



Centro di Ricerche
e Documentazione
"Piero Sraffa"

Stigler on Ricardo

Heinz D. Kurz

Centro Sraffa Working Papers

n. 27

January 2018

ISSN: 2284 -2845

Centro Sraffa working papers

[online]

Stigler on Ricardo^{*}

Heinz D. Kurz

University of Graz

Abstract

The paper scrutinises George Stigler's interpretation of Ricardo's theory. Like many marginalists, he assesses Ricardo's contribution in terms of marginalist theory. This confirms Piero Sraffa's observation that by the end of the nineteenth century the analytical structure, content and genuine significance of the classical theory had been "submerged and forgotten". However, Stigler's textual acuteness makes him see important elements of Ricardo's analysis that resist the marginalist interpretation.

His irritation can only have been increased by Sraffa's exposition of Ricardo's surplus-based theory of profits in volume I of the Ricardo edition. This contradicted marginal productivity theory of profits. Stigler praises Sraffa's edition beyond all measure, refrains however from discussing his interpretation. Things do not change after Sraffa in 1960 publishes a logically consistent formulation of the classical theory of value and distribution. Sraffa's interpretation challenged Stigler's ideological position, which, however, he did not feel the need, or possibility, to defend.

Keywords: David Ricardo; Ideology; Piero Sraffa; George Stigler; Value and distribution

JEL codes: B12; D24; D46

1. Introduction

Writing on Stigler on Ricardo exposes one to a formidable difficulty. In the preface to the *Principles of Political Economy, and Taxation*, first published in 1817, Ricardo famously identified the "principal problem in Political Economy" to consist in unravelling

^{*} I am grateful to Tony Aspromourgos, Jurriaan Bendien, Harry Bloch, Craig Freedman, Christian Gehrke, Harald Hagemann, Geoff Harcourt, Mark Knell, Shigeyoshi Senga, Anwar Shaikh and Yoshinori Shiozawa for valuable comments on earlier drafts of this paper. Any remaining errors or misconceptions are, of course, entirely my responsibility. Daria Pignalosa has prepared the manuscript for the Centro Sraffa Working Papers series. She turned out to be easily one of the best editorial assistants I ever had the pleasure to work with. I am deeply grateful to her.

the “laws” that regulate the distribution of the product between capitalists, workers and landowners in conditions in which capital accumulates, the population grows, the scarcity of some natural resources increases and there is technical progress (*Works* I: 5).¹ Eventually, after long debates with Thomas Robert Malthus in particular, Ricardo felt to have elaborated “a very consistent theory” (*Works* VII: 246). Then comes Stigler who in his treatise *Production and Distribution Theories* contends boldly: “In 1870 there was no *theory* of distribution” (1941: 2; emphasis in the original).² Readers will rub their eyes. Stigler supports his claim in terms of the assertion: “Most English economists after Smith devoted separate chapters to rent, wages, and profits, but without important exception such chapters were *only descriptive* of the returns to the three most important social classes of contemporary England” (1941: 2; emphasis added). He goes on:

This type of analysis may have had its uses in the England of Ricardo and Mill, but its analytical shortcomings are obvious. Extended criticism is unnecessary at this point;³ the fundamental defect was clearly *the failure to develop a theory of the prices of productive services* (1941: 3; emphasis added).

Such a theory required solving the (in)famous imputation problem (*Zurechnungsproblem*). Stigler (1941: 156) could therefore couch his criticism of the classical authors also in the following terms: “Smith and his followers never confronted the problem of how a given product may be imputed to the resources which cooperate in its production nor did they consider distribution as a value problem or discuss the pricing of productive services.”⁴ This shows neatly that Stigler assesses the contributions of the classical economists strictly in terms of marginalist theory. It also explains why he was of the opinion that “The branch of economics which was in most urgent need of reformulation was, in fact, distribution” (Stigler 1941: 2). In Stigler’s view marginal productivity theory filled the lacuna he contended to have discerned in the classical authors.

How can one possibly maintain that one of the celebrated heroes of political economy failed to produce precisely what he explicitly set out to produce – a theory of distribution? Is it because Stigler and Ricardo attribute vastly different meanings to the term “theory”? Is it because one of them requires an economic theory to be presented in

¹ The reference is to the Royal Economic Society edition of *The Works and Correspondence of David Ricardo* in eleven volumes (Ricardo 1951-1973), edited by Piero Sraffa with the collaboration by Maurice H. Dobb, abbreviated as *Works*, followed by volume and page number.

² The book grew out of Stigler’s PhD thesis of 1938.

³ In a footnote appended here, Stigler directs the reader to Knight (1935). There is next to nothing to be found in Stigler’s book that would support his harsh strictures of the classical economists. In fact, setting aside a few remarks, neither Adam Smith nor Ricardo is dealt with at all. I wonder how well Stigler was acquainted with the doctrines of the classical economists and especially Ricardo at the time when he composed his thesis.

⁴ As is well known, because of Euler’s Theorem the production technology must exhibit constant returns to scale for the product to be entirely distributed, neither more nor less of it, in terms of marginal productivities of the various factors of production. It deserves to be mentioned that Smith’s concept of the division of labor (which, as can be shown, Ricardo endorsed) involves dynamically increasing returns. This indicates an important incompatibility between the classical and the marginalist approach to the problem of value and distribution. Others will be dealt with in the following.

mathematical form, whereas the other doesn't?⁵ Or is it because one of them defines a *theory* of distribution in terms of its particular content, which differs from the content the other one had delivered? In my final judgment, which is supported by what we have just heard and what we are still going to hear in the sequel of this paper, it was first and foremost the issue of content, and no fundamental differences about what a theory is and whether it has to be formalized.⁶ In fact, when reading Stigler's works on Ricardo I could not help thinking that he did not really mean what he had written as a young (and perhaps not very well informed) PhD student. Ricardo clearly *had* a theory of distribution. It may have been less than perfect, incomplete, insufficiently general and so on, but a theory it definitely is. Stigler himself comes close to admitting this in the concluding section of his main work on Ricardo's theory of value and distribution. There he writes:

Ricardo, with his great power of abstraction and synthesis, was a master-analyst. Population, natural resources, capital accumulation, and the distribution of income – these were woven into a sweeping theoretical system [sic!]. Measured by the significance of the variables and the manageability of the system, he fashioned what is probably the most impressive of all models in economic analysis (Stigler 1952: 206-7).

I take this eulogy to mean that Ricardo had in fact elaborated an impressive theory of a dynamical economic system dealing with the production, distribution and utilization of the wealth of a nation. No talk anymore that in 1870 there was no theory of distribution! Around the time mentioned a fundamentally different explanation of distribution was gradually taking shape which the Stigler of 1941 apparently took to be the only one that deserves the name "theory". I am inclined to think that things have not changed much later. This follows from the fact that Stigler did not really take on board, or refute, Piero Sraffa's interpretation and reformulation of the classical theory of value and distribution, as we will see below. However, Stigler, unlike several other marginalist commentators, saw clearly that central properties of Ricardo's theory did not fit the marginalist perspective. The fact that Ricardo, amongst others, had invented the mar-

⁵ Craig Freedman informed me that Stigler had borrowed from Frank Knight the habit of sneering at mathematical formalization. Therefore, the form of Ricardo's theory can hardly have been the reason for Stigler's assessment.

⁶ As far as I can see, Stigler throughout his academic career stuck firmly to methodological individualism and advocated the market form of perfect competition as approximating near enough real world conditions. With perfect competition, no economic agent has any power whatsoever. Market results do not reflect any distortions caused by economic power or control and may therefore be seen to be "just". Stigler defended this position also with regard to the literature on monopolistic competition, championed by Edward Chamberlin and Joan Robinson, and thus denied a significant and lasting influence of monopolies on income distribution. On the treatment (and neglect) of power in economics, see Kurz (2017b). Stigler's unwillingness to admit the impact of economic power on the properties of the economic system reflects a remarkable ideological bias in his analysis. On important differences – methodological and substantive – between the classical and the marginalist viewpoint, see Kurz (2016a: chaps 2 and 4). Here it suffices to stress that the classical economists took the existing society as it was, stratified in social classes (workers, capitalists and land owners), and did not seek to reconstruct the economy by starting from the needy individual. Methodological individualism was no classical concept.

ginal principle when dealing with intensive diminishing returns and thus intensive rent apparently prompts Stigler to ask himself why he failed to apply this principle indiscriminately to all factors of production alike – land, labor and capital. This would have led Ricardo to the elaboration of the sought “theory of the prices of productive services”, which the marginalists later developed. When reading Ricardo, Stigler is on the lookout for anticipations of basic marginalist concepts, such as the elasticity of demand for labor or for corn (see, for example, Stigler 1982: 68-71), and since he does not really find them there is inclined to take it as reflecting a shortcoming of Ricardo’s theory rather than as evidence of its different nature.⁷ Ricardo’s treatment of wages as a given magnitude in his explanation of profits as a surplus is a case in point, as will be seen below (see also Kurz 2011).

The composition of the paper is the following. Section 2 sets the stage for what follows by emphasizing Sraffa’s edition of Ricardo’s works and correspondence as a watershed in interpreting Ricardo and more generally the classical economists’ approach to the theory of value and distribution. Section 3 discusses Stigler’s interpretation of Ricardo’s theory of value and distribution in his 1952 paper. Section 4 turns to his eulogy of Sraffa’s Ricardo edition in his 1953 review article. Section 5 deals with Stigler’s 1958 essay on Ricardo’s alleged 93% labor theory of value. Section 6 contains concluding remarks.

