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**'Openness' as a Methodological Principle of Sraffa's
Economic Thinking**

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'Openness' as a methodological principle of Sraffa's economic thinking¹

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Abstract: This paper discusses the impact of Sraffa's thinking on economics. It argues increasing specialization in research is producing an 'all trees, no forest' fragmentation of economics that creates opportunities for a return to concerns that motivated classical political economy. It associates this with a methodological conception of what a more pluralistic economics involves, and applies this to relationships between production and distribution. A methodological conception of 'openness' is traced to a 1931 turning point in Sraffa's thinking when he used an open-closed distinction to explain the relationship between production and distribution, and engaged in a philosophy of science reasoning reminiscent of systems theory. The paper argues there are important parallels between Sraffa and Gramsci's thinking regarding the open-closed distinction.

Keywords: Sraffa, political economy, fragmentation, open-closed, pluralism, Gramsci

JEL codes: B2, B4, B5

1 Introduction: The impact of Sraffa's thinking

Piero Sraffa's *Production of Commodities by Means of Commodities* (1960) was path-breaking as a contribution to political economy and penetrating as a critique of the orthodox economics of the twentieth century. As Ajit Sinha recently put it, the book produced a 'revolution in economic theory' (Sinha, 2016; cf. Martins, 2019), the impact and significance of which continues to be investigated. At the same time, despite the depth and far-reaching implications of Sraffa's critique of orthodox economics it was ignored by the great majority of economists, and this not only complicates our understanding of its impact on economic theory, but also creates a paradox regarding our interpretation of 'the' history of economics. For Sraffa, 'the' history of economics dates back at least to Adam Smith and David Ricardo as founders of a subject specifically understood as political economy. Yet economics today is no longer identified as political economy by most people in the field, is conventionally said to be a science independent of history, politics,

¹ I am grateful for comments on an earlier version of this chapter from Cristina Marcuzzo, Geoffrey Harcourt, Nuno Martins, and Ajit Sinha. All errors remain mine alone.

and social values, and thus makes little reference to how the social organization of the economy was a distinctive characteristic of the thinking of Smith, Ricardo, Marx, and others in the history of political economy.

We might explain this paradox, and Sraffa's contemporary influence, as an instance of 'scientific amnesia' – a phenomenon whereby the leading edge of a science is so focused on particular problems at hand that the past commitments and achievements of the field are neglected and forgotten. One can argue that all sciences, as their subjects of investigation are further and further extended, undertake increasingly specialized types of research, and that this produces a fragmentation in science whereby researchers no longer assess a science's overall goals and its history of development and only focus on very narrow issues. I have recently argued that this sort of development characterizes contemporary economics – an 'all trees, no forest' type scenario (Davis, 2019). One possible consequence, then, of this sort of development might be a rise in pluralism in science. Pluralism of course has different meanings. In its more normative sense, it involves a culture in a science that embraces and promotes diverse research strategies. In its more descriptive sense, it involves how the practice and social organization of a science happens to foster diverse research strategies – irrespective of the attitudes of researchers toward diversity in research. It is this latter state of affairs, I believe, that seems to characterize current economics, especially since there is little evidence of a culture of pluralism in today's economics. The advance of specialization in economics, made possible by the modern growth of the field in the resources it commands and the number of researchers it involves, has generated a diversity in new research strategies that exceeds what was the case only quite recently up to the end of the first half of the twentieth century and arguably into the first postwar decades of the second half of the twentieth century.

This, then, tells us something about interpreting the impact and significance of Sraffa's thinking. The publication of the *Production of Commodities* and the debates immediately thereafter over its meaning and implications occurred at the end of a long period in the history of economics prior to the recent emergence of a *de facto* greater diversity of research strategies in the field. During this period neoclassical economics possessed a dominant presence in the field, and diversity in research was relatively modest if not actively discouraged. However, as Beatrice Cherrier has shown in her study of the evolution of the JEL (*Journal of Economic Literature*) code used to classify different economic approaches and areas of investigation in economics, over the last half century – that is, since the publication of Sraffa's book – there has been a significant increase in new categories and new sub-categories of research in economics associated with new fields of research, new techniques and methods of research, and new domains of application (Cherrier, 2017).

