

Mill – like father like son: Misunderstandings and revisions of classical trade theory¹

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Abstract:

There has been a renewed interest in classical trade theory for some years. This has been accompanied by a shift in how researchers see Ricardo's trade theory. The standard/Stuart Mill interpretation, while usually giving credit to Ricardo for his developments, depicts him as erroneous or at least incomplete. The new interpretation, which we shall call Sraffa-Ruffin, sees Ricardo as substantially different from this. Neither a source of error nor incomplete. Even though the new literature puts emphasis in this contrast, it is lacking an exposition of how Stuart Mill came to change Ricardo. Our work tries to clarify this point. We have examined how James Mill made a mistake as he misinterpreted Ricardo. During the correction, he left the international values undetermined. His son departed from this to correct an error which he saw as being shared both by his father and Ricardo. Stuart Mill felt it was justified to introduce the foreign idea of supply and demand as determinants of value. This was not inconsequential.

Resumo:

Há alguns anos tem havido um intenso interesse pela teoria clássica do comércio internacional. Isso gerou uma mudança na forma como os pesquisadores veem a teoria do comércio de Ricardo. A interpretação padrão, embora geralmente dê crédito a Ricardo por seus desenvolvimentos, o descreve como errôneo ou pelo menos incompleto. A nova interpretação, que chamaremos de Sraffa-Ruffin, vê Ricardo como substancialmente diferente disso. Nem uma fonte de erro nem incompleta. Embora a nova literatura enfatize esse contraste, na nossa visão falta uma exposição de como Stuart Mill alterou Ricardo. Nosso trabalho tenta esclarecer esse ponto. Nós examinamos como James Mill cometeu um erro ao interpretar Ricardo. Durante a correção, ele deixou os valores internacionais indeterminados. Seu filho partiu disso para corrigir um erro que ele considerava compartilhado por seu pai e Ricardo. Stuart Mill considerou justificado introduzir a ideia de oferta e demanda como determinantes do valor. Isso não foi inconsequente.

Key words: James Mill; John Stuart Mill; classical trade theory; history of economic thought.

Palavras-chave: James Mill; John Stuart Mill; teoria clássica do comércio; história do pensamento econômico.

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1. Introduction

Recently there has been an increasing flow of authors reinterpreting Ricardo's trade theory.³ They stem from Sraffa's (1930) reply to Einaudi, and more specifically from Ruffin's (2002) rediscovery of this debate. Hence the name given in the literature: the "Sraffa-Ruffin Interpretation". In this piece of work Sraffa tried to dispel some controversies that aroused amongst classical economists regarding the theory of international trade. Controversies that had long lasting consequences in the history of economic thought, even in the modern textbook presentation of the "Ricardian Trade Theory".

To explore this issue an excursus is provided here into the history of ideas.⁴ The controversies that Sraffa was interested in his 1930 paper relate to a mistake in the classical theory of trade. The error was found in James Mill's first and second editions of his *Elements* (Mill, 1821 and 1824), but absent from its third edition (Mill, 1844[1826]). At first, Mill's analysis went as if the terms of trade could be different depending on what country was under scrutiny. England would trade its cloth for Poland's linen at a rate different from what Poland would do the reverse. This is clearly unfeasible. The revision for the third edition reveals that James Mill implicitly accepted that the original formulation was wrong, without offering a full solution for the problem. It was still incomplete in the sense that it could not determine the terms of trade.

It was Stuart Mill who picked up from where his father had left and proposed a closure. It involved the introduction of a foreign concept into the classical framework for value determination. He said he had to "fall back upon an antecedent law, that of supply and demand" (Mill, 1968[1871], p. 596) to determine the terms of trade. However, it not only had analytical implications but it also trickled down into the understanding of history of thought. Because in doing so, Stuart Mill (1844) went further back and said that the error and incompleteness could be traced to Ricardo's exposition in his *Principles* (Works, vol. 1).⁵

Sraffa's goals in the aforementioned paper were very modest and did not involve a coherent reworking of Ricardo's trade theory. He mainly wanted to question the validity of attributing the error to Ricardo. Sraffa's thesis is that Ricardo's construct was categorically different from both James Mill and Stuart Mill. The recent literature after Ruffin's rediscovery (see footnote 3) have been erected on this difference and the implications that emerge. Basically, clearing up the fact that Ricardo's exposition was neither erroneous nor incomplete. Apart from misapprehensions, it did not require the introduction of "antecedent laws".

