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Léon Walras and *The Wealth of Nations*: what did he really learn from Adam Smith?

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ABSTRACT

This paper clarifies what Walras learned from Smith by examining his quotations of Smith and his handwritten notes in the *Wealth of Nations* belonging to the Walras Library. Although Walras's general equilibrium theory has often been compared to Smith's "invisible hand," Walras himself had no intention of developing it in his pure economics. In his applied economics, Walras was influenced by Smith's analysis of the division of labour in terms of efficiency. However, Walras did not share the explanation of its origin in his social economics, which suggests the reason why Walras never quoted Smith's *Theory of Moral Sentiments*.

KEYWORDS

Walras; general equilibrium; invisible hand; Adam Smith; division of labour

JEL CODES

B10; B12; B13; D50

1. Introduction

This study shows Léon Walras (1834–1910)'s understanding of Adam Smith's *Wealth of Nations* (1776) by considering Walras's references to Smith not only in his main work, *Elements of Pure Economics* (first edition, 1874–1877) but also in his writings on other topics. To strengthen my argument, I also examine Walras's handwritten notes in the French version of the *Wealth of Nations* by G. Garnier (1859), which is housed in the Walras Library at the University of Lausanne.

From a theoretical viewpoint, Walras's general equilibrium theory has often been compared to Smith's concept of an 'invisible hand'. The question is whether Walras in fact intended to develop Smith's invisible hand in his general equilibrium theory. In his *Elements of Pure Economics*, in which he proposed the general equilibrium theory in mathematical form for the first time in history, Walras referred to Smith's research only three times: when he argued about the definition of political economy, the distinction between science, art, and ethics. and the origin of value in exchange. In the preface to the fourth edition (1900), although Walras suggested the theoretical linkage of Cournot, Gossen Jevons, and himself to Adam Smith, he never referred to the concept of the invisible hand.

In this respect, Schumpeter denied the theoretical influence of Smith on Walras. In his *History of Economic Analysis* (1954), Schumpeter argued that Walras's pure

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economics was rather under the influence of the French tradition and that Walras only ‘paid conventional respects to A. Smith’. Jaffé even doubted whether Walras ever read *The Wealth of Nations* in any detail. He concluded that Walras refused to acknowledge the many similarities between his and Smith’s work due to his fanatical Anglophobia.

In this study, I adopt a completely different approach. First, I consider Walras’s references to Smith in his writings not only on pure economics but also applied and social economics. Special attention is given to his lecture notes on applied economics, ‘Cours d’économie politique appliquée’, also not hitherto considered. Second, I examine the handwritten notes that Léon Walras wrote in the French translation of *The Wealth of Nations* (1859), which had not been done by either Schumpeter or Jaffé. I find that Walras’s citations of Smith in his writings correspond to his handwritten notes in the Walras Library.

In conclusion, I prove that Walras did study *The Wealth of Nations* and was influenced by it differently than expected.

2. How have scholars tried to make connections between Smith and Walras?

In many modern textbooks, Walras’s general equilibrium theory has been explained as the theoretically developed version of Smith’s invisible hand.¹ We may say that one of the origins of this interpretation lies in Arrow and Hahn’s decisive remark at the beginning of their *General Equilibrium Analysis* (1971). They claimed that ‘Smith was a creator of general equilibrium theory, though the coherence and consistency of his work may be questioned’² by affirming the linkage of Smith’s invisible hand to the general equilibrium analysis as follows:

Adam Smith’s “invisible hand” is a poetic expression of the most fundamental relations, the equalization of rates of return as enforced by the tendency of factors to move from low to high returns. (Arrow and Hahn 1971, 1)

Witzum (2010) explains in detail how scholars have argued about the connection between the invisible hand and the general equilibrium theory since this remark. He expresses his doubts about this linkage by paying special attention to Adam Smith’s original ideas. In conclusion, he astutely points out that ‘the struggle about the relevance of Smith’s invisible hand to modern economics is a struggle about the soul of classical economics’ because ‘the use of the invisible hand as a metaphor for the first welfare theorem’ suggests that ‘Smith’s economics is merely a primitive form of modern economics’.³ He also notes that when he deals with ‘the Walrasian conception of general equilibrium theory’, he does not refer to ‘Walras’s own theory but the modern representation of it as captured by Arrow and Hahn’.⁴

These remarks lead me to the question: what, in contrast, is the soul of Walras’s economics? In other words, did Walras in fact intend to develop Smith’s invisible hand in his general equilibrium theory? We surely must focus on Walras’s own ideas rather

¹ For example, Skousen (2016) explains that “Walras provided theoretical proof that Adam Smith’s invisible-hand system of competition maximizes social welfare” (Skousen 2016, 219).

² Arrow and Hahn (1971, 2).

³ Witzum (2010, 188–189).