This suggests, then, that our evaluation of the impact of Sraffa's book up to now may have been, in effect, backward-looking in that views of its reception have been framed by the history of economics of the first half of the twentieth century, a period when neoclassical economics was commonly identified with the field. If we instead adopt a forward-looking perspective, and frame the book's impact in terms of how economics has developed since 1960, we arguably get a different view. The earlier frame is one in which orthodox economics had largely replaced the political economy arguments of Smith, Ricardo, and Sraffa. In contrast, the later frame is one in which political economy arguments have re-emerged in a range of new research venues, especially, for example, in the re-invigorated recent debate over economic inequality (Chetty et al., 2018;

Chetty et al., 2017; Milanovic, 2016; Piketty and Saez, 2003; Saez and Zucman, 2014), which again makes relationships between classes and social groups central to economics in the manner of classical political economy. Indeed, the whole issue of globalization, much discussed today, raises fundamental questions about how economies are organized and grow, essentially just what concerned Smith, Ricardo, and Marx as political economists. From this perspective, Sraffa's contributions could well have an increasing impact and significance in the future – for reasons I will discuss in this paper.

However, left unaddressed in this picture, and potentially counteracting it, is the intellectual inertia of the past, and the role that economists' past attitudes and beliefs about the nature of economics might play in economics' future evolution. Needless to say, it is difficult to summarize the attitudes and beliefs of a large number of individuals, so claims about what economists' attitudes and beliefs are should be treated with caution. At the same time, one ought not deny that there exist collective views about economics and what it investigates on the part of great numbers of economists. If we term these views an ideology of economics, they represent assumptions that are likely slow to change but which might nonetheless also evolve over time as research strategies in economics diversify and what economists investigate changes. My conjecture, then, is that the emergence of a *de facto* greater diversity of research strategies in the field associated with increasing specialization in research is likely to act contrary to the field's past dominant conception of economics, if with a lag, and lead us increasingly back to a political economic thinking in the tradition of Smith, Ricardo, Marx, and Sraffa. In short, as the world has become economically more complicated in the future, and as economics research becomes increasingly diversified, a natural ideological posture for economists is to adopt is to be 'open' to thinking that confronts the changing ways in which the economies of the world are organized and function.

If this is so, it is worth examining what an increasingly 'open' ideological conception of economics might involve. This chapter seeks to develop a conception of what this might involve by following Sraffa's early lead in formulating a distinction between 'open' and 'closed.' Sraffa's *Production of Commodities* is not generally associated with this issue, and much of the research it generated is concerned with complex technical issues surrounding the nature of commodity values and production. Yet Sraffa's views regarding the relationship between production and distribution – views that departed in fundamental ways from neoclassical economics – raise important issues regarding how the economy may be open to history and change, and thus provide grounds for saying what an 'open' ideological conception of economics might involve.

This chapter traces Sraffa's views on this back to an early turning point in his intellectual development *en route* to the *Production of Commodities* that he commented upon in his unpublished 1931 'Surplus Product' manuscript (Sraffa, 1931). I revisit this document and argue that it involves an important contribution to the philosophy of science of economics in regard to how understanding the relationship between economics and the economy depends on working with a methodological conception of openness. While there is a great deal of careful scholarship on the *Production of Commodities*, less extensively investigated is Sraffa's philosophy of science thinking, and the role it plays in his economic thinking. This chapter is intended as a contribution to this side of his thought.

To introduce this discussion, Section 2 reviews Sraffa's economic contribution and critique of orthodox neoclassical economics, especially as they concern the relationship between production and distribution. It then places the *Production of Commodities* in its historical context, and discusses the puzzling nature of its reception in economics, treating this as methodological problem concerning how sciences evaluate and respond to internal critique.

Section 3 discusses Sraffa's 1931 manuscript. Here, building on arguments I previously developed (Davis, 2012, 2018), I argue that Sraffa used an open-closed distinction to explain the relationship between production and distribution, and engaged in a kind of philosophy of science reasoning that has come to be associated with systems theory.

Section 4 connects Sraffa's philosophy of science, methodological reasoning to his Turin, Italy origins and connection to Antonio Gramsci. It argues that Gramsci in his development of the concept of hegemony was concerned with how capitalism organized different domains of social activity, and then argues that there are important parallels between this and Sraffa's thinking regarding the open-closed distinction.

Section 5 closes the chapter by briefly commenting upon openness as a principle of explanation, and returning to the issue of economics' ideological conception of the relationship between economics and the economy. If how the world's economies are changing promotes a *de facto* greater diversity in economic thinking resonant of the political economic views of Smith, Ricardo, and Marx, then Sraffa's thinking, with its focus on the relation between distribution and production, may enjoy new appreciation.