Even though this contrast between Ricardo and the Mills is crucial, little effort has been put into analysing how the error appeared in James Mill and how his son dealt with it. This is not to say that nothing has been said about it in almost two centuries, but rather that the new understanding of Ricardo might help shine new light on the matter. The present work aims at filling this gap by clarifying James Mill's problem and his son solution. It is an assessment of both James Mill and Stuart Mill after the Sraffa-Ruffin interpretation. We will follow their examples, specifically the one present in both authors in which England and Germany trade cloth and linen. The paper is structured in four sections.

To do this, we will construct a basic classical framework and formalize some of its propositions. This will establish the foundations from where we can start analysing both authors. The first section deals with this basic setting. Following an interpretation of the trade example as dealing with trade in non-basic commodities (cloth and linen), we will introduce a non-tradable basic good in each country (good w below). This has the advantage of showing explicitly some conditions that must be met if goods are to be produced domestically in any economy.

³ See for example: Ruffin, 2002; Maneschi, 2004; Bhering, 2017; and the book edited by Senga, Fujimoto, and Tabuchi, 2017.

⁴ This is a very brief and superficial remark on a much more complex subject. The idea is to provide a short panorama from which to proceed. The full story involves many other authors that I have chosen to leave out.

⁵ All references to Ricardo will be made according to the Sraffa edition of his works. Specifically, the online edition available at <http://oll.libertyfund.org/titles/159>. We will indicate the respective volume and page number when appropriate.

A discussion will follow on how classical economics determines relative prices and distribution. The relevant data taken are the structure of production, real wages, and the output level. The notion of competition is what gives coherence to those concepts. We will assume a pure labour economy, with commodities produced by means of unassisted labour. This means that the only capital advanced is the wages. It will allow us to derive some conditions that must be met in each country (England and Germany) separately.

From there, we will introduce the idea that countries might be open for trade. This is the second section. So, each country has the option of either producing certain goods domestically or importing them. Two general propositions can be formalized. The first one regards the conditions necessary for a country to benefit from foreign trade. The second, and related one, is about when *both* countries can derive benefits from trade.

The third section will deal with James Mill's work. Given the framework established in the first two sections, it is possible to see what was the error he faced in the first two editions of his book. Eventually, the error was spotted and the third edition was revised to cover the mistake. However, this left an open question. The determination of the terms of trade was absent.

In the fourth section we will evaluate Stuart Mill's contribution. He could close the question his father had left open. In doing so, however, he introduced a series of unfamiliar concepts to classical economics. We will try to clarify why and how significant it was his decision to "fall back upon an antecedent law, that of supply and demand" (Mill, 1968[1871], p. 596). It is no coincidence that the chapter where he introduces it has been called the "great chapter" by Edgeworth and endorsed by other marginalist economists. After all, marginalism relies on supply and demand to explain almost, if not all, phenomena of economic life.

There are two goals in pursuing this kind of research, both relating to Sraffa's research agenda. The first, obvious one, is a revaluation of history of economic thought. This point in particular might help clarify how Stuart Mill was a key author in the transition from classical to marginal economics. The second, less clear one, is about recreating classical economics after Sraffa's intervention (Sraffa, 1960). If, for example, we want to set up a "Sraffian" trade theory then we might want to go back and understand how the classical economists dealt with it. This procedure has the advantage of showing clearly what was the problems they faced and how it fits into the greater picture.

2. Classical framework

Here we will follow the reconstruction of classical economics offered by Sraffa (1960) and pursued by some of his disciples (e.g. Garegnani, 1984). According to this line of interpretation, classical economics starts from an idea of a given productive structure, real wages, and the output level to determine relative prices and distribution. From a given productive structure a combination of material inputs and labour is used to make a commodity. We have taken the procedure of reducing this all to labour: the only input is direct labour. This does not mean that classical economics is defined by a pure labour economy, as the conventional treatment of Ricardian Trade Theory tends to say (see, for example, Chipman, 1965; Krugman, 2002). However, the labour theory of value has well known deficiencies that are unrelated to international trade. By restricting the analysis to only labour as input we can side step those problems.