2. A watershed in the interpretation of Ricardo – the RES edition

The Royal Economic Society edition of *The Works and Correspondence of David Ricardo* in eleven volumes (Ricardo 1951-1973) marks a watershed in the interpretation of Ricardo’s contributions to political economy and indeed a watershed in the history of economic analysis more generally. In the introduction to volume I, which contains Ricardo’s *Principles of Political Economy, and Taxation*, Piero Sraffa, the editor (in collaboration with M. H. Dobb), put forward a novel interpretation of Ricardo’s approach to the problem of value and distribution, now known as the “surplus approach”, which has revolutionized the way we see Ricardo today. The core of this interpretation was actually not new: it had been advocated by contemporaries of Ricardo, including James Mill and Robert Torrens, by some of his later critics, most notably Marx, and then by authors who formalised aspects of the theory, in particular Vladimir K. Dmitriev and Ladislaus von Bortkiewicz. But as Sraffa pointed out in his 1960 book, an understanding of “the old classical economists from Adam Smith to Ricardo has been submerged and forgotten since the advent of the ‘marginal’ method” (Sraffa 1960: v).⁸ Sraffa de-

⁷ He criticises, for example, Alfred Marshall for having read into Ricardo an early allusion to the notion of marginal utility; see Stigler (1965a: 75-8). Stigler also rightly insists that Ricardo “was not a Benthamite” and “did not apply the utility calculus to economics” (1965a: 75).

⁸ In his autobiography, Stigler (1988: 214) reported that “Jacob Viner, whose vast and honest erudition has long been my despair, once told me that the average modern reference to the classical economists is

serves the credit for having rediscovered the classical approach from under thick layers of interpretation, which frequently amounted to misinterpretation. And he has shown conclusively that it was not an early and primitive version of demand-and-supply theory. His view has not gone undisputed, but in my judgment emerged from the debates unscathed.⁹

George Stigler was an eminent Ricardo scholar, who thought very highly of Sraffa's Ricardo edition. He did not join the camp of the critics, despite the fact that because of his marginalist training and outlook he was much closer to it than to that of the followers of Sraffa. He was critical of Samuel Hollander's point of view, for example, and criticised him for being "interested only in Ricardo's inner convictions" (Stigler 1990: 765). This is tantamount to saying that Hollander's view is based on beliefs, the correctness of which cannot possibly be established. Stigler published several articles on Ricardo in the 1950s: a major one at a time when he had not yet had access to Sraffa's introduction to *Works I* (Stigler 1952), others before Sraffa's 1960 book had come out (Stigler 1953, 1958). The book contains a logically consistent reformulation of the "classical standpoint" in the theory of value and distribution and solves many of the conundrums with which Ricardo had struggled. It is therefore interesting to see how Stigler tried to cope with the situation. He wrote in a period of transition from received views on Ricardo, shaped first and foremost by Alfred Marshall, to Sraffa's novel one. His acute scholarship prevented him from falling victim to a fairly common attitude, namely to see Ricardo as one's preconceptions wish to see him. Different from some other interpreters, he did not substitute fantasy and inventiveness for meticulousness and scientific sobriety but tried as best as he could to make sense of Ricardo. This was a difficult task, not least because when Ricardo passed away his theory of value and distribution was still in the making, in *statu nascendi*, as his manuscript fragments on "Absolute and Exchangeable Value" (*Works IV*) show. Not knowing the logical terminal point of Ricardo's thoughts and theory – the "higher standpoint" – made it difficult, if not impossible, to judge the various processing elements in it. It cannot come as a surprise, therefore, that Stigler was not always right in his assessment of Ricardo's efforts and in some places, was seriously wrong. At the same time, he deserves credit for having seen things in Ricardo that escaped the attention of other scholars and confirmed implicitly Sraffa's point of view.

so vulgarly ignorant as not to deserve notice, let alone refutation. [...] [F]amous economists have made breath-taking misrepresentations of Malthus on population, Ricardo on value, and so on."

⁹ It suffices to mention contributions by Mark Blaug, John Hicks, Samuel Hollander and Paul Samuelson on the side of the critics and Tony Aspromourgos, Krishna Bharadwaj, John Eatwell, Pierangelo Garegnani, Christian Gehrke, Gary Mongiovi, Neri Salvadori and Giancarlo de Vivo on the side of the supporters of Sraffa's interpretation.

3. Stigler on the Ricardian theory of value and distribution

In June 1952 Stigler published what may be seen as his main article on “The Ricardian theory of value and distribution” (Stigler 1952). He informs the reader that “A draft of this paper was completed before the magnificent edition of Ricardo’s works edited by Sraffa and Dobb began to appear.” (1952: 187n.) And while all references to Ricardo’s works are to this edition, there are no signs that Stigler had been able to absorb Sraffa’s new interpretation of Ricardo’s theory of value and distribution contained in his introduction to volume I of the edition (Sraffa 1951). This is unfortunate because it could have served as a foil to Stigler’s own interpretation, its hits and misses. The fact that he did not confront it with Sraffa’s may perhaps be interpreted as indicating how confident Stigler was at the time that his interpretation, or at least central elements of it, would not be questioned. Be that as it may, in this section we provide a critical account of Stigler’s essay.

3.1 Law of population

Stigler calls Ricardo “the most influential economist” of nineteenth century England, which was “an extraordinary achievement of an extraordinary man” (1952: 187). He dubs the theory of population “the first pillar of the Ricardian system” (1952: 187). However, subsequently he points out rightly that while for some of his argument Ricardo accepted the law of population, which implied a tendency towards a long-term fixed real wage rate, “when he came to analyse wages, the Malthusian theory was virtually ignored” (1952: 194). So no pillar anymore!

This is a valid observation, which raises, of course, the question why Ricardo assumed a given subsistence wage in one part of his economic analysis, but abandoned it in another one. Stigler refrains from entering directly into a discussion of this issue.¹⁰ Close scrutiny shows that Ricardo distinguished between the determination of the rate of profits and relative prices in *given* economic circumstances, that is, at a given time and place, and the movement of all distributive variables, including wages, in *changing* circumstances over time. In the former case, Ricardo insisted, the rate of profits and relative prices are fully determined in terms of the given system of production and a given level of real wages. For an essentially tactical reason he was prepared to come partly Malthus’ way by assuming the law of population, because then the real wage rate could be taken as a given (“subsistence”) magnitude. This rendered the explanation of profits

¹⁰ Stigler has, however, very useful things to say in his methodological pronouncements on how to do the history of economic thought; see Stigler (1965a, 1965b). In his autobiography, Stigler provides compelling arguments in favour of doing and teaching the history of economic thought; see Stigler (1988: chap. 4). Actually, people who despise the history of economic thought ought to be reminded of the fact that publications today are history tomorrow. The cult of modernity is simply an expression of provincialism in time, as one sage observer insisted.

residually in terms of the surplus product a great deal easier and should have prevented Malthus from escaping the logic of Ricardo's reasoning.¹¹

When Ricardo in his theory of capital accumulation and economic development then turned to a system incessantly in movement and transformation from within, he emphasized that the real wage rate can no longer be taken as given and constant and explicitly distanced himself from the Malthusian law of population.¹² He stressed the historical and social dimensions of the natural wage (*Works* I: 96–7) and that “population may be so little stimulated by ample wages as to increase at the slowest rate – or it may even go in a retrograde direction” (*Works* I: 169). “Better education and improved habits” may break the connection between population and necessaries (*Works* II: 115). Workers may get “more liberally rewarded” and thus participate in the sharing out of the surplus product (*Works* I: 48). If this were the case for a prolonged period of time, a sort of ratchet effect may be observed: the higher real wages become customary and define a new level of “natural” wages.¹³ As early as in the *Essay on Profits*, Ricardo stressed that “it is no longer questioned” that improved machinery “has a decided tendency to raise the real wage of labour” (*Works* IV: 35; see also VIII: 171; Jeck and Kurz 1983). It follows that the concept of “natural wages” in Ricardo is defined with reference to the wealth of a society and the growth regime it experiences and must not be interpreted as indicating a given and constant real wage rate – nothing of this sort. An implication of this is that Ricardo felt the need to replace the real (that is, commodity) wage rate by a share concept, or “proportional wages” (Sraffa 1951: lii), that is, “the proportion of the annual labour of the country [...] devoted to the support of the labourers” (*Works* I: 49). It was on the basis of this wage concept that he asserted his fundamental proposition on distribution: the rate of profits depends inversely on proportional wages (see Gehrke 2011).¹⁴

¹¹ Alas, Malthus time and again found means and ways to escape the argument of the “stern logician and powerful debater” that was Ricardo (Stigler 1952: 206) by bringing in new problems or shifting the argument to some new field. Yet the validity of Ricardo's surplus explanation of profits does not presuppose a particular level of wages, but is compatible with any level from the feasible range of wage rates; see on this Section 5 below.

¹² Ricardo's theory of economic growth and development is clearly an endogenous theory that explains the phenomena under consideration from within the economic system and not as a response to factors given from the outside, as the models put forward by Gustav Cassel or Robert Solow more recently. Modern theories of endogenous growth seem to be unaware of this fact and are therefore bound to recapture lost territory little by little. See on this Kurz and Salvadori (2003). Not remembering important chapters of the history of economics evidently comes at a high cost.

¹³ Tony Aspromourgos informed me that Adam Smith appears to have had a similar idea, which is supported by his notion of “emulation” in the *Theory of Moral Sentiments*. While it is somewhat difficult to textually support this in Smith, James Steuart is very explicit about such a ratchet effect.

¹⁴ In his autobiography, Stigler (1988: 217) comes close to what has been said in the above. He writes, “that Ricardo's text is often ambiguous: Page X takes or implies one position and page Y another. That sort of ambiguity is not due simply to carelessness, for at one point he may have been thinking of the short run and at another of the long run, or at one point the focus is on another topic so the wage question is simplified to get it out of the way.”

To conclude, the surplus explanation of profits applies both in a regime, in which the law of population holds, and in a regime, in which it doesn't. Interestingly, Stigler (1952: 194) qualifies Ricardo's view on wages explicitly as "correct", because it did not postulate a given and constant real wage rate, but allowed for an increase over time. The previous discussion should have made clear, however, that Stigler's adjunct remark "Ricardo did not know how to incorporate [it] into his theoretical system" (ibid.) cannot be sustained. We come back to this below.