2 *Sraffa's entry point and challenge to neoclassical economics*

To begin, let me summarize the domain of research stimulated by Sraffa's important book. I rely on Tony Aspromourgos' extensive review of the scholarly literature on Sraffa's thinking (through 2004) that distinguishes five separate research programmes that he sees Sraffa as having been responsible for having generated: (a) the nature and significance of long-period equilibria in the theory of distribution and production prices; (b) the Cambridge Growth Equation and closures of the distribution system via the accumulation rate; (c) closures of the distribution system via the monetary determination of the rate of interest; (d) production prices, effective demand and long-period adjustment – the Sraffa–Keynes synthesis; (e) the critique of marginalism (Aspromourgos, 2004, Table 1). As Aspromourgos shows, research on Sraffa's economic thinking is quite advanced and far-reaching. But what is it that unites all these different research programmes?

I take as an entry point, as many others have also argued, Sraffa's profound investigation of the relationship between production and distribution, and how it contrasts in fundamental ways with marginalist neoclassical economics. In the latter, individual economic agents' optimization behavior generates demand and supply functions for all goods and factors of production under market-clearing competitive conditions, such that production and distribution are simultaneously determined – a framework fully explainable in terms of a self-contained economic logic of scarcity. In contrast, Sraffa rejected the factor substitution production analysis this involved, and developed an analysis of commodity prices in production systems in which, given the methods of production and the level of output produced, one distributive variable is fixed exogenously (for example, the

general rate of profit), or is set outside of the analysis, thereby determining all other distributive variables (in particular, the wage rate). This effectively ‘opens’ the ‘closed’ neoclassical system of production and distribution in which all economic relationships are endogenous to one another and in which individual economic agents determine prices independently of any historical reference or context. For Sraffa, whatever the rate of profit is, or alternatively whatever the wage rate is, is determined by historical conditions, not by a self-contained economic logic independent of history, so that economic analysis always needs to be integrated with an analysis of the social forces determining those rates.

Sraffa’s rejection of marginalist thinking – the foundation of the neoclassical analysis of prices – has made his own analysis of commodity prices a central focus of Sraffa scholarship. That explanation depends on input-output ratios and production coefficients tied to methods of production and technologies in use when there are many capital goods, or capital is heterogeneous. Neoclassical economists, following in the lead of J.B. Clark (1891), had come to rely on the idea that capital goods could be represented as a single quantity of capital and the economy as a whole could be represented as a single aggregate production function. This led them to claim that scarcity relationships governed the economy, and in the case of capital that there accordingly exists an inverse monotonic relation between the quantity of capital and the rate of interest. Sraffa’s analysis showing that such phenomena as capital-reversing would occur when a lower capital/labor ratio is associated with a lower interest rate was contrary to neoclassical scarcity reasoning and the idea that a demand for capital curve must always be downward sloping.

This result led to a lengthy, complex debate – the so-called ‘capital theory controversy’ (cf. Cohen and Harcourt, 2003) – in which leading neoclassical economists from Cambridge in the US attempted to defend the Clark vision and set aside Sraffa’s thinking, while leading economists from Cambridge in the UK and Italy defended Sraffa’s conclusions. The result of this debate was that the neoclassical substitution analysis was shown to fail as an interpretation of the economy as a whole, and that Sraffa’s explanation of commodity prices was agreed to provide a more accurate and more sophisticated account of the nature of production. Yet, as is well known, most neoclassical economists subsequently ignored this outcome and proceeded as if the ‘capital theory controversy’ debate had never occurred.

This is puzzling from a history of science perspective since a widely shared belief is that scientific progress prevails in the long run, meaning that discredited theories and unsupportable explanations are ultimately abandoned. It might be thought that when the issues debated are highly complex, as they were in this case, that this outcome can be delayed, on the grounds that it would then take considerable time for important scientific results to be acknowledged and understood. Yet this should not have been the case in regard to the ‘capital theory controversy’ since the most influential neoclassical economist of the time, Paul Samuelson, who was centrally involved in the debate, explicitly and clearly stated at its end that the neoclassical aggregate production function analysis could not be maintained (Samuelson, 1966). This seems to imply, then, that the conventional view of science – that progress ultimately prevails – is somehow incorrect. This is both worrisome and confusing. It is worrisome because it suggests humanity’s best efforts to understand the world may sometimes be fruitless; it is confusing because it challenges our whole conception of science as rational dialogue.

