demonstrates that the inequality must be studied as the function of imperialism which enables the dominant countries to exercise economic and political power over the destitute. From this, it follows that the economic imperialism, disguised by the freedom of exchange, brings about enormous inequalities regarding the consumed labour recognition. Accordingly, the affluent countries of the global North are appropriating a part of the value produced by the global South. This cross-country unequal exchange causes a spillover effect that influences inner-country inequality and international inner-class antagonism, which confirms the controversial claim that it is not only the capitalists, but also the metropolitan labourers that are benefiting from the exploitation of the global periphery.

This begets a tension between national and supranational interests and poses an enormous challenge to the left-wing social movements and the socialist internationalism. The faulty design of the political and economic system, through a theory of political cycles, ensures that the national policymakers will be incentivized to repeatedly favour the national objectives ahead of global aspirations. This is because

the national policymakers who try to advocate the supranational wellbeing enter the conflict with the national electorate needed to put them in power. Therefore, the resulting political deadlock prevents any forward-looking alterations and ensures the sustainability of the detrimental exploitative dynamics. In this sense, Cope shows the need to abandon the narrowminded outlook on macroeconomics and the necessity to focus on the maximization of the global wellbeing. This departure must be conceived in Tocqueville's (2010) self-interest properly understood and must be centred around the urgency to redefine the global playing field ruled by the imperialism and the unequal value transfer.

To summarize, "The Wealth of (Some) Nations" is a thought-provoking, anti-imperialist publication marked by objective and elaborate approach, plentiful intellectual delights, and highly readable writing style that renders it equally useful as a layman's starting point and as a pundit's source of insight. This book represents an exceptional contribution to the international political economy, crucial for understanding that the contemporary crisis of economics and politics alike does not arise due to lack of adequate ideas.

References

Amin, S. (2011). *Maldevelopment: Anatomy of a Global Failure*. Cape Town: Pambazuka Press.

Cope, Z. (2019). *The Wealth of (Some) Nations: Imperialism and the Mechanics of Value Transfer*. London: Pluto Press.

Dos Santos, T. (1970). The Structure of Dependence. *American Economic Review*, 60 (2), pp. 231-236.

Emmanuel, A. (1972). *Unequal Exchange: A Study of the Imperialism of Trade*. New York: Monthly Review Press.

Fine, B. and Saad-Filho, A. (2016). *Marx's Capital*. London: Pluto Press

Harvey, D. (2007). *A Brief History of Neoliberalism*. Oxford: Oxford University Press.

Hickel, J. (2017). *The Divide: A Brief Guide to Global Inequality and Its Solutions*. London: Heinemann.

Lenin, V. I. (1970). *Imperialism: The Highest Stage of Capitalism*. Peking: Foreign Languages Press.

Li, M. (2016). *China and the 21st Century Crisis*. London: Pluto Press.

Marx, K. (1990). *Capital. A Critique of Political Economy* (Vol. 1). London: Penguin Group.

Nolan, P. (2012). *Is China Buying the World?*. Cambridge: Politi Press.

Ricci, A. (2019). Unequal Exchange in the Age of Globalization. *Review of Radical Political Economics*, 51 (2), pp. 225-245.

Rubinić, I. and Tajnikar, M. (2019a). Labour Force Exploitation and Unequal Labour Exchange as the Root Cause of the Eurozone's Inequality. *Društvena Istraživanja*, 28 (2), pp. 207-228.

Sinclair, U. (1994). *I, Candidate for Governor: and Hoe I Got Licked*. Berkeley: University of California Press.

Rubinić, I. and Tajnikar, M. (2019b). The Influence of Economic Cycle on Eurozone Cross-Country Inequality Dynamics. *South-Eastern Europe Journal of Economics*, 17 (2).

Smith, A. (1999). *The Wealth of Nations: Books I-III*. London: Penguin Group.

Tocqueville, A. de. (2010). *Democracy in America*. Indiana: Liberty Fund Inc.