3.2 *Rent theory*

According to Stigler, the second pillar upon which Ricardo's system was erected was the theory of differential rent. However, also in this regard Stigler considers Ricardo "chiefly a borrower [who] did not improve upon either theory in any basic respect" (1952: 200). I wonder whether this harsh judgment can be sustained in view not only of the evidence available to us but also in view of what Stigler writes in the rest of his essay. Sir Edward West and Malthus had anticipated the theory, or parts of it, the latter "with much less incisiveness and clarity"; Malthus is even said, not without some justification, to have managed to "invent two errors for each truth" (1952: 198). Yet, in the form, in which Malthus had put forward the theory was muddled and if "Ricardo went beyond West" as regards "the analysis of the effects of improvements [in agriculture] on rent" (1952: 199), then Ricardo obviously deserves greater credit than Stigler is willing to give him. Stigler is, however, right in insisting: "In the synthesis of these theories into a general theory of value and distribution, [Ricardo] struck out on his own. The peculiar combination of doctrines that makes up his system is truly original" (1952: 200).¹⁵ Ricardo's main achievement, as I see it, was indeed to have studied the problems of value, distribution, capital accumulation and economic development for an open economy characterised by a division of labor in which money serves as a means of payment in a *general* framework of the analysis.

There is one element in Stigler's interpretation I consider to be misleading. This concerns the multifarious theme of technical progress. First, Stigler contends that Ricardo, like Malthus and West, "gave little thought to technical improvements" (1952: 196) and failed to see that "improvements in agricultural technology were neither negligible nor sporadic, [and that] technological progress in non-agricultural industries could offset diminishing returns in agriculture" (1952: 204). Secondly, he contends with reference to Wicksell ([1901] 1934) that "the celebrated chapter on machinery rests upon a logical error" (1952: 206; see also Stigler 1953: 587). As will be shown, both claims are untenable.

¹⁵ This argument is reminiscent of Joseph A. Schumpeter's (1912) concept of innovations as "new combinations" of known pieces of knowledge. Even if none of the building blocks of Ricardo's analysis had been his own invention, the combination of them represents an original novelty.

3.3 Different kinds of technical progress

Ricardo was clear that technical change was an essential part of the development of modern society and that different types have different effects. He saw the historical course of an economy as largely shaped by two opposing forces: the “niggardliness of nature”, on the one hand, and man’s ingenuity and creativity reflected in new methods of production and new commodities, on the other. Such inventiveness was seen to be the result of competitive conditions. Ricardo also saw that while technical change in industries producing “necessaries” (that is, wage goods) or in industries supplying these industries with inputs will increase the general rate of profits, given the real wage rate, technical change in the production of “luxuries” will not have this effect, but only reduce their prices. He saw the essence of foreign trade to consist in providing access to new methods of production and commodities abroad and compared it to technical progress. The Corn Laws, he insisted, implied interrupting this access with regard to the core necessary of the English economy, which entailed a fall in the general rate of profits, a consequent fall in the rate of capital accumulation and a fall in the real wage rate as a consequence of a reduced growth of the “demand for hands”. The only beneficiaries of the law were the landlords.¹⁶ And he understood that new technical knowledge may at first not be adopted, because it would not be profitable to do so, but may be adopted at a later time as a consequence of the economic environment having changed from within: this is the case of what John Hicks later called “induced technical change”.¹⁷

Already in *The Essay on Profits* of 1815 Ricardo wrote: “we are yet at a great distance from the end of our resources, and [...] we may contemplate an increase of prosperity and wealth, far exceeding that of any country which has preceded us” (*Works* IV: 34). In a letter to Hutches Trower on 5 February 1816 he concluded from a fall in grain prices since 1812 that “we are happily yet in the progressive state, *and may look forward with confidence to a long course of prosperity*” (*Works* VII: 17; emphasis added). Also, in his entry on the “Funding System”, published in September 1820, he stressed with regard to England that “it is difficult to say where the limit is at which you would cease to accumulate wealth and to derive profit from its employment” (*Works* IV: 179). The widespread view (see, for example, Rostow 1990: 34, 87; Blaug 2009; Solow 2010) that Ricardo saw the stationary state lurking around the corner cannot be sustained. It mistakes Ricardo’s method of counterfactual reasoning – What would happen if there was no technical progress, but capital accumulated and the population grew? – for a factual statement about economic development.

¹⁶ Ricardo stated: “I shall greatly regret that considerations for any particular class, are allowed to check the progress of the wealth and population of the country” (*Works* IV: 41). And in the same context he drew an analogy between the Corn Laws and the prevention of “all improvements in agriculture, and in the implements of husbandry”. Clearly, suppressing innovations would entail a tendency towards economic stagnation.

¹⁷ Ricardo’s claims have since then been rigorously shown to be correct; see Sraffa (1960) and, among others, Kurz and Salvadori (1995).

Ricardo studied various types of technical progress and their effects. In chapter II of the *Principles* the focus is on (i) land-saving and (ii) capital alias labor-saving forms of improvements in agriculture. Stigler is, of course, aware of the existence of Ricardo's discussion. He argues that the class of improvements that fall under case (ii), in which "the amount of labor necessary to produce a given product from given land" is reduced, "is surely vacuous under [Ricardo's] definition" (Stigler 1952: 199). He maintains that "Under [Ricardo's] usual assumptions his conclusion should have been that *improvements always benefit the landlords*: the marginal product curve of capital-and-labor is higher relative to the cost of capital-and-labor." (1952: 199-200; emphasis added).

Ricardo's chapter has met with considerable difficulties of understanding and some serious misunderstandings. Edwin Cannan ([1893] 1967) made a start; scholars including Harry Johnson (1948), Mark Blaug ([1967] 1997), Denis O'Brien (1975) and Paul Samuelson (1977) followed him. However, as Gehrke *et al.* (2003) have shown, Ricardo's argument is essentially correct, only its presentation is (partly) problematic.¹⁸ Stigler (1982: 110) in another context, and with explicit reference to Cannan, rightly speaks of the "blinding effect of hypercriticism", which prevents one from understanding what can be deduced from an analytical system.¹⁹ Stigler deserves credit to be always concerned with learning from and understanding the thrust of Ricardo's argument and not mistaking imperfections of presentation for irremediable errors. Alas, with regard to chapter II of the *Principles* his criticism, which is different from that of Cannan *et al.*, can also not be sustained. The fact he mentions regarding the marginal product curve is not sufficient to disprove Ricardo's view since it does not touch upon the question of how in the new situation the social surplus is divided between the recipients of property income, capitalists and landlords, that is, profits and wages. While the sum total of profits and rents is larger, given a constant level of wages, it is well possible that profits are larger and rents smaller. This is the case if the *same* product can be produced cultivating a *smaller* number of qualities of land (Stigler's above formulation "... from given land" lacks clarity in this regard). A simple diagrammatic illustration can show this. The backbone of Stigler's argument is a diagram he borrowed from Marshall ([1890] 1977: Appendix L) in which the effect on rents of a parallel upwards shift of the marginal productivity curve as a result of technical improvements is discussed; see Stigler (1941: 90-91 and 90 fn. 2). However, the argument does not disprove Ricardo's argument, in which certain qualities of land, some of which will have been intramargin-

¹⁸ This shows anew the basic solidity of Ricardo's analysis. Given the limited tools at his disposal, he was remarkably successful in "elucidating economic principles" in the face of a "labyrinth of difficulties"; see Kurz (2015). The fact that the way he presented his findings was frequently less than optimal should not be received with surprise, given the intrinsic complexities of the issues at hand.

¹⁹ According to Stigler (1982: 109), Cannan "was an acute analyst as well as an erudite student of the English classical school", who however "simply could not understand a man like Ricardo". By "examining each sentence, phrase, and word with scrupulous care", he failed to see the forest for the trees. Interestingly, Stigler asks the reader to compare Cannan's (misleading) interpretation with that of Sraffa (1951).

al in the original situation, will no longer be cultivated as a consequence of technical progress. Hence the sum total of the rents of land will be smaller.²⁰

To conclude, the following clarification is in place. In summarising Ricardo's theory especially in the *Essay on Profits*, Stigler interprets him as saying: "the rent of land [Q] will be equal to the total product [X] minus the amount of agricultural capital [K] times its profit rate [r]" (1952: 201). Hence according to this definition $Q = X - rK$. This is only correct, if by "total product" Stigler means what Ricardo called "neat" or *surplus* product. Ricardo leaves no doubt that the latter equals what he, Ricardo, called "total produce" (in quarters of wheat) "after paying the cost of production" (*Works* IV: 17, Table). With total capital consisting only of wages, W , an assumption Ricardo entertained in his example, the correct equation would be $Q = X - W + rW = X - (1 + r)W$, since the wages of labor must be subtracted from the total product. I wonder whether Stigler felt entitled to identify neat and total product because in his view Ricardo did not provide a "complete system", for, he maintained, "in the absence of more explicit theories of population and capital accumulation, the aggregate output of the economy is not determined" (1952: 201). However, as Ricardo's numerical example in the *Essay* shows, aggregate output is known at each stage of the cultivation of different qualities of land. And if it were not known, this would certainly not justify dropping cost of production from economic accounting. Furthermore, assuming a given and constant wheat wage in the example strikes me as a legitimate simplification that does not render the entire exercise futile. It also does not contradict Ricardo's conviction that in the course of actual development the real wage may be expected to change. His reluctance to forecast in which direction and by how much, rather than being a sign of the weakness and incompleteness of his theory, reflects his awareness of the complexity of the issue at hand and the limits of our knowledge. To "elucidate" an economic principle in given conditions is one thing (here: the inverse movement of the rate of profits and the rents of land), to venture predicting the actual course of events is an entirely different thing. Stigler is repeatedly inclined to request being given the latter, where perhaps only the former is possible.

On the basis of his reasoning Stigler (1952: 199) contends: "Ricardo was prone to exaggerate the conflict of interests between landlords and other economic classes". We have seen that the argument Stigler puts forward in support of his claim does not stand up to scrutiny.

²⁰ The marginalist concept of perfect competition, fully flexible "factor prices" and ample opportunities of substitution between the various factors of production leads to the supposition that all factors, including the various qualities of land, will always tend to be fully utilized. No such view is to be found in Ricardo and the classical authors more generally.