Having established this, the assumptions of a given level of output and productive structure boil down to a known amount of labour to produce a given output. So, we know for every commodity i its scale of production (X_i) and how much labour it uses (L_i):

$$L_i \rightarrow X_i$$

We can readily scale down to find the amount of labour required to produce one unit (however this is defined) of the commodity, or the labour coefficient:

$$\frac{L_i}{X_i} = l_i \rightarrow 1 \text{ unit of } i$$

The assumption of a given real wage translates into a pre-determined amount of good(s) that goes to workers. In classical economics this was usually done by referring to a minimum subsistence wage to sustain and reproduce workers. Ricardo argued that: “The natural price of labour is that price which is necessary to enable the labourers, one with another, to subsist and to perpetuate their race” (Ricardo, Works, vol. 1, p. 90). This should not be read as a purely biological determination of wages, as Ricardo a few pages later remarks “It is not to be understood that the natural price of labour, estimated even in food and necessaries, is absolutely fixed and constant. (...) It essentially depends on the habits and customs of the people” (p. 92). So, there is a social and historical aspect to it.⁶ Workers across sectors will face the same real wage. Any difference in quality of labour will be expressed as a higher or lower coefficient of general labour.

Consider first wages and prices for England, denoted by the superscript E . What is relevant for us is that this basket of goods that workers can secure is defined prior to the determination of prices. Simplifying the matter, assume that they only consume one generic commodity, call it commodity 1. In modern terminology this is the same as having only one basic good. Then, the monetary wages the workers receive (w^E) must be enough to pay for this amount of commodity 1. Let p_1^E be its price and b_1^E the amount of it workers can secure:

$$w^E = b_1^E \cdot p_1^E \quad (1)$$

From there is possible to find the price of production. This is defined as the price for one unit that is enough to cover the costs of production and a normal profit rate over advanced capital. By assumption, capital advanced consists only of labour, or more precisely of the basket of goods advanced to workers. This implies that the price of production for good 1 is:

$$p_1^E = w^E \cdot l_1^E (1 + r^E) \quad (2)$$

This is one equation in three variables (p_1^E , w^E , and r^E). However, equation (1) establishes w^E as a function of p_1^E . It is possible to reduce to number of variables even further by making the price of good 1 the numeraire ($p_1^E = 1$). This is enough to find the rate of profits attainable according to that structure:

$$r^E = \frac{1 - b_1^E \cdot l_1^E}{b_1^E \cdot l_1^E} \quad (3)$$

This can be interpreted as the quantity of good 1 that is left for capitalists, net of workers consumption, per unit of capital advanced. In this scenario the profits are determined as a residual magnitude. This is more properly defined as the *surplus* this economy can generate, which can be divided amongst different classes. Since we have included only workers and capitalists in our construction, it will be entirely absorbed by capitalists as profits.

We shall now introduce two other goods. Call them cloth (C) and linen (L). These will become the tradable goods once we allow for trade to occur. They are, by assumption, not part of wage goods. From the same kind reasoning used for good 1, we can define the prices of production for both goods:

$$p_C^E = w^E \cdot l_C^E (1 + r_C^E)$$

$$p_L^E = w^E \cdot l_L^E (1 + r_L^E)$$

There is something lacking in those equations. They only say that, if wages are paid according to w^E , the sectoral rate of profit will vary according to the good's monetary price. Alternatively, the capitalist in a specific sector will be able to guarantee a given profit rate if (s)he is able to keep the price at an appropriate level. The question that remains is: is there a magnitude towards which those variables tend to adjust to?

⁶ For a more in-depth analysis of how classical economics treated wages see Stirati (1992).

This piece was supplemented through the theoretical distinction between “market” and “normal” prices. Adam Smith argued that normal prices are characterized by normal wages, rents, and profits:

When the price of any commodity is neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the stock employed in raising, preparing, and bringing it to market, according to their natural rates, the commodity is then sold for what may be called its natural price. (Smith, 2001[1776], p. 83)

This is the magnitude towards which market prices will gravitate. In contrast, market prices will depend on circumstantial elements that cannot be the object of scientific enquiry. We have excluded land rent from the analysis. Normal wages reflect the choice of a given basket for workers consumption. The one that remains to be defined is the notion of a normal profit rate.