I believe, however, that we can retain the general view that science is a progressive human endeavor if we modify the view that science is essentially a rational dialogue. Let me explain this in connection with the evolution of philosophy of science thinking in the postwar period. Though that thinking is largely the product of reflection on the history and character of natural and physical science, where historians of science generally believe there is strong support for a progress view, the argument has also been made that progress operates in the social and human sciences as well. Influential in this regard is Karl Popper's defense of falsificationist inquiry and rationality throughout science (Popper, 1963). In his view, though practitioners invested in past research are often guilty of 'immunizing' it from confounding evidence and competing theories, in the long run these efforts are likely to succumb to rational inquiry.

Popper's arguments, however, encountered a problem in the form of the Duhem-Quine thesis, which was that any particular scientific proposition subject to testing and apparent falsification, which was an implication of a theory with its many supporting assumptions and confirming evidence, could still be retained if that theory and the assumptions from which it is derived are sufficiently modified and reconfigured (cf. Boumans and Davis, 2016, pp. 90-2). In effect, questionable propositions in theories that fail to be empirically supported can be insulated from critical evaluation by creative re-elaboration of the theories in which they are embedded. Imre Lakatos, in his methodology of scientific research programmes approach, accordingly revised Popper's views to account for this, arguing that scientific theories typically possessed 'hard cores' of basic principles which scientists often aimed to preserve under all circumstances (Lakatos, 1978). But Lakatos did not explain what motivated scientists' defenses of theories' 'hard cores.'

Consider, then, what happened in the case of the 'capital controversy' critique of neoclassical substitution analysis. While it was agreed that the aggregate production function view had been falsified as Popper would have emphasized, nonetheless, in Duhem-Quine terms, neoclassical theory after the debate largely came to be seen as represented by the Walrasian multi-market general equilibrium framework to which it was argued this critique did not apply (Hahn, 1982). In a general equilibrium framework there are many capital goods, not a single aggregate capital. At the same time, the static character of the Walrasian framework meant that such problems as capital-reversing (which depend on temporal analysis) do not arise, so the critique of scarcity reasoning lost its immediate target. What, then, was the 'hard core' of neoclassical theory, as Lakatos would have put it, and what, moreover, motivated its defense?

There are different possible answers to these questions, but I emphasize one specific to Sraffa's political economic concern with history and the relationship between production and distribution. As we saw, central to this is his rejection of the marginalist idea that all economic activities are endogenous to one another – that is, that economic analysis is closed, and involves a fully self-contained scarcity logic sufficient for explaining any historical context. Whether economics should be thought to be closed in this way or should be thought to be historically open as Sraffa believed, then, concerns a fundamental matter, namely how one understands the relationship between economics and the economy. Neither view, it seems fair to say, can ultimately be empirically verified or falsified. Indeed, what evidence would ever clearly tell us which view should be favored? In addition, proponents of each view, committed to their respective beliefs, are likely to always be able to reframe their theories in a Duhem-Quine manner to accommodate or set aside evidence inconsistent with them. Thus, I characterize both views, following Lakatos,

as ‘hard core’ beliefs, or alternatively as ideological conceptions that underlie economists’ philosophy of science thinking.

Yet if economists’ ‘hard core’ or ideological beliefs are not subject to empirical verification or falsification, might something else affect them? Looking at the change in economics especially in the more recent postwar period, I argued above that economics is becoming more diverse as a consequence of the growth in numbers of economists and the field’s increasing rate of specialization, and that this is occurring in a globalizing world seen as exhibiting greater inequality. I suggested that this change may produce a more political economic type thinking in economics, especially compared with economics’ recent past, as the range of types of issues investigated expands together with a rising awareness of the social dimensions of economies in the world today. That is, economics may be becoming *de facto* more pluralistic despite the discipline’s past orientation. If this is indeed the case, then, economists’ ‘hard core’ views and ideological conceptions as pertain to the relationship between economics and the economy may change as well. What this change could then promote would be a more open view of economics emphasizing how the relationship between production and distribution varies over time and across societies, rather than the more ‘closed’ understanding of that relationship which makes them endogenous to one another in a way that fits all societies in an ahistorical and identical way.

To explore further what an open ideological conception of economics might involve, the next section, discusses Sraffa’s distinction between ‘open’ and ‘closed’ in his 1931 ‘Surplus Product’ manuscript. Sraffa sought to restore political economic thinking in economics. As we will see, not only did he intend to develop a powerful economic analysis of commodity values alternative to that given by marginalism, but also sought to build that analysis upon secure philosophy of science foundations. Those foundations, I will argue, depend on his open-closed distinction.