3.4 On machinery

In the machinery chapter the emphasis is on improvements in the production of necessities (see Kurz 2010). While Adam Smith viewed the manufacturing sector as essentially producing only luxuries, Ricardo glimpsed its emerging key role as an engine of growth.²¹ It is remarkable that he even contemplated the limiting case of mechanization, that is, a fully automated system of production, and observed: “If machinery could do all the work that labour now does, there would be no demand for labour. Nobody would be entitled to consume any thing who was not a capitalist, and who could not buy or hire a machine” (*Works* VIII: 399–400).

Technical progress, Ricardo was clear, was not always an unambiguous blessing for all members of society. The system, he maintained, may experience prolonged periods of what later was called “technological unemployment”. In short, maximizing profits did not *ipso facto* amount to maximizing employment levels. He explained:

My mistake arose from the supposition, that whenever the net income [profits (and rents)] of a society increases, its gross income²² would also increase; I now, however, see reason to be satisfied that the one fund, from which . . . capitalists derive their revenue, may increase, while the other, that upon which the labouring class mainly depend, may diminish, and therefore it follows . . . that the same cause which may increase the net revenue of the country, may at the same time render the population redundant, and deteriorate the condition of the labourer (*Works* I: 388).

In the chapter “On Machinery” Ricardo constructed an example that was designed to illustrate precisely this possibility. Since the progressive replacement of circulating capital (wages or rather labor) by fixed capital is a characteristic feature of modern economic development, the case under consideration is of great relevance.²³ The numerical example is judiciously constructed. The resulting reduction of employment of labor follows from the stipulated assumptions, which include for simplicity a given real (“subsistence”) wage rate. The argument does not rest upon a “logical error”, as Stigler sur-

²¹ As regards Smith’s view in this regard, see the valid observations in Stigler (1952: 192). Interestingly, he calls agriculture “the basic industry”, because in Smith it was the only industry whose product (“corn”) was needed as an input (via wages) in the production of each and every commodity. (Sraffa (1960), as is well known, defined “basic products” as products needed directly or indirectly in the production of all products.) Different from Smith, Ricardo counted also certain manufacturing goods (coats, hats and other necessities, but also tools, machines etc.) as basics. But in his numerical examples he did not do so consistently, as Stigler perceptively remarks.

²² Gross income in Ricardo’s system of national accounting equals net income (profits and rents) plus wages, and in his labor value reckoning equals the value added by year’s labor of society.

²³ Marx translated Ricardo’s particular case into a rising “organic composition” of capital – the ratio between dead labor incorporated in capital goods and living labor actually performed – and interpreted it as the form of technical progress induced by the capitalist mode of production. The labor displacing effect is taken to give rise to an “industrial reserve army of the unemployed”. Marx contended that this particular form of technical progress is also responsible for a falling tendency of the general rate of profits, whereas Ricardo had argued that technical progress counters the effect of diminishing returns in agriculture on profitability. Anwar Shaikh (2016: esp. 650-651) entertains instead the view, which he formalizes, that the tendency towards a reserve army is only exacerbated by a rising organic composition, but exists also independently of it.

mises. When Wicksell ([1901] 1934) showed that displaced workers may swiftly find employment again, he did so by stepping out of the framework of Ricardo's analysis: Wicksell in fact assumed in a fully-fledged marginalist manner a downward flexible real wage rate and ample opportunities of substitution between labor and machines. And he pointed out that his different results followed from the different assumptions he entertained. Wicksell's reasoning was not designed to question the logic of Ricardo's argument, but to show that premises matter.²⁴

There is also the problem of how to read Ricardo's famous statement that "Machinery and labour are in constant competition and the latter can frequently not be employed until the former rises" (*Works* I: 395). This has typically been interpreted in straightforward marginalist terms as referring to the usual static mechanism of substitution among factors of production as (relative) real factor prices change: with a *rising* real wage rate relative to the rate of profits machines will be substituted for labor. Stigler is inclined to read the statement in this perspective and rejects some alternative interpretations. Eugen von Böhm-Bawerk's attribution to Ricardo of an early version of the concept of the superiority of more roundabout processes of production, Stigler (1941: 284-5) dismisses as being without foundation. However, the conventional interpretation cannot be sustained. As I have shown (Kurz 2015), an interpretation of Ricardo's above statement that is faithful to his doctrine has to take into account the fact that with the accumulation of capital and the growth of population, *money* wages will have to rise in order to prevent real wages from falling as corn prices rise. This rise in money wages eventually triggers a shift to methods of production that use machinery: it is a case of induced innovations in a dynamical setting and not a case of static factor substitution.

Stigler concludes his respective considerations in the following way: "Depending on the relative strengths of technological progress and diminishing returns, the dismal stationary state lies near or far in the future". He adds: "Ricardo pays little attention to this final, historical equilibrium, so we are entitled to infer that he did not believe that it was near" (Stigler 1952: 204).

Both statements, I think, are correct and contrast Stigler's Ricardo pleasantly with the Horseman of the Apocalypse as which Ricardo is frequently portrayed, apparently confounding him and Malthus. But if the latter statement portrays adequately Ricardo's position, and I have no doubt that it does, is it then possible to accuse Ricardo of paying too little attention to technical progress? I wonder.

Stigler calls Ricardo rightly "a theorist who wished to answer definite questions (presented by economic problems), and he made his theory no more general than these questions required" (1952: 200). He rightly praises Ricardo's great intellectual powers and his capability of abstract reasoning and, as we have already heard, sees him as hav-

²⁴ Incidentally it deserves to be mentioned that Samuelson (1989) maintained that "Ricardo was right!" in the machinery chapter. There is no need to enter into a critical discussion of Samuelson's view on the matter; see, therefore, Garegnani (2007) and the short remark in the second part of the following section. On the machinery issue, see also, for example, Neisser ([1932] 1990) and Hagemann (2008).

ing elaborated “what is probably the most impressive of all models in economic analysis” (1952: 207). Ricardo incited “order and precision” in political economy: “This was the basic ‘Ricardo effect’; and [...] we must thank him for it” (1952: 200).

4. Stigler on “Sraffa’s Ricardo”

Shortly after the appearance of the first nine volumes of *The Works and Correspondence of David Ricardo* in 1951 and 1952, Stigler publishes a review article of them in the *American Economic Review* (Stigler 1953).²⁵ The article contains three main parts: an assessment of Sraffa’s work as an editor; Stigler’s view on James Mill’s role in prompting Ricardo to write the *Principles*; and Stigler’s interpretation of whether Ricardo or Malthus advocated “Say’s Law” in one form or other. Here we focus attention on the first and the third theme.

4.1 Sraffa’s editorial achievement

Stigler is full of admiration for Sraffa’s editorial achievement.²⁶ He calls Ricardo “a fortunate man”, not least because “he has been befriended by Sraffa – who has been befriended by Dobb” and calls “Sraffa’s *Ricardo*” a “work of rare scholarship”. He explains:

The meticulous care, the constant good sense, and the erudition, make this a permanent model for such work; and the host of new materials seems to suggest that Providence meets half-way the deserving scholar (1953: 586).

²⁵ Stigler’s review article was one amongst several others. There were only a few authors who came close to seeing immediately the gist of Sraffa’s novel interpretation of Ricardo. See, in particular, Hutchinson (1952).

²⁶ As we have heard, already in Stigler (1952: 187) he spoke of Sraffa’s “magnificent edition”. Stigler’s high esteem of Sraffa apparently dates back to Sraffa’s criticism of Marshall’s partial equilibrium analysis in Sraffa (1926); see the references to the paper in Stigler (1941: 71-3). Stigler is fully aware of the devastating implications of the criticism for Marshall’s theory: “As Sraffa has pointed out, partial equilibrium analysis is completely applicable only to those economies external to the firm but internal to the industry. Here, he says, ‘nothing, or virtually nothing’, is to be found” (1941: 72). As regards possible escapes from the “apparent impasse” (ibid.), the first one lies in the abandonment of partial equilibrium theory and thus of Marshall’s technique of analysis in favour of general equilibrium theory. Stigler warns, however, that the “notorious difficulties of application of general equilibrium theory should undermine overly sanguine hopes of thus securing useful conclusions quickly or easily” (1941: 73). “The second escape”, he adds, “lies in restricting partial equilibrium analysis to those economies which are external to the firm and internal to the industry, recognizing the restricted scope of economies of this type” (ibid.). In short, Stigler basically accepts Sraffa’s argument about the very limited applicability of partial equilibrium analysis. This raises, of course, the question why Stigler in much of his work, including his work on economic policy, relies almost exclusively on competitive partial equilibrium analysis without ever justifying it by entering into a critical discussion of Sraffa’s analysis. One may wonder whether he felt that his politico-ideological commitment could then no longer be kept up and that it was therefore better to avoid such a discussion.

Can a greater amount of praise be heaped upon a scholar? Yes, it can. Stigler stresses the “extraordinary accuracy” of the edition; he calls Sraffa’s editorial notes “superb” and adds:

They seem unbelievably omniscient; they are never obtrusive or pedantical; and they maintain unfailing neutrality. Their presence not only *clarifies much of Ricardo’s work* but also provides a vast fund of information on the economics of the period (1953: 587; emphasis added).

Stigler notes that Sraffa limited his observations in his introduction to volume I, the editorial prefaces and notes to the statement of facts and refrained from providing his interpretation of them. Stigler comments: “This severe self-abnegation was wise: the facts are relatively timeless but even the best analysis of a predecessor will change with the interests and knowledge of the science” (1953: 587). While this is true, it deserves to be mentioned that by simply stating the facts Sraffa was able to draw the attention to a Ricardo, who had nothing in common with the received picture of Ricardo.

Stigler concludes the section in the following way: “Others may be as uncomfortable as I at undiluted praise”, but putting forward the few insignificant criticisms that can be made would only “emphasize more subtly the superlative quality of the scholarship. But usual rules must bow to unusual events: here is a task that need not be performed again” (1953: 587). He ends the essay with the remark: “We are still to receive from Sraffa a biography of Ricardo. We shall wait for it with the patience which he munificently rewards” (1953: 599). Volume XI, which contains a short biography, was published in 1973.