It is conceivable that capitalists will seek the highest rate of profit they can attain, regardless of what they are producing. In a capitalist system, what regulates production is exchangeable value. This is, getting the most one can from realizing your production. As a corollary, the resting position has to be a situation in which every sector renders the same rate of profit. Otherwise, capitalists will migrate their capital from one sector to another. This movement, or force, justifies setting a homogeneous rate of profit in the economy. This is what we are calling the normal rate of profit. That is the notion of free competition adopted by classical economists and it is what gives coherence to their theory (Eatwell, 1982). As Stuart Mill puts it “only through the principle of competition has political economy any pretension to the character of a science” (1968[1871], p. 239).

Equation (3) establishes the highest rate of profit obtainable in the production of the wage good, for a given real wage. The normal profit rate cannot be higher than this without putting the reproduction of the economy in jeopardy. Otherwise capitalists would have no interest in producing this good and, therefore, workers could not feed themselves. It cannot remain persistently below it as well. Since capitalists would forgo the production of other goods and concentrate their capital in this sector, the general profit rate would still be the one in sector 1. There remains no other option than to say that “it is the profits of the farmer which regulate the profits of all other trades” (Ricardo, Works, vol. 6, p. 117). An idea shared also with James Mill: “The return which is made to capital employed upon the land, is that which determines the rate of annual profit from all other employments of capital” (Mill, 1844[1826], p. 47). Ricardo maintained this idea in his “Essay on Profits” (Works, vol. 4, pp. 6-26).⁷

The prices of production for cloth and linen can then be rewritten as:

$$\begin{aligned} p_C^E &= w^E \cdot l_C^E (1 + r^E) \\ p_L^E &= w^E \cdot l_L^E (1 + r^E) \end{aligned} \quad (4)$$

Which are just the previous equations with normal profit rates. Plugging in the r^E from equation (3) and after some algebraic manipulation we find that:

$$\frac{p_C^E}{p_L^E} = \frac{l_C^E}{l_L^E} \quad (5)$$

This implies that if both goods are to be produced domestically then their relative prices shall conform to the ratio of embodied labour. For whatever other magnitude different from this, it is impossible that both will exhibit the normal rate of profit. What we mean is that if $\frac{p_C^E}{p_L^E} \neq \frac{l_C^E}{l_L^E}$ then at least one of the sectors will not be able to achieve r^E , according to equations (4) above. We can rewrite this relationship in a slightly modified way. This will help clarify some points when we analyse Stuart Mill’s contribution:

⁷ The first reference is a letter from Ricardo to Trower dated 8th March 1814. The “Essay on Profits” first came out in 24th February 1815. See also Sraffa’s seminal Introduction to the *Collected Works* (Works, vol. 1, pp. 9-37).

$$\begin{aligned} p_C^E &= p_1^E (l_C^E / l_1^E) \\ p_L^E &= p_1^E (l_L^E / l_1^E) \end{aligned} \quad (6)$$

These set of relations must be respected if cloth and linen are to be produced in this country. Conditions (5) and (6) are equivalent, notice that the former can be obtained by dividing both equations in the latter. This modified condition states the existing constrains on monetary prices of cloth and linen, which depends on the price level for the wage good. For whatever monetary price of commodity 1, the monetary price of cloth and linen have to be as in (6) if a normal rate of profit is to be observed in their production. Any deviation from this will imply a different sectoral profit rate and, if unimpeded, the mechanism of competition discussed above will start to work.

The same kind of relationships could be drawn for the second country, Germany:

$$r^G = \frac{1 - b_1^G \cdot l_1^G}{b_1^G \cdot l_1^G} \quad (7)$$

And:

$$\frac{p_C^G}{p_L^G} = \frac{l_C^G}{l_L^G} \quad (8)$$

$$\begin{aligned} p_C^G &= p_1^G (l_C^G / l_1^G) \\ p_L^G &= p_1^G (l_L^G / l_1^G) \end{aligned} \quad (9)$$

Where commodity 1 also represents a non-tradable wage good. It can be materially the same as in England or not. This would not change the conclusions drawn above.

3. Enter trade

We shall now allow for international trade to take place. Classical economists relied on a specific group of assumptions when dealing with trade. Our first step is to clarify some of those. From there, we can justify some general propositions. This will set the stage for a proper analysis of James Mill and Stuart Mill in the following sections.