⁴ Witzum (2010, 158).

than on modern Walrasian economics to answer this question. In addition to Witzum (2010), many recent historians of economic thought have paid attention to the original ideas of Smith but none to the relationships between Walras's own ideas and Smith's invisible hand. In this respect, we must note that, in the history of economic thought, the invisible hand concept has been argued not only as a tool of economic analysis but also an economic idea in general⁵. In other words, it has been regarded as a theoretical term expressing how a free competition can realise a maximisation of social welfare and as a metaphor of unintended and unexpected consequences by individual activities, as Hayek argued about spontaneous order. In this study, I will deal mainly with the former aspect and focus on the latter in the last section.

From the former perspective, it is useful to begin with Schumpeter's interpretations. In his *History of Economic Analysis* (1954), he denied the theoretical influence of Smith on Walras by pointing out that Walras's pure economics was rather under the influence of French tradition and that Walras only 'paid conventional respects to A. Smith'.

'Marie Esprit Léon Walras (1834–1910) was a Frenchman and not only by virtue of his birthplace. The style of his reasoning and the nature of his achievement are characteristically French in the same sense in which Racine's plays and J. H. Poincaré's mathematics are characteristically French. So are all the roots of his achievements. He emphasised himself the influence of his father Auguste Walras and of Cournot. But, as has been pointed out before, *we must add that of Say, his true predecessor. And behind the figure of Say there looms the whole French tradition — Condillac, Turgot, Quesnay, Boisguillebert — however much or little he may have consciously absorbed from it. He paid conventional respect to A. Smith. The rest of the great Englishmen meant little to him.*' (Schumpeter [1954] 1994, 828, emphasis is mine)

Schumpeter insisted that 'the French tradition' produced such indispensable elements of the general equilibrium theory as the idea of interdependence, the utility theory of value and the concept of free competition. Indeed, Schumpeter accepted the seed of the equilibrium theory in *The Wealth of Nations* and the theoretical continuity from Smith to Walras, but he insisted that this was indirectly channelled through J. B. Say's influence on Walras.

'The rudimentary equilibrium theory of Chapter 7, by far the best piece of economic theory turned out by A. Smith, in fact, points towards Say and, through the latter's work, to Walras. The purely theoretical developments of the nineteenth century consist to a considerable degree in improvements upon it.' (Schumpeter [1954] 1994, 189)

Jaffé (1977) accepted the many similarities between Smith and Walras, especially between the purposes of Book IV of *The Wealth of Nations* and of Walras's applied economics to determine the government policies that best promote the production of wealth.⁶ However, he doubted that Walras ever read *The Wealth of Nations* attentively, insisting that 'not only in *Elements*, but on the rare occasions that he cited Adam Smith elsewhere, the quotations appear to be, if not second-hand, at least drawn from

⁵ The Samuels, Johnson, and Perry (2011) study comprehensively examines how the invisible hand has been misused as an ideology and as a language in the history of economic thought. However, when this study refers to Walras's connection to the invisible hand, it refers only to "the auctioneer" in the general equilibrium theory, which does not exist in Walras's original theory. (Samuels, Johnson, and Perry 2011, 72–73).

⁶ Jaffé (1977, 23).

references already made by others’,⁷ including J.B. Say. Jaffé (1977) concluded that Walras failed to appreciate Smith properly despite the many similarities in their works because of ‘his fanatical Anglophobia’.⁸

In this study, I will show how Walras really recognised Smith’s influence on his work as well as that Walras probably read some parts of *The Wealth of Nations* attentively not through the work of J.B. Say but independently.

3. Two versions of *the Wealth of Nations* in the Walras Library at the University of Lausanne

In the next sections, I will examine the handwritten notes left in a copy of *The Wealth of Nations* which belonged to Walras to strengthen my argument. Léon Walras had a habit of writing notes on the pages when he read. He left many such hand-written notes, composed of texts, lines and crosses, in the books preserved in the Walras Library at the University of Lausanne⁹. Unlike Walras’s other manuscripts,¹⁰ these hand-written notes in his books have never been published. However, they can strengthen our argument if we use them carefully as evidence.

Two different French versions of *The Wealth of Nations* are preserved in the Walras Library. One is the 1822 Garnier version (Smith [1776] 1822). The other is the 1859 Garnier version (Smith [1776] 1859). In 2005, the complete catalogue of the Walras Library was published in the last volume of the collected complete economic works of Auguste and Léon Walras (L. Walras 2005). It indicates that there are handwritten notes by Léon Walras in the 1859 version but not in the 1822 version.¹¹

The first time I visited the Walras Library in October 1998, I saw only the 1822 version and did not find any handwritten notes in it. As I was not aware of the existence of the 1859 version in the library, I mistakenly concluded that Schumpeter’s interpretation was correct.¹² On my visit in March 2015, with the complete catalogue available (L. Walras 2005), I checked the 1859 version and found many handwritten notes, most as vertical lines in the margins. In this study, I will examine these handwritten notes left in the 1859 version. In fact, this study is not the first attempt to use these notes. Baranzini (2005) had also used them to clarify Walras’s thoughts on monetary theory.¹³

The 1859 version once belonged to Auguste Walras (1801–1866), the father of Léon Walras. It was mentioned in a letter from Auguste to his son Léon, on March 25 in 1864¹⁴.