The arguably most controversial statement of Stigler’s essay is the claim that the volumes of the edition “often amplify and sometimes modify our understanding of [Ricardo’s] doctrines, but *they do not change it in essentials*” (1953: 586; emphasis added). As a matter of fact, Sraffa’s interpretation (and then his 1960 reformulation) of Ricardo’s theory of value and distribution changed our understanding fundamentally. Sraffa brought it back towards the way in which the theory was seen by some of Ricardo’s contemporaries, Marx, Vladimir K. Dmitriev and Ladislaus von Bortkiewicz, to mention but a few. Sraffa removed it from the interpretation of the marginalists, who tried to understand Ricardo strictly in marginalist terms and thus missed the gist of his approach. Most importantly, from a history of economic thought perspective, Sraffa’s interpretation turned out to be faithful to what Ricardo actually had written, whereas marginalist interpretations, old and new, faced insurmountable obstacles in establishing a correspondence between interpretation and textual evidence.²⁷ Alas, Stigler also had dif-

²⁷ Stigler (1953: 586) quotes approvingly John Maynard Keynes’s famous quip that Sraffa is a man “from whom nothing is hid”. The perhaps crassest form of twisting the facts came from Samuel Hollander, who argued that whenever Ricardo did not explicitly use a particular (marginalist) concept, we can be sure that it was at the back of his mind and so obvious to him that he did not feel the need to even mention it. This is wishful thinking in the extreme. We have already heard how Stigler characterized Hollander’s attitude.

faculties to escape received modes of interpretation (more of which will be seen below). Luckily these did not completely overshadow his perception of Ricardo.

4.2 Ricardo's achievements and failures

While Stigler's praise of Sraffa's edition can hardly be topped, his praise of Ricardo's achievements as an economist is moderate at best. Interestingly, he writes: "I think Ricardo's policy recommendations were profoundly good but his theory was not of the highest quality" (1953: 586). This may come as a surprise to many readers. First, one may ask whether Sraffa has wasted his talent and energy on a mediocre scholar, and if so, would his edition deserve to be held in such high esteem as Stigler displayed? Would it not rather be a sign of a misallocation of scarce intellectual resources and therefore a welcome object of scathing criticism? And if Ricardo's theory was not of the highest quality, how come that his policy recommendations could be "profoundly good"?

Joseph A. Schumpeter was of a radically different opinion than Stigler. In several of his writings and most notably in his *History of Economic Analysis* (1954) he chastised Ricardo for what he dubbed the "Ricardian vice". This accusation was intended to highlight Ricardo's alleged habit of introducing excessively bold assumptions into an already over-simplified picture of the economy and treating these as known magnitudes when in fact they are unknowns. According to Schumpeter (1954: 569), Ricardo's "fundamental problem" was that he had only one equation, but four variables: "net output equals rent plus profits plus wages".²⁸ Operating with this perspective, Ricardo was bound to treat three of the variables as constants. In addition Schumpeter deplored Ricardo's alleged habit of "piling a heavy load of practical conclusions upon a tenuous groundwork" (1954: 1171). In short, Schumpeter insinuated that Ricardo's policy recommendations were not derived from a fairly coherent economic theory, but were rather ad hoc and opinionated. Ricardo was more of a political animal than an unprejudiced scholar.

I disagree with both commentators, but my disagreement with Schumpeter is greater still.²⁹ Let me explain the reasons for it. As far as I can see, Stigler bases his judgment that Ricardo's theory "was not of the highest quality" on the following reasoning. While he does not claim that Ricardo's theory is underdetermined, he maintains that several elements of it cannot be sustained. These include in particular: (i) "Ricardo's mistaken theory of the effects of machinery (fixed capital) on wages" (1953: 587); and (ii) Ricardo "postulating full employment in dealing with a theory of unemployment" (1953: 598). As regards the machinery case, we have already seen in Section 3 that Stigler's

²⁸ William Stanley Jevons and Walras anticipated the objection that Ricardo's system was underdetermined – the number of equations was smaller than the number of unknowns to be ascertained; see Kurz (2016b and 2017a).

²⁹ I side with Stigler (1982: 4) when he stresses that preaching "is almost non-existent in Ricardo's Principles".

criticism does not stand up to close scrutiny. Here the case may be related to the second criticism, which turns upon the compatibility, or otherwise, of “Say’s Law”, as Ricardo advocated it, and unemployment.

Prior to that we have to deal briefly with Schumpeter’s “Ricardian vice” criticism (see also Kurz 2008). As regards the way Ricardo reasoned, Schumpeter and other critics have not taken seriously his statement that in all his argument and numerical illustrations “I have been desirous only to elucidate the principle, and it is scarcely necessary to observe, that my whole basis is assumed at random, and merely for the purpose of exemplification. The results though different in degree, would have been the same in principle. [...] My object has been to simplify the subject” (*Works* I: 121-22). Hence, while it is true that Ricardo typically employed bold cases to “elucidate” the principle at hand and draw attention to what in his view were the most important aspects of the problem under consideration, he invited his readers to try out less restrictive assumptions and investigate their implications. Some later commentators rightly praised Ricardo for having heralded an approach in economics that requires a clear statement of the assumptions on the basis of which certain propositions are taken to be valid within a given analytical context. This is now considered an indispensable prerequisite of scientific communication. Therefore, what in Schumpeter’s view is a vice, nowadays is taken to be a virtue. Stigler actually emphasizes in this vein: “The triumph of Ricardo over Malthus cannot be regretted by the modern economist: it is more important that good logic win over bad than that good insight win over poor” (1953: 599).

We now come back to the machinery chapter. It was a turning point in Ricardo’s understanding of an economic system penetrated by labor saving and fixed capital increasing methods of production. Ricardo had to admit, as we have already heard, that certain types of technical progress “may at the same time render the population redundant, and deteriorate the condition of the labourer” (*Works* I: 388). While Ricardo previously had thought that displaced workers would swiftly find employment again, either in the same or some other industry, he now felt that this was not so: there was no presumption that labor compensation was almost automatic. The question now is: Does this new view get in the way of Ricardo’s concept of “Say’s Law” – is it the source of an inconsistency of his theory?

The answer is no. To see this, we must be clear about the precise meaning of Say’s Law in Ricardo. The important point to be made is that Ricardo’s conception of the law implied, against Malthus, that there cannot be a “general glut” of commodities and a redundancy of capital, that is, there cannot be an overproduction or excess supply of things that are being produced out of the profit motive. Since labor is not so produced, the law does not extend to it: it does not *eo ipso* imply the full employment of labor. Stigler (1953: 595) quotes Ricardo, who emphasizes “that there is no limit to demand – no limit to the employment of capital while it yields any profit” (*Works* I: 296). If this is the case, then there is no presumption that the ordinary state of affairs in the economy is characterised by full employment. Stigler is one of the few interpreters of Ricardo, who has clearly seen this when he writes with regard to the quoted passage: “In this form the

law of markets is no longer a truism, it is the proposition that general equilibrium of the economy, with prices equal to costs (including ‘profits’), *is compatible with any level of real income*” (1953: 595). It is thus also compatible with a level of employment below full employment. Stigler adds: “It would be more appropriate to call this the [James] Mill-Ricardo Law than Say’s Law” (1953: 595).

Since in Ricardo’s conceptualization Say’s Law did not in itself imply the full employment of labor, the net displacement of labor consequent upon the introduction and diffusion of new methods of production, will increase unemployment. If the wages of those employed were fixed at a rigidly defined subsistence level, they could not support the unemployed. Unemployment would gradually disappear because of workers’ attrition. In Ricardo such a scenario is at most used in order to illustrate the logical implications of an extreme hypothesis, but not in order to describe the ordinary state of affairs of a developing economy.³⁰

5. Stigler on Ricardo’s “93% labor theory of value”

5.1 Analytical vs. empirical labor theory of value

Stigler (1958: 357) introduces his essay bearing the same title as this section with the question: “Did Ricardo have a labor theory of value – did he believe that the relative values of commodities are governed exclusively by the relative quantities of labor necessary to produce them?” As against those who have given “a flat affirmative answer to this question” he insists “that there is not the slightest basis for such an answer” (ibid.). This view may be confronted with Sraffa’s whom Paul Samuelson once asked, whether Ricardo held a labor theory of value. Sraffa is reported to have answered: “He did and he didn’t.” What might at first sight be considered a sibylline response turns out to reflect properly Ricardo’s point of view, which, for example, in the third edition of the *Principles* comes to the fore when Ricardo speaks “of labour as being *the foundation of all value*, and the relative quantity of labour as *almost exclusively* determining the relative value of commodities” (*Works* I: 20; emphasis added).

Stigler derives his concept of a “93% labor theory of value” from a numerical example Ricardo discusses in the *Principles* (see *Works* I: 35-6) in order to illustrate the dependence of relative prices on income distribution, given the system of production in use. Stigler’s interpretation elicits the following remarks. In the example Ricardo exemplifies how a *change* in income distribution, that is, a rise in wages and the correspond-

³⁰ In his treatment of the machinery question in Ricardo, Samuelson (1989) assumed that wages are fixed at a rigid subsistence level. Unemployment therefore results in a decline of population – even in the short run. In this way labor supply is assumed to adjust quickly to labor demand. Samuelson speaks nevertheless of a Pareto optimal sequence of situations despite the fact that some people are destined to premature death. In my view Samuelson’s interpretation does not reflect adequately Ricardo’s position on the matter, but is caught in what might be called a Malthusian trap of the mind.

ing fall in the rate of profits (see below), affects relative prices of commodities produced with different proportions of fixed and circulating capital. Ricardo concludes against the background of his numerical example: “The greatest effects which could be produced on the relative prices of these goods from a rise of wages, could not exceed 6 or 7 per cent.” The reason he gives in support of what he calls a “comparatively slight” effect, is that “profits could not, probably, under any circumstances, admit of a greater general and permanent depression than to that amount” (*Works* I: 36). Which amount does he stipulate? “[O]wing to a rise of wages, profits fall from 10 to 9 per cent” (*Works* I: 35). Here Ricardo invokes his “fundamental law of distribution” – the inverse relationship between the general rate of profits and wages (in modern theory also known as the *wage curve*). Alas, since he is not possessed of an analytically precise specification of this relationship, he can only put forward a guesstimate by how much the rate of profits will “probably” have to fall as a consequence of the postulated rise in wages. He *stipulates* that it falls by just one per cent. If it fell by more (or less) than that, the change in relative prices would be different.