The classical analysis of international trade differed from the national scope with respect to the mobility of capital and labour. While in any specific country or region, as we have seen above, it is true that there are forces leading to the equality of profit rates and wages, in the international scenario this force is absent. This implies that profit rates and/or wages can be persistently different between countries. As Stuart Mill puts it: “between different countries, profits may continue different” (1968[1871], p. 588). Also, a long quotation from Ricardo may be helpful:

In one and the same country, profits are, generally speaking, always on the same level; or differ only as the employment of capital may be more or less secure and agreeable. It is not so between different countries. If the profits of capital employed in Yorkshire, should exceed those of capital employed in London, capital would speedily move from London to Yorkshire, and an equality of profits would be effected; but if in consequence of the diminished rate of production in the lands of England, from the increase of capital and population, wages should rise, and profits fall, it would not follow that capital and population would necessarily move from England to Holland, or Spain, or Russia, where profits might be higher. (Works, vol. 1, p. 113)

In terms of the framework set up in the previous section, the profit rate in England and Germany will not converge (nor the basket of goods consumed by workers). This persistent difference

will not trigger flows of capitals between the countries from capitalists seeking to maximize their profits.⁸ In general, the long-period position will be characterized by $r^E \neq r^G$.

Another assumption usually made is that balanced trade is the only stable position. A country can only pay for its imports with revenue received by exporting. In a barter system as Stuart Mill conceptualizes (1968[1871], book 3, chap. 17), is hard to conceive trade occurring outside of this equilibrium. There is a correspondent import for whatever good that is sent as export, and vice-versa. However, the equilibrium position does not change when one includes money into the analysis and hence the possibility of non-balanced trade. There will be a mechanism that acts to bring the system back to equilibrium, namely the gold-flow.

Another common feature of trade theories is the acknowledgment that prices of tradable goods must be the same across countries, discounting transport costs. We shall call it the law of one price. Obviously, this is true when evaluating the prices in a common standard, since one dollar is not the same as one euro and so on and so forth. From this it also follows that relative prices of tradable goods will be the same. So, their relative prices will follow the terms of trade, for whatever magnitude this is. In the case of two commodities traded, Stuart Mill asserts: “the two commodities will exchange for each other at the same rate of interchange in both countries” (1968[1871], p. 595). In terms of the example of cloth and linen, we will represent this common international relative price as p_C/p_L . We shall call it “international relative prices”, “terms of trade”, or “international values” interchangeably.

There is enough ground now to ascertain a few general propositions. The first one regards the conditions that make a country benefit from trade. Any country will benefit from trade if the ratio of export to import prices is higher than its own ratio of costs of production. For example, England can benefit from exporting cloth and importing linen if, and only if, $\frac{p_C^E}{p_L^E} < \frac{p_C}{p_L}$. This implies that the ratio at which England can “transform” cloth into linen is higher in the international market than in the domestic one. For a given quantity of cloth it could obtain more linen by means of importation than by producing it itself.

To illustrate this, suppose a given quantity of cloth (Q_C) owned by some English man. If England produces both goods the relative prices will be equivalent to its cost ratio. Then, anyone in possession of this amount could obtain a certain quantity of linen (Q_L) given by: $Q_L = \frac{p_C^E}{p_L^E} Q_C$. Now let's assume it can trade with other countries and in doing so it is faced with terms of trade $\frac{p_C^E}{p_L^E} < \frac{p_C}{p_L}$. Then, the same quantity Q_C would command a different quantity M_L of linen in the international market. This will be such as $M_L = \frac{p_C}{p_L} Q_C$. It is easy to see that if the terms of trade are as we have assumed then $M_L > Q_L$.⁹ If the terms of trade were different, then England would benefit from exporting linen ($\frac{p_C}{p_L} < \frac{p_C^E}{p_L^E}$) or could obtain no benefit from trade ($\frac{p_C}{p_L} = \frac{p_C^E}{p_L^E}$).¹⁰

⁸ Other authors working in the classical tradition have questioned this assumption. For example, Shaikh has extensively worked with models where countries' normal profit rates converge (in a recent contribution see Shaikh, 2016, chap. 11). Since our goal is to examine specific contributions, we ought to stay as close to their assumptions as possible. Therefore, we will not question the validity of doing so.

⁹ Let $\frac{p_C^E}{p_L^E} < \frac{p_C}{p_L}$, $Q_C > 0 \Rightarrow Q_L = \frac{p_C^E}{p_L^E} Q_C < \frac{p_C}{p_L} Q_C = M_L \Rightarrow Q_L < M_L$.