⁷ Jaffé (1977, 26).

⁸ Jaffé (1977, 31).

⁹ On the other hand, Pareto did not leave notes in the books preserved in the Pareto Library at the University of Lausanne.

¹⁰ On the other handwritten notes, see Walras (2000).

¹¹ Walras (2005, 296).

¹² See Misaki (1999).

¹³ Baranzini (2005, 57 and 89). These notes, probably written by Walras in the 1859 version, show two quotations of Smith in Walras’s article “Théorie mathématique du billet de banque” (1880) had been already well known to him since the 1860s. On this subject, see also Pribram (1983), Chapter 13—The spread of Smithian economics.

¹⁴ « J’ai fait demander chez Guillaumin la dernière édition d’Adam Smith et de J.-B. Say. Je veux les relire avant de terminer mon travail. J’ai ici quelques physiocrates et la 4^e édition du manuel de Garnier. » (A. Walras [1864] 2005, 622).

Per the editor's footnote of this text, Auguste also owned the 1822 version. In fact, it is this version that Auguste referred to when he cited *The Wealth of Nations* in his main work, *De la Nature de la richesse et de l'origine de la valeur* ([1831] 1990). Judging from this letter, Auguste purchased the 1859 version in 1864 to read it again before his death in 1866. Léon probably inherited the 1822 and 1859 versions from his father and used the 1859 version for citations in his publications, thereafter, including his main work, *Elements of Pure Economics* (1874–1877). As the 1822 version owned by Auguste has no handwritten notes, we may conclude that he was not in the habit of writing notes on the pages of his collected books.

However, we must note that the handwritten notes in the 1859 version may not be restricted to those of Léon. The editors of the complete catalogue of the Walras Library say that they decided against reporting the handwritten notes that had not been made by him.¹⁵ In fact, in the Walras Library, some of the handwritten notes in the copies of such books as Jevon's *Theory of Political Economy*¹⁶ can be obviously attributed to Walras. We can compare the peculiarities of Walras's handwriting there to those in the other copies. Unfortunately, most of the handwritten notes in *the Wealth of Nations* are lines and not letters, which still makes it difficult for us to verify the writer. Therefore, I will carefully compare these handwritten notes to Walras's references to Smith in his published writings in the following sections.

4. Adam Smith cited by Walras in his *Elements of Pure Economics* (1874–77)

Léon Walras proposed the general equilibrium theory in mathematical form for the first time in history in his *Elements of Pure Economics*, which has been considered his main work.

In the first edition of *Elements* (1874–1877), Walras referred to Adam Smith in only three parts, namely, when he argued:

1. The definition of political economy in Lesson 1,
2. The distinction between science, art, and ethics in Lesson 2
3. The origin of value in exchange in Lesson 16.

He never changed these references in any other editions of *Elements*. Among these three subjects, he included direct citations from *The Wealth of Nations* when he argued 1 and 3.

4.1. The definition of political economy in Lesson 1

Walras referred to 'Introduction of Systems of Political Economy' in Book IV of *The Wealth of Nations*:

¹⁵ L. Walras (2005, 174).

¹⁶ See Misaki (2019).

« *L'économie politique, nous dit-il (he says to us), considérée comme une branche des connaissances du législateur et de l'homme d'Etat, se propose deux objets distincts: le premier, de procurer au peuple un revenu ou une subsistance abondante, ou, pour mieux dire, de le mettre en état de se procurer lui-même ce revenu ou cette subsistance abondante; le second objet est de fournir à l'Etat ou à la communauté un revenu suffisant pour le service public: elle se propose d'enrichir à la fois le peuple et le souverain.* »¹⁷

(Walras [1874–1877–1900], 1988, 26)

This citation is from page 176, vol. 2 of the 1859 French version of *The Wealth of Nations*. In the copy from the Walras Library, I found unreadable handwritten notes on the words 'L'Economie politique' in note 2 which was made by Buchanan on the same page.¹⁸

By using this citation, Walras intended to show how Smith's definition of political economy was incomplete, by insisting that the definition only encompasses its form as an *art* and fails to mention its aim as a *science*. On the other hand, Walras distinguishes three characteristics of political economy: *science*, *art*, and *ethics*,¹⁹ explained in Lesson 2, corresponding to his pure, applied, and social economics, respectively. Thus, Walras was aware that Smith's concept of political economy as it appears in *The Wealth of Nations*, corresponds to his own applied economics. Indeed, I will pay special attention to his 'Cours d'économie politique appliquée', his lecture notes on applied economics made in Lausanne from 1870 to 1889, published in 1996 in the 12th volume of the collected complete economic works of Auguste and Léon Walras (Walras [1870–1889] 1996).

4.2. The origin of value in exchange in Lesson 16

In Lesson 16 of *Elements*, Walras referred to Chapter 5, Book I of *The Wealth of Nations*: 'Of the Real and Nominal Price of Commodities, or of Their Price in Labour, and Their Price in Money'. This is the longest citation in *Elements* from *The Wealth of Nations*.