3 Sraffa’s 1931 Manuscript and the open-closed distinction

In his 1931 “Surplus Product” manuscript, Sraffa distinguished clearly between what he called the ‘economic field’ – later the subject of his *Production of Commodities* analysis of commodity values – and distribution particularly as pertained to the surplus product, thus suggesting that they constituted two different types of economic systems. But why should we say these two domains constitute different ‘systems’ rather than, say, just different aspects of the economy, as in marginalist neoclassical economics where everything is endogenous within one system? The answer for Sraffa, I believe, derived in important ways from his philosophy of science thinking about the scientific principle of causality, and how maintaining this principle created a problem for explaining surplus product.

For Sraffa, then, causality operated in a clear way in the ‘economic field’ following established thinking in natural science. At the same time, he saw that how causality operated in the ‘economic field’ could not be readily transferred to an explanation of distribution and the surplus product. Indeed, as he expressed it:

If one attempts to take an entirely objectivist point of view, the very conception of a surplus melts away. For if we take this natural science point of view, we must start by assuming that for every effect there must be a sufficient cause, that the causes are identical with their

effects, and that there can be nothing in the effect which was not in the causes; in our case, there can be no product for which there has not been an equivalent cost, and all costs (=expenses) must be necessary to produce it (Sraffa, D3/12/7: 161:3).

The “objectivist point of view” he refers to contrasts with neoclassicism’s subjectivist point of view, and holds that how the natural world works is independent of human valuation. For Sraffa, it is embodied in “the natural science” principle that “for every effect there must be a sufficient cause,” a corollary of which is that “there can be nothing in the effect which was not in the causes.” For economics to be scientific, then, this principle needs to be applied to the analysis of production in terms of the idea that the costs incurred in producing goods constitute their causes, where these costs or “expenses” were only the commodities consumed in the production of commodities.

Thus, clearly, Sraffa aimed to build his analysis on sound philosophy of science thinking. Yet paradoxically this ‘natural science point of view’ led him to conclude that “the very conception of a surplus melts away” since a surplus product amounts to an excess of value over costs or “expenses” incurred in producing goods, thus violating the corollary that “there can be nothing in the effect which was not in the causes.” Indeed, Sraffa believed that the existence of the surplus in capitalism depended on capitalists’ willingness to withdraw circulating capital from production in order to engage in luxury consumption. Their motivation for doing so was clearly subjective and consequently at odds with a natural science point of view. Thus when it came to the surplus product, as Heinz Kurz and Neri Salvadori have put it, “as soon as it is explained, [and] a cause is found for it ... [it] ceases to be a surplus,” given the cost of production analysis of commodity values Sraffa sought to develop (Kurz and Salvadori, 2008, p. 267; also cf. Sinha, 2016, pp. 82-89).

Sraffa, then, resolved this problem by first assuming that production and distribution involved two different types of causal systems, not just two different types of economic activities, which therefore could not be explained with identical forms of reasoning. Production was still to be explained in an objectivist way with a natural science account of commodity values based on costs, but social forces operated in a different causal way in connection with distribution. To reinforce this conception, Sraffa accordingly characterized commodity production and the ‘economic field’ as a ‘closed system.’ But he also asserted that this ‘closed system’ interacted with “outside causes” that somehow operate both upon it and within it at the same time. As he put it, this ‘closed system’ somehow had a “leak” by which it communicated with the world permitting these “outside causes” to affect the determination of commodity values.

There must be a leak at one end or the other: the ‘closed system’ is in communication with the world. When we have defined our ‘economic field’, there are still outside causes which operate in it; and its effects go beyond the boundary (Sraffa, D3/12/7: 161: 5).

One might argue that since “outside causes” also affect commodity values that it makes no sense to say that the ‘economic field’ should be modeled as a ‘closed system.’ However, Sraffa recognized that subsistence economies producing no surplus represented production in its most basic form, implying that later stages of historical development which produced a surplus only modified the operation of the ‘economic field.’ We should say, then, that the ‘economic field’s is merely a relatively independent ‘closed system’ in which commodity values are dominated by, but

not exclusively determined by, their costs of production. This characterization is reinforced by the fact that different historical regimes would be expected to affect the ‘economic field’ differently, implying that over time the ‘economic field’ was independent of its different historical manifestations and only modified in its functioning by social forces.