¹⁰ This proves that there are country wide benefits from trade. Which is the level of analysis classical economists worked with. As Faccarello (2017) argues, in a capitalist system the decisions of production are undertaken by capitalists that wish to maximize their profits. Hence, a country will partake in international trade if its capitalists are in a better position producing the exportable than otherwise.

This will be true. Take for example the case in which England benefits from trade by exporting cloth and importing linen. We have seen that at those relative prices the equalization of profit rates cannot be maintained (condition (5) above). For given real wages, the profit rate that could be obtained in each sector would be implicitly defined according to:

$$\frac{p_C}{p_L} = \frac{w^E \cdot l_C^E (1 + r_C^E)}{w^E \cdot l_L^E (1 + r_L^E)}$$

$$\text{Since } \frac{p_C}{p_L} > \frac{p_C^E}{p_L^E}$$

It is important to notice that the benefits England can gain from international trade are independent of Germany's cost ratios. They rely solely on the English cost ratios and the terms of trade. A disregard for this point has been used to attack Ricardo's trade model in the history of economic thought. For example, Chipman (1965, p. 479) argues that Ricardo's famous example of England and Portugal trading cloth and wine is problematic. This would be because Ricardo finds that England can benefit from trade before saying anything about Portugal, which would be "a *non-sequitur*" (ibid.).

Chipman fails to notice that for Ricardo, as Sraffa (1930) has shown, the terms of trade are given. This would be enough to derive the benefits of trade, in line with what we have done above. This is even more striking once one realize that in the next page the author shows a clear understanding of this point when he defends Torrens against Jacob Hollander's criticism. He argues that "what Torrens was comparing was the cost ratio in one country with the international price ratio; this made it possible for Torrens to provide a correct argument for the gains from trade" (Chipman, 1965, p. 480). From what we have argued, this would be the only proper way of assessing a country's gain from trade at any point. The problem then must rest in not seeing the given terms of trade in Ricardo (see footnote 3 for a recent literature on Ricardo). To be fair, Chipman (1965) argues that "Ricardo's exposition (...) [is] not free from ambiguity" (p. 479). He is also not completely sure "Whether or not this is a correct interpretation of Ricardo" (p. 483). He justifies the interpretation by saying that "the solution happens to correspond precisely to that which was later obtained by [Stuart] Mill". This emphasizes the esteem Stuart Mill's interpretation of Ricardo has had in the history of economic thought.

We can formalize now a second proposition, regarding mutual benefit from trade. We have seen the conditions for a country to choose to trade internationally. However, a country can only trade with others if it is beneficial for the other country to do the opposite transaction. In terms of our example, England can only export cloth and import linen (or vice-versa) if Germany also gains from this exchange. To be more precise, Germany cannot be worse off by entering trade. This sets the interval for the terms of trade in which both countries can benefit.

From conditions (5) and (8) above we know the relative prices that would have to rule in England and Germany, respectively. Those would be the only ones that ensure a domestic normal profit rate in the production of both cloth and linen. In general, those two cost ratios will be different. This implies that $\frac{p_C^E}{p_L^E} \neq \frac{p_C^G}{p_L^G}$. Whoever has the lowest relative cost in a good we shall say that has a comparative advantage in producing that good. Without loss of generality, we can set England to have a comparative advantage in the production of cloth. Consequently, Germany will have a comparative advantage in the production of linen. This can be summarized as $\frac{p_C^E}{p_L^E} < \frac{p_C^G}{p_L^G}$.

In this scenario it would only be possible to have England producing and exporting cloth and Germany linen. This is, if trade is to occur at all. If, for example, the terms of trade are such that England would rather produce and export linen it would also mean that Germany would rather produce and export linen ($\frac{p_C}{p_L} < \frac{p_C^E}{p_L^E} < \frac{p_C^G}{p_L^G}$). So, it would be a situation in which both countries want to export the same good. In a two country two commodity world this would be absurd and no trade could happen. The same problem would appear if the terms of trade would induce Germany to export cloth. Therefore, trade has to be with England exporting cloth and Germany exporting linen. Otherwise no trade will happen and the countries will act as in autarky.