« *Le prix réel de chaque chose, dit-il (he says), ce que chaque chose coûte réellement à celui qui veut se la procurer, c'est le travail et la peine qu'il doit s'imposer pour l'obtenir. Ce que chaque chose vaut réellement pour celui qui l'a acquise et qui cherche à en disposer ou à l'échanger pour quelque autre objet, c'est la peine et l'embarras que la possession de cette chose peut lui épargner et qu'elle lui permet d'imposer à d'autres*

¹⁷ It is not the purpose of this paper to argue the difference of the original text of *the Wealth of Nations* to that of its French version. Therefore, I only indicate the corresponding text in the Cannan edition for each of Walras's citations from the French version. This quotation corresponds to the paragraph in the Cannan edition: "Political oeconomy, considered as a branch of the science of a statesman or legislator, proposes two distinct objects: first, to provide a plentiful revenue or subsistence for the people, or more properly to enable them to provide such a revenue or subsistence for themselves; and secondly, to supply the state or commonwealth with a revenue sufficient for the public services. It proposes to enrich both the people and the sovereign." (Smith [1776] 1979, 397)

¹⁸ « Dans les vues économiques du docteur Smith, la richesse nationale est toujours trop exclusivement présentée comme le principal objet à étudier. Cependant *l'Economie politique* peut être considérée comme une théorie de gouvernement ayant pour but essentiel le bon ordre et la justice, dont la richesse nationale est une conséquence nécessaire, quoique indirecte. » (Smith [1776] 1859, vol. 2, 176, emphasis is mine).

¹⁹ On the evolution of Walras's three-way division of economics and its methodological significance, see Potier (1994), Dockès (1996), and Baranzini (2006).

personnes. Ce qu'on achète avec de l'argent ou des marchandises est acheté par du travail aussi bien que ce que nous acquérons à la sueur de notre front. Cet argent et ces marchandises nous épargnent dans le fait cette fatigue. Elles contiennent la valeur d'une certaine quantité de travail, que nous échangeons pour ce qui est supposé contenir alors la valeur d'une quantité égale de travail. Le travail a été le premier prix, la monnaie payée pour l'achat primitif de toutes choses. Ce n'est point avec d'or ou d'argent, c'est avec du travail que toutes les richesses du monde ont été achetées originairement, et leur valeur pour ceux qui les possèdent et qui cherchent à les échanger contre de nouvelles productions est précisément égale à la quantité de travail qu'elles les mettent en état d'acheter ou de commander. »²⁰ (Walras [1874–1877–1900] 1988, 245–246)

This is quoted from the 1859 French version of *The Wealth of Nations*, vol. 1, 123–124, and I did not find any handwritten notes on these pages in the Walras Library. Note that Auguste Walras also cited the same paragraph in his *De la Nature, de la Richesse et de l'Origines de la Valuer* ([1831] 1990) from the 1822 version of *The Wealth of Nations*²¹.

For these reasons, we may say that Léon probably cited this part under his father's influence, as Jaffé (1977) correctly pointed out.²² Following his father, Léon Walras criticised Smith's labour theory of value and insisted on the superiority of their value theory of scarcity. Followed by this citation, Walras emphasises that labour has value because it is both useful and limited in quantity—in other words, it is scarce.

Concerning Chapter 7 of Book I of *The Wealth of Nations*, 'Of the Natural and Market Price of Commodities', which Schumpeter mentioned as 'the rudimentary equilibrium theory',²³ Walras never mentioned it in his *Elements* or other writings at all. I did not find any handwritten notes in this chapter in the Walras Library, either. We may conclude that Walras did not pay attention to this section.

4.3. Walras never referred to the 'invisible hand'

In the preface to the fourth edition (1900) of *Elements*, which is the last version published during his lifetime, Walras concluded by suggesting the linkage of Cournot, Gossen, Jevons and himself to Adam Smith by comparing the development of political economy to the history of astronomy and mechanics.

It is now quite clear that political economy is, like astronomy and mechanics, a science that is empirical and rational at once. And no one can reproach it with having taken such a long time in taking the second character as well as the first one. It took

²⁰ 'The real price of every thing, what every thing really costs to the man who wants to acquire it, is the toil and trouble of acquiring it. What every thing is really worth to the man who has acquired it, and who wants to dispose of it or exchange it for something else, is the toil and trouble which it can save to himself, and which it can impose upon other people. What is bought with money or with goods is purchased by labour, as much as what we acquire by the toil of our own body. That money or those goods indeed save us this toil. They contain the value of a certain quantity of labour which we exchange for what is supposed at the time to contain the value of an equal quantity. Labour was the first price, the original purchase-money that was paid for all things. It was not by gold or by silver, but by labour, that all the wealth of the world was originally purchased; and its value, to those who possess it, and who want to exchange it for some new productions, is precisely equal to the quantity of labour which it can enable them to purchase or command.' (Smith [1776] 1979, 30–31).

²¹ Walras [1831] 1990, 146.