Thus, the position Sraffa adopted for explaining commodity values when a surplus is generated involves two types of causal systems whose different principles affect how production and distribution interact and work together. The *Production of Commodities* later showed how distributive variables mathematically enter into the determination of commodity values, but does not interpret this in system terms or raise philosophy of science issues regarding causality. Perhaps Sraffa believed a philosophy of science treatment of the matter would have made his analysis in the book unnecessarily more complicated, and could have distracted from the its main conclusions when he wanted his analysis to be as clear and powerful as possible. Yet the issues he addressed in his 1931 manuscript remain.

On one level, then, we might explore further Sraffa’s conception of how two types of causality combine to produce one causal system. However, I put aside this investigation because Sraffa’s thinking about science does not lead in this direction. As Sinha notes, Sraffa “never adopted a deterministic scientific point of view,” but was rather “committed to the quantum physics point of view of indeterminacy” (Sinha, 2016, p. 88), so the whole idea that two types of causality might combine in some single way is foreign to his thinking.

On a second level, however, we can say something more about how Sraffa thought in systems terms, since he explicitly speaks of systems in open and closed terms. In addition, there also existed at the time Sraffa wrote an incipient literature on systems thinking, particularly as developed by Ludwig von Bertalanffy (1968). Though there is no evidence archival or otherwise that I am aware of that Sraffa knew or drew on Bertalanffy’s work, at the same time, as I have argued (Davis, 2018), there is an important overlap in their thinking in regard to what open and closed systems are. I thus draw on this overlap to say more regarding the nature of the open-closed distinction in Sraffa’s philosophy of science thinking.

Bertalanffy (1901-1972) was an Austrian biologist who in the 1920s and 1930s was one of the early developers of general systems theory, formulated in terms of an open-closed systems distinction comparing how the physical sciences differ from the natural or life sciences (cf. Davidson, 1983). On the one hand, he associated the former with physics and the second law of thermodynamics (the entropy law), and argued that the physical sciences are closed systems in the sense that their principles work in isolation from their particular environments. Alternatively, physical science principles work in the same way in all environments no matter what the time or place. On the other hand, he argued that living systems, especially those seen as undergoing growth and change such as studied in biology, are open in that their activity must always be explained in terms of their interaction with their environments, since the environments they occupy influence how they function. Thus, whereas closed systems always operate in the same way, open systems always work differently according to the environments they occupy.

We can recast Bertalanffy’s distinction between open and closed sciences as a distinction between open systems that are dependent on time and place and closed systems that are in an important

sense independent of time and place. For Sraffa, then, whereas the distribution of the surplus in terms of wages and profits is settled in an open socio-historical way, production relationships are rather closed in a technically determined way.²

In economics, this is the difference between a type of analysis that is fully self-contained and applies to any and all historical contexts, and a type of analysis that always needs to be integrated with its historical context. For Sraffa, neoclassical economics is a closed system because all relationships are endogenous to one another, and the scarcity reasoning which this allows can be applied to any environment, circumstance, or application no matter what the time, place, or setting. In contrast, his political economic distinction between production and distribution as two different domains of economic activity essentially treated the former as a closed system (in that it still obeyed the principles of natural science) which was nonetheless still open to the world, because it was influenced by social forces that reflected historical context.

Bertalanffy did not explain how open and closed systems communicated. He recognized that the natural or life sciences drew on principles from the physical sciences, but his goal as a biologist was to make the case that the natural or life sciences operated on a different basis from the physical sciences despite their drawing on physical science. Sraffa, however, was not in a position to avoid this issue of the relationship between open and closed, since economies such as capitalism function as wholes that are not compartmentalized in the way that the sciences are. At the same time, the neoclassical way of dealing with two types of domains was not acceptable to him because the subjectivism on which it is based was incompatible with a natural science account of production. How, then, did he understand the open-closed distinction?

What his remarks in his 1931 manuscript then specifically tell us is that the ‘economic field’ as a (relatively) ‘closed system’ is acted upon by “outside causes” but these “outside causes” are not referred to as a different type of system or appear to constitute a system in the manner that the ‘economic field’ does. In contrast to Bertalanffy, who was concerned with the differences and relationships between two types of science systems, Sraffa was rather concerned with how a (relatively) ‘closed system’ might be embedded in a larger world that lacks the characteristics of a system. That is, the world itself is, in effect, ‘unsystematic’ and constitutes a wider process that influences a (relatively) ‘closed system’ such production. This suggests that the nature of that influence is not easily determined. Were we investigating the interaction of two different kinds of systems, we might explain their interaction in terms of how their respective sets of principles combine, as did Bertalanffy when he allowed that physical science principles affect how living systems grow and change. That strategy, however, was not one that Sraffa undertook. Rather, his use of the open-closed distinction was not an open systems-closed systems one, but rather one that embedded closed systems in an open world which operated on an entirely different basis.