The terms of trade would have to fall into a specific interval if both countries are to benefit from trade. This interval is given by the cost ratios in both countries. If it falls in between those, the

$$\frac{p_C}{p_L} = \frac{l_C^E(1+r_C^E)}{l_L^E(1+r_L^E)} > \frac{l_C^E}{l_L^E} = \frac{p_C^E}{p_L^E} \Rightarrow r_C^E > r_L^E$$

Indeed, for those terms of trade English capitalists will prefer to produce and export cloth. Remember that competition will force the rate of profit to be r^E . What we have proved is that if cloth production observes the normal rate of profit, then linen production will not be able to.

situation would be such that England wants to export cloth and Germany linen. So, trade will happen

$$\text{if } \frac{p_C^E}{p_L^E} \leq \frac{p_C}{p_L} \leq \frac{p_C^G}{p_L^G}.$$

What's important to notice is that the cost ratios of both countries only define the region where trade is profitable. They do not necessarily guarantee that trade will be profitable. For that it is required that we know the terms of trade. However, when trade does occur, it has to be with the country producing and exporting the commodity in which it has a comparative advantage.

4. James Mill's Error

The first two editions of James Mill's *Elements* (1821; 1824) contained a mistake in the treatment of international trade. It was present in an example in which England and Germany exchanged cloth and linen.¹¹ The error was finally identified and revised in the third edition (1844[1826]). However, a fundamental question was left open. The determination of the terms of trade was missing. The second edition introduced our example with England and Germany exchanging cloth and linen, which we shall use throughout. The first step is to understand how he first committed the error. Afterwards we can translate it into our model.

Let's start by analysing the paragraph where James Mill establishes the example. It was first introduced in the second edition of his book and kept, albeit with modifications, in the third. A full quotation might be in place:

If 10 yards of broad cloth in England can purchase 15 yards of linen, which means that they have cost an equal quantity of labour; while in Germany 10 yards of broad cloth can purchase 20 yards of linen; it is very evidently the interest of England to send broad cloth to purchase linen in Germany, because with 10 yards of broad cloth, that is, as much cost of production as would produce 15 yards of linen, she can obtain 20 yards.

It is equally the interest of Germany to send linen to purchase broad cloth in England, because with 15 yards of linen she can purchase 10 yards of broad cloth in England, which, if made at home, would cost her as much as 20 yards of linen. (Mill, 1824, p. 118-9)

What is he saying in this paragraph? He starts by establishing the cost ratios in both countries. In England, the cost ratio of producing cloth in terms of linen is $\frac{p_C^E}{p_L^E} = 1.5$. In Germany the same cost ratio would be $\frac{p_C^G}{p_L^G} = 2$. This implies that England has a comparative advantage in producing cloth while Germany in producing linen ($1.5 < 2$). In this case, as we have seen, there can only be mutually beneficial trade if England exports cloth and Germany linen. The interval where the terms of trade could lie is $1.5 \leq \frac{p_C}{p_L} \leq 2$. Nothing has been said about the terms of trade, though. Now trade is a mere possibility.

In order to argue how England would benefit from trade he says that: "it is very evidently the interest of England to send broad cloth to purchase linen in Germany, because with 10 yards of broad cloth (...) she can obtain 20 yards [of linen]" (ibid.). This implies that England faces an international price of cloth in terms of linen equal to 2, every unit of cloth exported is able to secure two units of linen. The terms of trade will then be equivalent to Germany's cost ratio.

This would be an extreme case where only one country would benefit from trade. However, there are no mistakes so far. As Sraffa (1930, p. 539-40) notes in the England-Poland example (see footnote 11 above): "To take, as James Mill does, the extreme case in which the ratio of interchange is such that the whole gain is reaped by one of the two trading countries to the exclusion of the other,

¹¹ All three editions of James Mill's book start with an example in which England and Poland exchange cloth and corn. However, since it deals with a basic commodity (corn) it has additional complications regarding distribution that we would like to avoid here. The analytical error was the same in both examples. That's why we will focus on the England-Germany one.

and use it to illustrate the general theory of foreign trade, is highly misleading; but in itself it does not involve a contradiction". By construction, only England is benefitting from trade.

The mistake was in the next part of the argument. Mill argued that "It is equally the interest of Germany to send linen to purchase broad cloth in England", which we know is nonsensical. But where does the error lie? According to him, from Germany's point of view: "with 15 yards of linen she can purchase 10 yards of broad cloth in England". So, Germany is importing cloth with her linen in a ratio of 1.5/1. This is exactly England's cost ratio. For this terms of trade England could not take any benefit from trade.