²² Jaffé points out that Leon 'did little more than repeat in summary what his father had written before him in Chapter XII of *De la Nature, de la Richesse et de l'Origines de la Valuer* in 1831.' (Jaffé 1977, 26).

²³ See section 1 of this paper.

from a hundred to a hundred and fifty or two hundred years for the astronomy of Kepler and the mechanics of Galileo to become the astronomy of Newton and Laplace and the mechanics of d'Alembert and Lagrange. *Yet, less than a century has passed between the publication of Adam Smith's work and the attempts of Cournot, Gossen, Jevons, and myself.*²⁴ (Walras [1874–1877–1900] 1988, 22. Emphasis is mine.)

Here, we must note that Walras never implied theoretical resemblance of Smith's idea of the invisible hand to his general equilibrium theory, for Walras in fact never referred to Smith's invisible hand concept in any edition of his *Elements*. This brings us to the question of whether Walras read Chapter 2 of Book IV entitled: 'Of Restraints upon the Importation from Foreign Countries of such Goods as can be Produced at Home', which is the only part where Smith refers to the 'invisible hand'.

In the Walras Library, I found some handwritten vertical lines in the margins of this chapter on pages 206, 208, 210 and 212 in vol. 2 (Smith [1776] 1859), but nothing on page 209 where the 'invisible hand' appears. We may therefore conclude that the invisible hand did not interest Walras, although he probably read this chapter. In the Walras Library, I found similar handwritten vertical lines in Chapter 1, Book IV, 'Of the Principle of the Commercial or Mercantile System'. Walras probably read this chapter attentively, as one of the phrases highlighted by these vertical lines²⁵ corresponds to his quotation²⁶ in Lesson 15 of his 'Cours d'économie politique appliquée', titled 'Système exclusif ou mercantile'. The phrases highlighted and attributed to Léon Walras were never quoted by Auguste Walras.

5. Smith's influence on Walras's applied economics: Division of labour

Léon Walras was influenced by his father, Auguste, in many respects, including his comments on Adam Smith's labour theory of value, as we have already seen. The next question is in what respect was Léon influenced directly, rather than by way of others, by Adam Smith. In his installation speech of the professorship in Lausanne in 1871, Walras explained clearly that he was influenced by Adam Smith in his theory of the division of labour.

'For my part, *I borrow*, with confidence, from Physiocrats, from Turgot, their enunciation so clear and so positive about the principle of free competition regarding labour and exchange, and its principal applications in agriculture and manufacturing, in trade and in credit; *from Adam Smith, his wonderful analysis of the phenomenon of the*

²⁴ In this paper, all the English translations of the citations of Walras's work originally written in French are made by the author. « Il est à présent bien certain que l'économie politique est, comme l'astronomie, comme la mécanique, une science à la fois expérimentale et rationnelle. Et on ne pourra pas lui reprocher d'avoir trop tardé à revêtir le seconde caractère avec le premier. L'astronomie de Kepler et la mécanique de Galilée ont mis de cent à cent cinquante ou deux cents ans à devenir l'astronomie de Newton et de Laplace et la mécanique de d'Alembert et de Lagrange. Or il s'est écoulé moins d'un siècle entre l'apparition de l'ouvrage d'A. Smith et les tentatives de Cournot, de Gossen, de Jevons et la mienne. »

²⁵ Smith [1776] 1859, vol. 2, 178–179.

²⁶ « On raisonne de la même manière, dit-il, à l'égard d'un pays. Un pays riche est celui qui abonde en argent, et le moyen le plus simple d'enrichir le sien, c'est d'y entasser l'or et l'argent. Quelque temps après la découverte de l'Amérique, quand les Espagnols abordaient sur une côte inconnue, leur premier soin était ordinairement de s'informer si on trouvait de l'or et de l'argent dans les environs. Sur la réponse qu'ils recevaient, ils jugeaient si ce pays méritait qu'ils y fissent un établissement, ou bien s'il ne valait pas la peine d'être conquis... Ainsi, suivant eux, la richesse consistait en bétail, comme, suivant les Espagnols, elle consistait en or et en argent. De ces deux idées, celle des Tartares approchait peut-être le plus de la vérité » (Walras [1870–1889] 1996, 523–524).

division of labour and its consequences; from Ricardo, his method by leaving his principles to him; from J.-B. Say, his concept of the three productive services, by correcting it by the theory of value in exchange and the theory of capital and income, given by my father²⁷ (Walras [1871] 1987, 373. Emphases are mine).

In fact, I found many handwritten notes in Chapter 1 of Book I, ‘Of the Division of Labour’ in the Walras Library, including not only vertical lines in the margins but also underlines, numbers, and crosses.

Walras argued Smith’s concept of division of labour mainly in his lecture note ‘Cours d’économie politique appliquée’. From the 1859 version of *The Wealth of Nations*, Walras quoted the two long phrases in Lesson 3 « La division du travail, Ses avantages » of Section 1 of his lecture notes. One is about a pin factory and the other is about a boy who invented a machine.