More importantly with regard to Stigler, since the rate of profits was assumed to be positive in the initial situation (10 per cent.), relative prices will already then have deviated from relative labor values. Hence, what Ricardo in fact discusses, and what Stigler’s interpretation misses, is not a deviation of prices from labor values, but a *change* in the deviation due to a change in income distribution. And this *change in the deviation* Ricardo considers to be relatively small, in the range of 6 to 7 per cent. The *whole* deviation is an entirely different thing and may, for a given distribution of income (that is, a given wage rate), be a great deal larger with respect to some prices and a great deal smaller with regard to some other prices.³¹ If the chosen standard of value exhibits a medium proportion of fixed to circulating capital, its price will *ex hypothesi* not change and remain equal to its labor value, independently of income distribution. Yet commodities that are produced with a higher proportion than the medium one, will fall in price relative to the standard consequent upon a rise in wages (and the corresponding fall in the rate of profits), whereas commodities produced with a lower proportion will rise in price.³² In view of these facts, which Ricardo stresses, it makes little sense to talk of a 93% labor theory of value.

Secondly, and closely related, for a given system of production and a given rate of profits not 93% of *all* prices will be “explained” by labor, some prices will deviate more strongly and others less strongly from labor values. Depending on the measurement de-

³¹ The main purpose of Ricardo’s numerical example is to insist that the effects of a change in the methods of production and thus technical progress on relative prices are more important than those associated with a change in income distribution, given the methods of production employed. Technical change tends to reduce the quantities of labor needed in the production of the various commodities. The effects of what Ricardo calls “the other great cause [!] of the variation in the value of commodities, namely, the increase or diminution in the quantity of labour necessary to produce them” (*Works* I: 36), are “not so” comparatively slight.

³² Since we are here concerned with comparative statics, a “fall” or “rise” in price should be read as a lower or higher level of the respective price compared with what it was in the initial situation.

vice applied with regard to labor values and prices, some prices will exceed and others fall short of the labor value!³³ Would one then have to say in the second case that labor values explain *more* than the price under consideration? One may construct at will numerical examples in which the average percentage will be higher or lower, as the case may be. And with a change in the general rate of profits (and an inverse change in the real wage rate), given the system of production in use, the percentage with regard to each commodity will typically change more or less. Hence, attributing to Ricardo a definite percentage labor theory of value, while suggestive, is neither faithful to his argument nor does it make analytically much sense.³⁴

Yet the important point Stigler wishes to make, and which I endorse, is this: “I can find no basis for the belief that Ricardo had an *analytical* labor theory of value, for quantities of labor are *not* the only determinant of relative values.” According to Stigler, Ricardo “held what may be called an *empirical* labor theory of value, that is, a theory that the relative quantities of labor required in production are the dominant determinants of relative values” (1958: 361; emphases in the original)

While I consider the first statement to be correct and faithful to Ricardo, the status of the second one is somewhat dubious not least in the face of numerical examples that can be constructed. However, the problem is somewhat deeper and derives from the fact that Ricardo did not manage to elaborate a fully correct theory of value and distribution, as Stigler rightly mentions (1958: 361). Yet without such a theory the deviation of relative competitive prices from relative labor values for a given system of production and a given distribution of income cannot be ascertained. Therefore, Stigler’s attribution to Ricardo of a 93% labor theory of value is somehow hanging in the air, not least because with a change in the system of production and in the real wage rate (or the share of wages) the percentage will, in general, change too. Since Sraffa elaborated a correct theory in his book *Production of Commodities by Means of Commodities* (1960) by adopting, correcting and extending Ricardo’s approach to cover all important phenomena in the theory of production (fixed capital, joint production, scarce natural resources), we may look at the issues at hand from this higher standpoint.

5.2 Two senses of “labor”

Sraffa began to develop his theory as early as the second half of 1927. In a quick succession he came up with important insights that throw fresh light on old controversies and actually show the way how to resolve them. A first such insight concerns the con-

³³ This is typically the case with regard to Marx’s “transformation” of labor values in production prices, which is based on the assumption that the positive and negative deviations cancel out in the aggregate.

³⁴ This does not mean, of course, that the labor theory of value can never be a fairly good empirical predictor of prices. Indeed, Ricardo was convinced that relative prices corresponded closely to relative quantities of labor embodied in commodities and developed his argument on the simplifying assumption of their equality, even though he knew very well that this was not strictly true. For the most recent work on empirics and the labor theory of value, see Shaikh (2016: chap. 9).

cept of “labor”, which in many contributions, old and new, is treated as a simple and straightforward thing, although it is anything but that, as Ricardo knew well. The following note Sraffa wrote in November 1927 may be read as a comment also on Ricardo’s above statement (see *Works I*: 20):

It is the *whole* process of production that must be called “human labour”, and thus causes all product and all values. Marx and Ricardo used “labour” in two different senses: the above, and that of *one* of the factors of production (“hours of labour” or “quantity of labour” has a meaning only in the latter sense). It is by confusing the two senses that they got mixed up and said that value is proportional to quantity of labour (in second sense) whereas they ought to have said that it is due to human labour (in first sense: a non measurable quantity, or rather not a quantity at all) (Sraffa Papers D3/12/11: 64; emphasis in the original).

A confusion of the two senses was widespread in the literature on Ricardo, as Stigler (implicitly) stresses. Actually it still is. Recently Mary Morgan wrote with regard to Ricardo’s theory: “it is labour alone that creates value, and ... there is a direct relationship between labour input and value” (Morgan 2012: 60). As we have just seen, Ricardo was decidedly *not* of this opinion. While he assumed *for simplicity* (see *Works I*: 36-37) that relative prices are proportional to relative labor quantities, he clearly did not advocate the view that “it is labour alone that creates value” – it was Marx who did it most prominently.

So what precisely was Ricardo’s view, what was his *analytical* theory of value, as interpreted in terms of Sraffa’s reformulation and generalisation of it?³⁵

5.3 “Natural prices”

This theory may be stated with the help of some little formal analysis. The system of “natural prices” or “prices of production” in the simple case of circulating capital only (and setting aside scarce land on Ricardo’s assumption that prices and the general rate of profits are determined on no-rent bearing, or marginal, land) and in which each and every commodity is used in the production of each and every commodity, either directly or indirectly,³⁶ is given by

$$\mathbf{p} = (1 + r)(\mathbf{A}\mathbf{p} + w\mathbf{l}), \quad (1)$$

with \mathbf{p} as the n -dimensional price vector, \mathbf{A} as the material input matrix, \mathbf{l} as the n -dimensional vector of (homogeneous) labor inputs, r as the general rate of profits and w as the wage rate (see Kurz and Salvadori 1995: chap. 4). All value magnitudes are expressed in terms of some standard of value, a single commodity or a bundle of commodities \mathbf{d} , that is,

³⁵ Prior to Sraffa, authors such as Dmitriev ([1898] 1974) and von Bortkiewicz ([1906-7] 1952) had made attempts to re-interpret (parts of) Ricardo’s theory in mathematical terms. See the entries on their contributions in volume I of Faccarello and Kurz (2016).

³⁶ All commodities are assumed to be “basics” (see Sraffa 1960: 9-10); matrix \mathbf{A} is indecomposable. For a discussion of the case with basics and non-basics, see Kurz and Salvadori (1995: chap. 4).

$$\mathbf{d}^T \mathbf{p} = 1. \quad (2)$$

Solving (1) for \mathbf{p} gives

$$\mathbf{p} = (1 + r)w[\mathbf{I} - (1 + r)\mathbf{A}]^{-1}\mathbf{l}, \quad \text{where } 0 \leq r \leq R, \quad (3)$$

with R as the maximum rate of profits of the system corresponding to a zero wage rate, $w = 0$, and \mathbf{I} as the $n \times n$ identity matrix. For a given system of production represented by (\mathbf{A}, \mathbf{l}) , and a given real wage rate (that is, a wage rate expressed in the standard of value and compatible with a non-negative rate of profits), the $n + 1$ unknowns – n prices and r – are determined by equations (1) and (2).³⁸ Some simple manipulation of the equations gives the inverse relationship between the real wage rate and the rate of profits – Ricardo’s “fundamental law of income distribution”:

$$w = \{\mathbf{d}[\mathbf{I} - (1 + r)\mathbf{A}]^{-1}(1 + r)\mathbf{l}\}^{-1}. \quad (4)$$

Obviously,

$$\partial w / \partial r < 0,$$

or, as Ricardo put it: “The greater the portion of the result of labour that is given to the labourer, the smaller must be the rate of profits, and vice versa” (*Works* VIII: 194).³⁹

Before we continue, a remark on Stigler’s (1952: 203) following proposition is appropriate: “Ricardo’s basic theorem on distribution [...] is strictly dependent on his measure of value.” To be clear, depending on the chosen standard of value, that is, the vector \mathbf{d} in the above formalisation, the shape of the w - r relationship will change. But Stigler seems to suggest (see 1952: 202) that a change in the standard of value might also affect the mathematical properties of the economic system, especially whether the wage rate and the rate of profits are inversely related. However, as Ricardo already made very clear, the choice of a standard of value (or numeraire, as it was later called) is a question of convenience, but not of substance. The fact that he paid so much attention to the problem reflects his search for a correct theory of value and distribution and in this regard some standards of value are more illuminating and useful than others (see Sraffa 1960: Appendix D). In systems without pure joint production, the two distribu-

³⁷ As a vector, \mathbf{d} may be interpreted as defining the elementary wage goods basket, a multiple of which gives the ruling real wage.

³⁸ Here we assume a given real wage rate. The reader is invited to formalize the case with given proportional wages (that is, a given share of wage).