If an open world is ‘unsystematic’ in the sense that it is not governed by deterministic principles in the way that a ‘closed system’ can be, this does not imply that it involves an entirely chaotic, random set of processes. As a political economist, Sraffa thought in historical terms, where this meant that economies developed in an ‘arrow of history’ sort of way whereby the past influences the future. Let us put this as he did in terms of how distribution affects production. Determining

² Thus, in regard to Sraffa’s later relationship, $r = R(I - w)$, the variables are determined independently of prices of production. I thank Ajit Sinha for this point.

the profit (or wage) rate contributes to the determination of commodity values, which, given distributive shares, influences distribution, so how what is outside the relatively closed system of production not only acts upon it but also feeds back indirectly upon itself in regard to the effects on distribution. Seen as a repeated, reflexive process, this can have cumulative effects on how economies change and develop. Yet that distribution still belongs to an open world governed by social forces tells us that the specific direction that the interaction of production and distribution takes is not determined. All that is determined is that the future will be different from the past – that is, that the economy is an open historical process.

Sraffa, then, differed from Bertalanffy in how he used open-closed thinking. Whereas the latter was motivated to explain and emphasize the distinctiveness of the natural or life sciences, Sraffa was motivated by the fact that economics had abandoned its identity as political economy. He consequently appropriated and reconceived the open-closed distinction as a means of developing the scientific foundations he thought necessary for saying that economics must be political economy. Those foundations allowed him to distinguish different types of causal principles operating in production and distribution, and this made a philosophy of science analysis of causality central to the explanation of the economy as an historical process. This also meant he avoided the subjectivism on which neoclassical thinking depended, and can be seen as thinking – as reported by Ludwig Wittgenstein – as thinking in an ‘anthropological way’ (Monk, 1990).

From the perspective of how philosophy of science thinking evolved from Popper to Lakatos, Sraffa may have regarded neoclassicism’s scarcity logic as equivalent to a type of ‘hard core’ or ideological conception unlikely to be successfully contested in arguments about evidence. He certainly saw that scarcity reasoning maintained a powerful hold on most economists’ thinking, and perhaps reasoned that he needed to make the case for a political economic approach on solid philosophy of science grounds. That endeavor was complicated by the challenges he encountered in applying causal reasoning to economies that produce a surplus, but his use of the open-closed distinction provided a means of addressing them in a way that deepened his thinking about the role of history in political economy. In the following section, I briefly compare this use of the open-closed distinction to reasoning to how Gramsci can be interpreted as reasoning in a similar way about how capitalism organized different domains of social activity.

4 Gramsci and Sraffa on the open-closed distinction

Sraffa and Gramsci were both from Turin, Italy, and knew each other well (Naldi, 2000). Sraffa came to know Gramsci in 1919, and their friendship continued until the latter’s death in 1937. While evidence regarding how they influenced each other’s thinking philosophically is lacking and much debated, how Gramsci reasoned about his central concept of hegemony can be argued to exhibit clear parallels to Sraffa’s open-closed distinction. Gramsci developed the concept, then, to broaden the concept of state power in class society (Gramsci, 1971; cf. Bates, 1975). Traditionally the power of the state had only been associated with control over the machinery of government such as the police and the courts, but Gramsci argued that class power was also exercised through various non-state institutions such as the Church and the press. This meant that power manifested itself in various ways in that it took on different forms in connection with how it was exercised in these relatively independent social domains and institutions.

We can characterize these relatively independent social domains and institutions such as the Church and the press as closed systems since they can be distinguished from one another according to their own sets of rules and principles. Or rather, we should characterize them as relatively closed systems, in the sense employed by Sraffa, since for Gramsci how they operate is influenced by power relationships that lie outside of them acting upon them and affecting their internal functioning. At the same time, since Gramsci believed that class power pervades society, it lacks the characteristics of a system itself in the way that institutions function as systems. Moreover for Gramsci, class power was the product of class conflict that involved an historical process that was open-ended in nature. Thus interpreted, Gramsci's thinking about hegemonic power made similar use of the open-closed distinction to the way that Sraffa employed it. For both, the world is an open historical process in which social forces get differentially embedded in relatively closed systems of activity.