(1) « Un homme, dit-il, qui ne serait pas façonné à ce genre d’ouvrage, dont la division du travail a fait un métier particulier, ni accoutumé à se servir des instruments qui y sont en usage, dont l’invention est probablement due encore à la division du travail, cet ouvrier, quelque adroit qu’il fût, pourrait peut-être à peine faire une épingle dans toute sa journée, et certainement il n’en ferait pas une vingtaine. Mais de la manière dont cette industrie est maintenant conduite, non seulement l’ouvrage entier forme un métier particulier, mais même cet ouvrage est divisé en un grand nombre de branches, dont la plupart constituent autant de métiers particuliers. Un ouvrier tire le fil à la bobille, un autre le dresse, un troisième coupe la dressée, un quatrième empoigne, un cinquième est employé à émouder le bout qui doit recevoir la tête. Cette tête est elle-même l’objet de deux ou trois opérations séparées: la frapper est une besogne particulière; blanchir les épingles en est une autre; c’est même un métier distinct et séparé que de piquer les apapiers et d’y bouter les épingles; enfin, l’important travail de faire une épingle est divisé en dix-huit opérations distinctes ou environs, lesquelles, dans certaines fabriques, sont remplies par autant de mains différentes, quoique dans d’autres le même ouvrier en remplisse deux ou trois. J’ai vu une petite manufacture de ce genre qui n’employait que dix ouvriers, et où, par conséquent, quelques-uns d’eux étaient chargés de deux ou trois opérations. Mais, quoique la fabrique fût fort pauvre et, par cette raison, mal outillée, cependant, quand ils se mettaient en train, ils venaient à bout de faire entre eux environ douze livres d’épingles par jour; or, chaque livre contient au-delà de quatre mille épingles de taille moyenne. Ainsi, ces dix ouvriers pouvaient faire entre eux plus de 48000²⁸ épingles dans une journée; donc, chaque ouvrier, faisant une dixième partie de ce produit, peut être considéré comme faisant dans sa journée 4800 épingles. Mais s’ils avaient tous travaillé à part, et indépendamment les uns des autres, et s’ils n’avaient pas été façonnés à cette besogne particulière, chacun d’eux assurément n’eût pas fait vingt épingles, peut-être pas une seule, dans sa journée, c’est-à-dire pas à coup sûr, la 240^e partie, et pas peut-être la 4800^e partie de ce qu’ils sont maintenant en état de faire, en conséquence d’une division et d’une combinaison convenables de leurs différentes opérations. »²⁹ (Walras [1871–1889] 1996, 457–458, emphases are mine)

²⁷ « J’emprunte, pour ma part, avec confiance aux physiocrates, à Turgot, leur énonciation si claire et si positive du principe de la libre concurrence en matière de travail et d’échange et de ses applications principales à l’industrie agricole et manufacturière, au commerce, au crédit; à Adam Smith, sa merveilleuse analyse du phénomène de la division du travail et de ses conséquences; à Ricardo, sa méthode, en lui laissant ses principes; à J.-B. Say, sa conception des trois services producteurs, en la rectifiant par la théorie de la valeur d’échange et par la théorie du capital et du revenu qu’ à données mon père.»

²⁸ It is ‘quarante-huit milliers’ in the 1859 version. (Smith [1776] 1859, vol. 1, 96).

²⁹ ‘a workman not educated to this business (which the division of labour has rendered a distinct trade), nor acquainted with the use of the machinery employed in it (to the invention of which the same division of labour has probably given occasion), could scarce, perhaps, with his utmost industry, make one pin in a day,

This phrase is quoted from pages 95–96 in vol. 1 of the 1859 French version of *The Wealth of Nations*. In the Walras Library, I found corresponding handwritten underlines and vertical lines in the margin for the paragraph above.

(2) « Dans les premiers machines à vapeur³⁰, dit-il, il y avait un petit garçon continuellement occupé à ouvrir et à fermer alternativement la communication entre la chaudière et le cylindre, suivant que le piston montait ou descendait. L'un de ces petits garçons, qui avait envie de jouer avec ses camarades, observa qu'en mettant un cordon au manche de la soupape qui ouvrait cette communication, et en attachant ce cordon à une autre partie de la machine, cette soupape s'ouvrirait et se fermerait sans lui, et qu'il aurait la liberté de jouer tout à son aise. Ainsi, une des découvertes qui a le plus contribué à perfectionner ces sortes de machines depuis leur invention, est due à un enfant qui ne cherchait qu'à s'épargner de la peine. »³¹

(Walras [1871–1889] 1996, 459)

This phrase is quoted from page 101, vol. 1 of the 1859 French version of *The Wealth of Nations*. I found corresponding handwritten vertical lines in the margin for the paragraph above in the Walras Library. I also found handwritten numbers (1, 2, 3) and crosses in the phrases where Smith explains 'three different circumstances' to increase productivity on pages 99–101 in the same book. These corresponded exactly to Walras's summary of this part in his lecture notes, 'Cours d'économie politique appliquée'.