³⁹ It deserves to be mentioned that Ricardo had formulated his fundamental law with regard to a system of production in which all means of production could, in a finite number of steps, be reduced to, or resolved in, wages. This is not true with regard to circular systems of production, as Marx was the first to point out. However, there can be no doubt that Ricardo was interested especially in circular production, but felt that the simpler case of unidirectional or linear production would lead him a long way towards a proper understanding also of the former case; for an analytical comparison of the two, see Kurz and Salvadori (1995: chap. 6).

tive variables are negatively related, independently of the standard of value chosen.⁴⁰

As Sraffa made clear, the general rate of profits and relative prices can be fully ascertained in terms of the independent variables, or data, Ricardo assumed: the system of production in use (\mathbf{A} , \mathbf{l}) and the real wage rate (w). Hence prices depend on two givens – technology and income distribution.⁴¹ No other data are needed, as the marginalist critics of Ricardo from William Stanley Jevons to Léon Walras (but not Knut Wicksell!) wrongly contended. This finding pays tribute to Ricardo’s remarkable intuition. He was basically on the right track, although he was unable to follow it down to its end.

5.4 Labor values

Now what about labor values? The labor value of a commodity equals the amount of labor directly expended in its production plus the sum total of the amounts of labor needed indirectly. These are “embodied” in the commodities productively consumed directly or indirectly in the course of the production of a unit of the commodity under consideration; these commodities are taken to transfer the labor contained in them into the produced commodity. In matrix notation

$$\mathbf{v} = \mathbf{A}\mathbf{v} + \mathbf{l} \quad \text{or} \quad \mathbf{v} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{l}, \quad (5)$$

with \mathbf{v} as the vector of quantities of labor embodied in the different commodities.

We may now compare the equations giving natural prices (3) and the equations giving labor values (5). The ratio v_j/p_j gives the percentage of the price of commodity j ($j = 1, 2, \dots, n$) “explained” in terms of the amount of labor “embodied” in the commodity, *given* the system of production actually in use and *given* the real wage rate (the rate of profits). (To be able to say this, we would have to normalize prices in such a way that they are directly comparable to labor values, an exercise we leave to the reader.)

It can be seen at a glance that prices are proportional to labor values in the special case in which the general rate of profits is equal to zero, because then

$$\mathbf{p} = \mathbf{p}^* = w(\mathbf{I} - \mathbf{A})^{-1}\mathbf{l} = w\mathbf{v}. \quad (6)$$

Prices \mathbf{p}^* are just a special solution of system of equations (3) in which there are no profits and the entire social surplus is distributed in terms of wages. In this case, and opposed to Stigler’s view quoted above, quantities of labor are the *only* determinant of relative prices. There is another case in which they are the only determinant, but now irrespective of the level of the rate of profits r , $0 \leq r \leq R$. It is the case known as “equal organic compositions of capital” throughout the economy. Since from a technological point of view this case is very special it need not concern us here.

⁴⁰ In the case of pure joint production it is possible that with some numeraire (but not all possible numeraires) the wage rate and the rate of profits may be positively related to one another in some feasible range of non-negative values of the two variables; see Kurz and Salvadori (1995: chap 7). This possibility need not concern us here, not least because it does not seem to have been at the back of Stigler’s mind.

⁴¹ And not just on one, wages, as Ricardo typically assumed in much of his analysis of profits, and for which Marx had rightly criticized him.

5.5 Reduction to dated quantities of labor

In Ricardo we do not find any of the above equations. What we find, however, are numerical examples in which the prices of commodities are “reduced to dated quantities of labour” that are appropriately discounted forward. Such a reduction can also be carried out with respect to equation (1) by replacing time and again the \mathbf{p} on the RHS of the equation by the price equation itself. We get

$$\mathbf{p} = (1+r)\mathbf{A}^0\mathbf{w}\mathbf{l} + (1+r)^2\mathbf{A}^1\mathbf{w}\mathbf{l} + (1+r)^3\mathbf{A}^2\mathbf{w}\mathbf{l} + \dots + (1+r)^t\mathbf{A}^{t-1}\mathbf{w}\mathbf{l} + (1+r)^t\mathbf{A}^t\mathbf{p}, \quad (7)$$

where $\mathbf{A}^1 = \mathbf{A}$ and $\mathbf{A}^0 = \mathbf{I}$. With production as a circular flow – the production of commodities by means of commodities – the series is infinite, whereas with production as a unidirectional or linear process, it is finite. As was mentioned already, Ricardo frequently assumed unidirectional processes in order to simplify matters. Since Ricardo was interested first and foremost in relative prices, we may divide \mathbf{p} by w and arrive at what Adam Smith had called “labour commanded prices”, $\mathbf{p}^\circ = \mathbf{p}/w$. This renders clear that prices depend generally on (i) the technique used and (ii) the general rate of profits (or, because of equation (4), on the real wage rate). With $r = 0$, equation (6) tells us that labor commanded prices equal labor embodied values.

5.6 Ricardo and modern classical economics

Stigler published his 1958 paper two years before Piero Sraffa’s 1960 book came out. He therefore did not know Sraffa’s analysis, which once and for all clarified the analytical issues at hand and had the potential of putting long-standing controversies concerning Ricardo’s doctrine (but also Marx’s) at rest.⁴² However, Stigler knew Sraffa’s introduction in volume I of *The Works and Correspondence of David Ricardo*, which had been published in 1951. There Sraffa had laid out the foundation of his surplus-based interpretation of Ricardo, which stood in marked contrast to received interpretations, especially the one of Alfred Marshall, who portrayed Ricardo essentially as a precursor of the marginalist or demand-and-supply theory, with the demand side still in its infancy. In view of this, the concluding paragraph of Stigler’s essay comes as a surprise. He writes:

The basic reason Ricardo’s theory is often misinterpreted is that it was often misinterpreted in the past. If a theory once acquires an established meaning, each generation of economists bequeaths this meaning to the next, and it is almost impossible for a famous theory to get a fresh hearing. Perhaps one hearing is all that a theory is entitled to, but one may plead that Ricardo deserves at least a rehearing – *his theory is relatively more widely misunderstood today than it was in his lifetime*. One can build a strong case that

⁴² The fact that it did not quite succeed in the second respect had many reasons. These included *inter alia*: the unwillingness of those that had for some time advocated different interpretations to admit that they were wrong; the need for achievement and originality of those that came up with entirely new interpretations; ideological reservations with regard to the implications of the fully worked out Ricardian theory of value and distribution; and, of course, basic misunderstandings of its analytical complexities. Incidentally, I am not aware of any evidence showing that Stigler ever seriously read Sraffa’s 1960 book.

the modern economist need not be acquainted with Ricardo's work, but there is no case for his being acquainted with an imposter (Stigler 1958: 367; emphasis added).

This passage elicits the following observations. First, as has already been said, it can be presumed that a correct interpretation presupposes the availability of a fully coherent version of the theory Ricardo was intent on elaborating, as a measuring rod. Only against the background of such a theory is it possible to see clearly how far Ricardo had got in his endeavour, where he went wrong, what his intuition told him and the like. This is in turn a precondition for judging adequately the hits and misses of Ricardo's interpreters. This theory is now available to us. Therefore it can safely be assumed that today the situation is in principle a great deal better than it was a few decades ago and grave misunderstandings of Ricardo can (and ought to) be avoided.⁴³ Secondly, as Sraffa's revival of the classical theory of value and distribution also showed, marginalist theory – whether the partial equilibrium version in the tradition of Marshall or the general equilibrium one in the tradition of Walras – are difficult to sustain because of serious capital theoretic difficulties. Hence, the modern economist is well advised to get acquainted with the modern reformulation of Ricardo's theory.

6. Concluding remarks

The paper scrutinized George Stigler's numerous papers and remarks in books on David Ricardo's Political Economy. The emphasis is on the theory of value and distribution. It is shown that Stigler, like many other marginalist scholars, assesses Ricardo's contribution in terms of marginalist theory, based on the twin concepts of marginal productivity and marginal utility. This confirms Sraffa's observation that by the end of the nineteenth century the analytical structure, content and genuine significance of the classical theory had been "submerged and forgotten": Smith and Ricardo were then largely seen through neoclassical lenses. This applies also to Stigler in the papers he published in the 1950s. However, different from many others, his historical acuteness and concern with textual evidence from Ricardo's writings in support of the interpretation advocated, made him see that important elements of Ricardo's analysis resist the marginalist point of view. He noted with great care the incompatibilities, but was not able to disentangle Ricardo's genuine approach from the marginalist clasp.

His irritation can only have been increased by Sraffa's edition of the works and correspondence of David Ricardo and especially his introduction in volume I. In it Sraffa

⁴³ It may of course be argued that people living in the same period of time are capable of understanding each other better than later generations, because they have been brought up in the same intellectual climate, had perhaps had the same teachers and have read the same books and so on. The case of James Mill, Robert Torrens and others illustrates this. There is obviously some truth in this, but it is also not uncommon that people have tremendous difficulties in understanding each other. The discussions between Ricardo and Malthus are a case in point. The communication between two scholars who are on the lookout for different things need not exactly be easy and smooth.

laid out the analytical core of Ricardo's surplus-based theory of the rate of profits. This flew in the face of the marginalist interpretation, which takes profits to reflect the marginal productivity of capital. Interestingly, Stigler praises Sraffa's editorial work, introductions and notes beyond all measure. However, he refrains from entering into a detailed discussion of Sraffa's novel point of view. Things do not change after Sraffa in 1960 published his book in which he put forward a logically consistent formulation of the classical theory of value and distribution. We do not know the reasons for Stigler's reticence: Was it because he would have to take a position and possibly distance himself from his earlier work on Ricardo?⁴⁴ Was it because he held Sraffa's work, including the latter's article of 1926, in such high esteem that he saw no need, or possibility, to enter into a critical discussion of it? Was it because he did not feel yet in a position to form a judgment on the issue? It can safely be said that ideologically Stigler and Sraffa did not belong to the same flock. Hence one would have expected Stigler to enter the intellectual battlefield once the essence of Sraffa's view of Ricardo and the logical implications of the latter's theory had become clear. Alas, this did not happen.