Gramsci did not frame his thinking in a philosophy of science manner in terms of different kinds of causality and how they might interact, as I have argued Sraffa did. But similar to Sraffa, he did adopt ideas suggesting he believed broad, historical social forces interacted with the functioning of multiple different social domains and institutions in a two-way street manner or as a repeated, reflexive process. Sraffa focused on the interaction between social forces and only one relatively closed system, production, given his primary concern was the economy. This allowed him to emphasize the primacy of the relationship between production and distribution, but he avoided making any claims about what sort of balance existed between them, or in Marshallian terms, whether this interaction produced some sort of equilibrium state of affairs.

Gramsci, however, with his focus on power, did label that balance using the concept of equilibrium, though in a critical way. In commenting on Louis Bonaparte's conventional exercise of power by means of the military in nineteenth century France – Caesarism – he asserted that in this we saw a circumstance in which “the existing social form had not yet exhausted its possibilities for development,” whereas “[i]n the modern world, the equilibrium with catastrophic prospects occurs ... between forces whose opposition is historically incurable” (Gramsci, 1971, p. 222). Gramsci's concept of a ‘catastrophic equilibrium’ is the idea of unstable equilibrium reflecting a combination of opposed, conflicting forces rather than the neoclassical idea of a harmony of forces. For Gramsci, this reflected his view that class societies were always in conflict. We may also, however, explain this in terms of the open-closed distinction. The idea of a relatively closed system, whether it be production or a social institution, is of something whose activities are primarily governed by principles specific to its nature as a particular type of system. Yet that such systems are affected by forces from outside them means that their internal principles of operation are altered, or more strongly we might say disrupted, since as only relatively closed they are prevented from operating as they would in the absence of those outside forces.

Open-closed reasoning, then, gives us a way of looking at an economic system that transforms it from its neoclassical, ahistorical meaning to a meaning that treats as temporary states of affairs appearing to be in balance yet as transient and impermanent. This constitutes such a departure from its meaning in neoclassical economics that one might conclude it would be better to give up the concept altogether. For Sraffa, however, the concept was part of the language of economics and political economy, and proceeding explicitly in this way risked making his work inaccessible. Gramsci's ‘catastrophic equilibrium’ idea also employed the concept but criticized it at the same

time. We cannot say whether he was influenced by his contact with Sraffa to use the idea in this way or that this was Sraffa's view of the concept. But they both appear to have used the open-closed distinction which Sraffa developed in his 1931 deliberations over how to reason in causal terms about the relationship between production and distribution, and this provides grounds for understanding equilibrium as a transient, impermanent state of affairs.

5 Concluding Comments: Openness as a principle of explanation

This chapter's focus was how Sraffa thought about the open-closed distinction, but its larger theme is the concept of openness as a principle of explanation in economic thinking. Taking Sraffa's entry point as the relationship between production and distribution, the economic approach he rejected – that was responsible in his view for the demise of political economy and for placing neoclassical economics in its place – was one that enshrined a fully closed conception of the economy in which all relationships are endogenous to one another. Thus his goal was to open up economic analysis in order to rehabilitate political economy, which I argue required that he identify openness as a systematic principle of explanation.

My argument in this regard is from the perspective of the present looking backward, but Sraffa's pathway began almost a century ago from within the Marshallian system in his quest to make history matter. He did not fully foresee how he needed to proceed, but adopted an "objectivist point of view" rooted in the science thinking of his time he believed offered a way forward. To his surprise and dismay, he discovered, as he reported in his "Surplus Product" manuscript, that his goal of rehabilitating political economy was undermined by that same "objectivist point of view." This, however, impelled him to creatively re-think how causal forces could take different forms and interacted in ways that he then outlined in open-closed terms.

Yet the destination of his work, the *Production of Commodities*, did not make this underlying thinking clear, and the Duhem-Quine general equilibrium response to the debate the book generated concealed its critique of the closed production-distribution neoclassical system in the 'hard core' neoclassical view that scarcity logic explains all economies, whatever the time or place. I have treated 'hard core' views in economics, then, as ideological conceptions that concern the relationship between the field and the economic world it is intended to explain. Sadly, evidence and reasoned debate seem to have little effect on what ideological conceptions people hold. But if Sraffa's political economic vision is correct, and if history does change how we see the world, if slowly, then the change in the world's economies today may well make defense of the idea that the economy can be explained as a closed system increasingly difficult. Then perhaps Sraffa's impact on the history of economics will be seen in a brighter light and the field again identified as political economy as thought by Smith, Ricardo, and Marx.

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