Indeed, as Jaffé pointed out, Walras sometimes quoted the phrase of *The Wealth of Nations* not directly but from quotations already made by others. This led Jaffé to conclude that Walras never read *The Wealth of Nations* attentively. For example, when Walras referred to *The Wealth of Nations* in arguing public services in his *Etudes*

and certainly could not make twenty. But in the way in which this business is now carried on, not only the whole work is a peculiar trade, but it is divided into a number of branches, of which the greater part are likewise peculiar trades. One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on, is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which, in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them. I have seen a small manufactory of this kind where ten men only were employed, and where some of them consequently performed two or three distinct operations. But though they were very poor, and therefore but indifferently accommodated with the necessary machinery, they could, when they exerted themselves, make among them about twelve pounds of pins in a day. There are in a pound upwards of four thousand pins of a middling size. Those ten persons, therefore, could make among them upwards of forty-eight thousand pins in a day. Each person, therefore, making a tenth part of forty-eight thousand pins, might be considered as making four thousand eight hundred pins in a day. But if they had all wrought separately and independently, and without any of them having been educated to this peculiar business, they certainly could not each of them have made twenty, perhaps not one pin in a day; that is, certainly, not the two hundred and fortieth, perhaps not the four thousand eight hundredth part of what they are at present capable of performing, in consequence of a proper division and combination of their different operations'. Smith [1776] 1979, 4–5.

³⁰ It is 'à feu' in the 1859 version. (Smith [1776] 1859, vol.1, 101).

³¹ 'In the first fire-engines, a boy was constantly employed to open and shut alternately the communication between the boiler and the cylinder, according as the piston either ascended or descended. One of those boys, who loved to play with his companions, observed that, by tying a string from the handle of the valve which opened this communication, to another part of the machine, the valve would open and shut without his assistance, and leave him at liberty to divert himself with his play-fellows. One of the greatest improvements that has been made upon this machine, since it was first invented, was in this manner the discovery of a boy who wanted to save his own labour.' (Smith [1776] 1979, 9–10).

d'économie appliquée ([1898] 1992), all the quotations came from J.B. Say's writings.³² Further, I found no handwritten notes for the same phrases in the Walras Library.

However, judging from the handwritten notes shown above, these quotations about the division of labour are made directly from *The Wealth of Nations* by Walras himself. The phrases highlighted and attributed to Léon Walras had never been quoted by Auguste Walras. From this evidence, contrary to Jaffé's interpretation, we could conclude that Walras probably read some parts of the *Wealth of Nations* attentively and used it to develop his ideas in his applied economics in which he studied how the organisation of the market in the real economy, including the labour market³³, could bring the maximum utility to society.

6. The division of labour in Walras's social economics: Did Walras read Smith's *Theory of Moral Sentiments*?

We must note that 'Cours d'économie appliquée' is not the only text in which Walras discussed 'the division of labour'. We can also find his definitive analysis in *Études d'économie sociale* (Walras [1896] 1990)³⁴. He argued the significance of division of labour in 'General theory of society, the six public lectures made in 1867–1868'³⁵ in Part 1 of the book from the perspective of morality, which was more suitable for his social economics than for his applied economics.

Note that this text was originally written in 1867–1868 and was later reproduced in his *Études d'économie sociale* in 1896. As we have already seen, Walras probably inherited the 1859 version of the *Wealth of Nations* from his father Auguste who died in 1866 and Walras clearly declared at his inaugural speech in Lausanne in 1871 that he was influenced by Smith's theory of division of labour. From these facts, we cannot ascertain whether Walras had already examined Smith's theory of division of labour when he wrote this text. However, Walras never quoted Smith in this text when he discussed the division of labour, and Walras's ideas on division of labour is in striking contrast with those of Smith.

In its fourth lecture in 'General theory of society', titled 'Man and human destiny from a twofold point of view: physiologic-economic and psychologic-moral'³⁶, Walras argued how aptitude for division of labour and moral personality differentiate man and animal and how man's aptitude for division of labour constitutes a necessary condition for his existence. In this part, Walras argued for division of labour not mentioning Smith, but Frédéric Bastiat. By slightly changing Bastiat's quotation from *Harmonies économiques* (1855)³⁷, Walras explained that specificity of jobs is not a conventional practice or an optional possibility and that it is the primary and inevitable condition for man's existence and subsistence. He insisted that division of labour comprises the

³² See Walras. [1898] 1992, 193–195.

³³ On this point, see also Misaki (2018).

³⁴ Walras [1896] 1990.

³⁵ *Théorie générale de la société : Leçons publiques faites à Paris (1867–1868)*.

³⁶ *De l'homme et de la destinée humaine au double point de vue physiologico-économique et psychologico-moral*.

³⁷ « *Sans la division du travail, nos besoins surpassent nos facultés ; avec la division du travail, nos facultés surpassent nos besoins* » (Walras [1896] 1990, 92).

whole physiological man and that this fact also contains the entire human economic destiny³⁸.