Stigler has variously been accused of being an ideologue. Against this he always insisted to be a scientist. In this regard, Schumpeter's following observation is perhaps of some use. Schumpeter argued that economists are confronted with an explanandum, the economy, which is extremely complex. They cannot approach the subject without pre-scientific views, which might be called ideologies. No economist can escape this. The question is, whether and to what extent an author in the course of his scientific work is able to correct his preconceptions, transcend them or establish them firmly. Some fare better in this regard than others. Seen from this perspective, Stigler was right to see himself as a scientist, but an ideologue he still was. The fact that he unswervingly stuck to the ideal of *perfect* competition despite Sraffa's devastating criticism of Marshall's analysis of it might be seen as reflecting a strong ideological bias in his thinking. In conditions of universally perfect competition, by construction there is no economic power whatsoever. In the real world, however, there is no perfect competition, as a matter of fact. To mistake the real world for an ideal, one implicitly favours those that actually do have economic power vis-à-vis those that don't. In contradistinction, the classical concept of *free* competition, which must not be confounded with that of perfect competition, does not refer to a powerless situation and therefore lacks the ideological bias of the view that the real world is best understood in terms of a reference to perfect competition.⁴⁵

⁴⁴ Stigler was apparently known for typically not responding to criticisms.

⁴⁵ Harry Bloch has insisted in correspondence with me that in fairness to Stigler it ought to be mentioned that in his work on price theory he refers to the distinction between free and perfect competition and in his applied work makes more use of the former than the latter. See, in particular, the survivor principle for determining economies of scale or the effect of concentration on price through the probabilistic approach to ascertaining cheating on tacit price coordination in his theory of oligopoly. Nonetheless, ideology is certainly important, not least in Stigler's choice of topics to research in his applied work.

I conclude by paraphrasing Sigler's final remark in his review article (1953: 599). We are still to receive from Stigler his view of Sraffa's interpretation and reformulation of Ricardo's theory of value and distribution. We would be prepared to wait for it with the patience which he munificently rewards, but we know that we would wait in vain.

References

- Blaug, M. ([1967] 1997), *Economic Theory in Retrospect*, 5th edn, Cambridge and New York: Cambridge University Press.
- Blaug, M. (2009), The trade-off between rigor and relevance: Sraffian economics as a case in point, *History of Political Economy*, 41(2): 219–247.
- Bortkiewicz, L. von ([1906-7] 1952), Wertrechnung und Preisrechnung im Marxschen System', three parts, *Archiv für Sozialwissenschaft und Sozialpolitik*, 23: 1–50; 25: 10–51 and 445–488. English translation of pts. 2 and 3 as 'Value and price in the Marxian system' in *International Economic Papers*, 2: 5–60.
- Cannan, E. ([1893] 1967), *A History of the Theories of Production and Distribution in English Political Economy from 1776-1848*, London: P.S. King. Reprint 1967, New York: Augustus M. Kelley.
- Dmitriev, V.K. ([1898] 1974), First Essay: The Theory of Value in D. Ricardo – An Attempt at a Rigorous Analysis, in Dmitriev, V.K., *Economic Essays on Value, Competition and Utility*, edited by D. M. Nuti, Cambridge: Cambridge University Press, pp. 37-95.
- Faccarello, G. and Kurz, H.D. (eds) (2016), *Handbook on the History of Economic Analysis*, three vols, Cheltenham and Northampton: Edward Elgar.
- Garegnani, P. (2007), Professor Samuelson on Sraffa and the classical economists, *European Journal of the History of Economic Thought*, 14(2): 181–242.
- Gehrke, C. (2011), Price of wages: a curious phrase, in R. Ciccone, C. Gehrke and G. Mongiovi (eds), *Sraffa and Modern Economics*, vol. 1, London: Routledge, pp. 405-422.
- Gehrke, C., Kurz, H.D., and Salvadori, N. (2003), Ricardo on agricultural improvements: a note, *Scottish Journal of Political Economy*, 50(3): 291–296.
- Hagemann, H. (2008), Capital, growth and production disequilibrium: on the employment consequences of new technologies, in R. Scazzieri, A. Sen and S. Zamagni (eds.), *Markets, Money and Capital. Hicksian Economics for the Twenty-First Century*, Cambridge: Cambridge University Press, pp. 346-366.
- Hutchinson, T. (1952), Some questions about Ricardo, *Economica*, 19(76): 415-432.

- Jeck, A. and Kurz, H.D. (1983), David Ricardo: Ansichten zur Maschinerie, in H. Hagemann and P. Kalmbach (eds), *Technischer Fortschritt und Arbeitslosigkeit*, Frankfurt am Main: Campus, pp. 38–166.
- Johnson, H.G. (1848), An error in Ricardo’s exposition of his theory of rent, *Quarterly Journal of Economics*, 62(5): 792-793.
- Knight, F.H. (1935), The Ricardian theory of production and distribution, *Canadian Journal of Economics and Political Science*, 1(1-2): 3-25 and 171-196.
- Kurz, H.D. (2008), Ricardian vice, in W.A. Darity (ed.), *International Encyclopedia of the Social Sciences*, vol. 7, 2nd edn, Detroit, MI: Macmillan Reference, pp. 243–247.
- Kurz, H.D. (2010), Technical progress, capital accumulation and income distribution in classical economics: Adam Smith, David Ricardo and Karl Marx, *European Journal of the History of Economic Thought*, 17(5): 1183-1222.
- Kurz, H.D. (2011), On David Ricardo’s theory of profits. The laws of distribution are “not essentially connected with the doctrine of value”, *The History of Economic Thought*, 53(1): 1–20.
- Kurz, H.D. (2015), David Ricardo: on the art of “elucidating economic principles” in the face of a “labyrinth of difficulties”, *European Journal of the History of Economic Thought*, 22(5): 818–851.
- Kurz, H.D. (2016a), *Economic Thought: A Brief History*, New York: Columbia University Press.
- Kurz, H.D. (2016b), David Ricardo (1772-1823), in Faccarello and Kurz (eds), vol. I, pp. 120-143.
- Kurz, H.D. (2017a), Is there a “Ricardian Vice”? And what is its relationship with economic policy ad“vice”?, *Journal of Evolutionary Economics*, 27(1): 91-114.
- Kurz, H.D. (2017b), Power – the bête noire of much of economics, The XXVth Krishna Bharadwaj Memorial Lecture, Jawaharlal Nehru University, New Delhi, 3rd March 2017, to be published.
- Kurz, H.D. and Salvadori, N. (1995), *Theory of Production. A Long-Period Analysis*, Cambridge: Cambridge University Press.
- Kurz, H. D. and Salvadori, N. (2003), Theories of “endogenous” growth in historical perspective, in H.D. Kurz and N. Salvadori, *Classical Economics and Modern Theory*, London: Routledge, chapter 6.
- Marshall, A. ([1890] 1977), *Principles of Economics*, 1st edn 1890, 8th edn 1920. Reprint, reset (1977), London: Macmillan.
- Morgan, M. (2012), *The World in the Model. How Economists Work and Think*, Cambridge: Cambridge University Press.

- Neisser, H. ([1932] 1990), Lohnhöhe und Beschäftigungsgrad im Marktgleichgewicht. *Weltwirtschaftliches Archiv*. 36: 415–55. English translation in Neisser, The wage rate and employment in market equilibrium, *Structural Change and Economic Dynamics*, 1(1): 141-163.
- O'Brien, D. (1975), *The Classical Economists*, Oxford: Oxford University Press.
- Ricardo, D. (1951-1973), *The Works and Correspondence of David Ricardo*, edited by P. Sraffa with the collaboration of M.H. Dobb, 11 vols, Cambridge: Cambridge University Press. Referred to as *Works* followed by the volume number and page.
- Rostow, W. (1990), *Theories of Economic Growth from David Hume to the Present*, New York: Oxford University Press.
- Samuelson, P.A. (1977), Correcting the Ricardo error spotted in Harry Johnson's maiden paper, *Quarterly Journal of Economics*, 91(4): 519-530.
- Samuelson, P.A. (1989), Ricardo was right!, *Scandinavian Journal of Economics*, 91(1): 47-62.
- Schumpeter, J.A. (1912), *Theorie der wirtschaftlichen Entwicklung*, Berlin: Duncker & Humblot.
- Schumpeter, J.A. (1954), *History of Economic Analysis*, New York: Oxford University Press.
- Shaikh, A. (2016), *Capitalism. Competition, Conflict, Crises*, Oxford and New York: Oxford University Press.
- Solow, R. (2010), Stories about economics and technology, *European Journal of the History of Economic Thought*, 17(5), 1113–1126.
- Sraffa, P. (1926), The laws of returns under competitive conditions, *Economic Journal*, 36(144): 535-550.
- Sraffa, P. (1951), Introduction, in Ricardo, *Works* I, pp. xiii-lxii.
- Sraffa, P. (1960), *Production of Commodities by Means of Commodities*, Cambridge: Cambridge University Press.
- Stigler, G.J. (1941), *Production and Distribution Theories. The Formative Period*, New York: Macmillan.
- Stigler, G.J. (1952), The Ricardian theory of value and distribution, *Journal of Political Economy*, 60(3): 187-207. Reprinted in Stigler (1965), pp. 156-197.
- Stigler, G.J. (1953), Sraffa's Ricardo, *American Economic Review*, 43(3): 586-599. Reprinted in Stigler (1965), pp. 302-325.
- Stigler, G.J. (1958), Ricardo and the 93% labor theory of value, *American Economic Review*, 48(3): 357-367. Reprinted in Stigler (1965), pp. 326-342.
- Stigler, G.J. (1965a), *Essays in the History of Economics*, Chicago and London: The University of Chicago Press.

- Stigler, G.J. (1965b), Textual exegesis as a scientific problem, *Economica*, 32(128): 447-450. Reprinted in Stigler (1982), pp. 68-71.
- Stigler, G.J. (1982), *The Economist as Preacher and other Essays*, Chicago: The University of Chicago Press.
- Stigler, G. J. (1988), *Memoirs of an Unregulated Economist*, New York: Basic Books.
- Stigler, G.J. (1990), Ricardo or Hollander?, *Oxford Economic Papers*, 42(4): 765-768.
- Wicksell, K. ([1901] 1934), *Lectures on Political Economy*, vol. I, London: George Routledge & Sons.

Author contact information:

Heinz D. Kurz
The Graz Schumpeter Centre
Department of Economics
University of Graz
Resowi-Centre 4F, A-8010
Graz (Austria)
heinz.kurz@uni-graz.at