Thus, Walras explains division of labour using the physiology of man, as he assumed that division of labour is a natural fact in the same way as moral personality is. This explanation is so different from that of Adam Smith³⁹, who based division of labour on the human propensity to exchange in Chapter 2, Book I of *The Wealth of Nations*. In fact, there are no handwritten notes in this part of *The Wealth of Nations* in the Walras Library. As we have seen, at his inauguration speech in 1871, Walras had declared that he was influenced by Smith's 'wonderful analysis of the phenomenon of division of labour and its consequences'⁴⁰; however, we can conclude that he does not share the explanation of its origins for human beings with Smith.

In fact, Walras had already mentioned the importance of division of labour in his first book on economics, *L'Economie politique et la justice*⁴¹, in which Walras criticised Proudhon for attributing poverty to division of labour, never referring to Adam Smith⁴². Note that Auguste Walras never quoted Adam Smith either when he discussed division of labour in his writings.

Thus, Walras defined the division of labour and the moral personality as natural facts. It brings us to another question: Did Walras read Smith's *Theory of Moral Sentiments*? We have no evidence that Walras read it as he never quoted the book in any of his writings and there is no copy of it in the Walras Library, even though its French translation was already available at that time.

Jaffé (1977) argued that if Walras had read *the Theory of Moral Sentiments*, he would have discovered many similarities between Smith and himself, by insisting that both Smith and Walras were Cartesian. Jaffé regarded a 'sympathy' in the *Theory of Moral Sentiments*, a 'propensity to truck, barter and exchange' and a 'desire of bettering our condition' in *the Wealth of Nations* as the connecting principles to create a harmonious human society and to promote orderly progress. According to Jaffé, these connecting principles play the same role as Newton's principle of universal gravitation, while Walras used his 'rareté' as the connecting common principle in his general equilibrium theory. From his younger days to the end of his career, Walras sought to create a theory of economics celestial mechanics.⁴³

As I have mentioned in section 1, the invisible hand concept has two aspects: a theoretical term expressing how free competition can realise a maximisation of social welfare and a metaphor of unintended and unexpected consequences by individual activities, as Hayek argued with spontaneous order. According to Dockès (1996), Walras rejected the concept of spontaneity by Adam Ferguson or Hayek, which means that men produce their institutions neither consciously nor voluntarily. For Walras,

³⁸ Walras [1896] 1990, 92–93.

³⁹ Bee (2013) examined Walras's explanation of the relationship between division of labour and moral personality in this text by comparing it to Smith's ideas. He pointed out that, for Smith, the fact of being in the human community with the faculty of speech is the condition for the possibility of exchange and, for Walras, on the contrary, the necessity of division of labour is the cause of the community and of the faculty of speech (Bee 2013, 102).

⁴⁰ See section 4 of this paper.

⁴¹ Walras [1860] 2001.

⁴² On this point, see also Misaki (2018).

⁴³ Jaffé (1977, 27–28).

history goes on not only by ‘trial and error’ or ‘tâtonnement’⁴⁴, it is also voluntarist and partly rational⁴⁵. Walras’s rejection of the spontaneity in the formation of a social order is a key for us to understand why he never referred to Smith’s invisible hand concept not only in his *Elements of Pure Economics* but also in any other writings. In this respect, Jaffé’s interpretation that identifies Walras with Smith in terms of Cartesians is insufficient.

We must add another reason in that Walras should have read *the Theory of Moral Sentiments*. How was the human sociability formed before the division of labour? As we have already seen, Walras regarded the division of labour and the human morality as well as the existence of a society as natural facts, and never argued their origins. In other words, it was the consequences of the division of labour, as Walras himself insisted⁴⁶, but not its causes that he really learned from Adam Smith. Therefore, even if he should have read the *Theory of Moral Sentiments*, Walras may have concluded that Smith’s argument was out of his scope.

7. Conclusion

We can conclude that Walras was probably not directly influenced by Smith’s concept of the invisible hand and his price analysis, which had been believed to be the original form of the general equilibrium theory in the textbook. However, it does not mean that Walras never read *The Wealth of Nations* attentively, as Jaffé insisted, or that he was not directly influenced by Smith, as Schumpeter believed.

In truth, Walras was influenced by Smith’s theory of division of labour, probably by reading some of the parts of *The Wealth of Nations* attentively. Although he denied Smith’s labour theory of value, he agreed with Smith regarding the role of labour to bring maximum wealth to society. Walras recognised the significance of labour from the viewpoint of efficiency in his applied economics. Thus, as Jaffé correctly pointed out, Walras had the same purpose as Smith in his applied economics rather than in his pure economics. In his social economics, Walras explained division of labour as well as the human morality and the society as natural facts, and never argued their origins, which is in striking contrast to that of Smith. In other words, Walras learned from the consequences of the division of labour from Adam Smith in terms of its efficiency but not its cause. It explains why Walras never quoted the *Theory of Moral Sentiments* in his any writings.

Thus, from only the viewpoints of the formation process of the general equilibrium theory, we cannot clearly delineate what Léon Walras in fact learned from Adam Smith.

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⁴⁴ On this point, see also note 5 of this paper.

⁴⁵ Dockès (1996, 145).

⁴⁶ See section 4 of this paper.

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