The problem is that England is exchanging cloth into linen in the international market at a rate different from which Germany is exchanging linen into cloth. This is truly a "non-sequitur". After all, as soon as England trades its cloth for Germany's linen it is implied that Germany is doing the reciprocal operation simultaneously. Between the second and the third edition the error was spotted and the text edited. Mill added that: "it is the inevitable effect of such an interchange to bring the relative value of the two commodities to a level in the two countries" (Mill, 1844[1826], p. 55).

Mill is unable to specify where the terms of trade would lie, though. The level to which international values will inevitably be brought to is nowhere to be found in his work. This incompleteness has a few implications according to the framework we have drawn above. First, it is not possible to verify the benefits each country can gain from trade, or the direction of specialization. After all, a country needs to compare its cost ratio with the ruling international value in order to do that. Besides this, it is impossible to ascertain that trade will be mutually beneficial. Nothing guarantees that international values will fall inside the interval between both countries' cost ratios. Stuart Mill understands what the problem was and the remaining theoretical gap.¹² His contribution aims at completing his father's construct.

5. Stuart Mill's closure

Enough ground has been covered to allow us to deal with Stuart Mill. We will focus our attention in his international trade argument as present in the *Principles* (Mill, 1968[1871]). His other main contribution was in the first essay of *Essays on Some Unsettled Questions of Political Economy* (1844). The later book contains long quotations from the previous work and an argument almost intact, which implies that the analytical argument is unchanged. An important point that changed between both expositions is that in the later Stuart Mill makes no claim that Ricardo was either wrong or incomplete. The earlier work is explicit: "Mr. Ricardo (...) unguardedly expressed himself as if each of the two countries making the exchange separately gained the whole of the difference between the comparative costs of the two commodities in one country and in the other." (Mill, 1844, p. 5-6).

Stuart Mill starts his chapter *Of International Trade* (Mill, 1968[1871], book 3, chap. 17) by arguing that "cost of production is not the regulator of international values" (p. 587). This is a clear reference to Ricardo's remark that "The same rule which regulates the relative value of commodities in one country, does not regulate the relative value of the commodities exchanged between two or more countries" (Works, vol. 1, p. 113). Stuart Mill uses his father's England-Germany example to illustrate the point. England has a comparative advantage in producing cloth and Germany in linen. The terms of trade will not be equal to either one's cost ratio, though. This is a necessary condition for both of them to benefit from trade, as we have seen in section two above.

¹² Other authors have argued that James Mill's *Elements* was, in great measure, written by his son. They claim that the error was introduced by Stuart Mill rather than by James Mill, for example Thweatt (1987). Though intended as a defense of James Mill, Thweatt's claims are a bit flimsy. For it would imply that James Mill not only let his book contain an evident error for two editions, but also had a lack of understanding of Ricardo's theory. After all, when the error was corrected in the third edition it was wanting as compared to Ricardo (Thweatt more or less agrees with Sraffa's interpretation of it).

However, we are not concerned with those details. Our aim is to clarify analytical points. The objective data we are faced with is: the error present in two editions of James Mill's book; an insufficient correction in the third edition; and two contributions by Stuart Mill where he proposes a solution.

However, it is erroneous to say that international values do not conform to the cost of productions in Ricardo. His allusion to a different rule that regulates relative value seems to imply that commodities do not exchange according to their embodied labours in the international market. This contrasts to the case of commodities produced nearby, whose relative prices tend to be equal to the relative amount of labour spent in their production. We have seen that this comes because of capital not being mobile across countries.

Despite this, terms of trade will necessarily be equal to the ratio of cost of production across exporting countries. Otherwise one might be puzzled when a few chapters later Ricardo says that “it is the natural price of commodities in the exporting country, which ultimately regulates the prices at which they shall be sold (...) in the importing country” (Works, vol. 1, p. 238). How can both propositions be true? The answer can be found in Stuart Mill’s book itself, which makes his confusion even more striking.

In book three, chapters three and four of his *Principles* Stuart Mill discusses the relationship between cost of production and value. As usual, for reproducible commodities, the general case is that value conforms to the relative amount of labour. However, in paragraphs three and four of chapter four, he admits that when profit and wages are permanently different in the production of two commodities, their relative price is not equal to the ratio of embodied labour. He summarizes this by saying that “Profits, therefore, as well as wages, enter into the cost of production which determines the value of the produce” (Mill, 1968[1871], p. 482).

This is exactly what he assumes to happen with international trade: “between different countries (...) there may exist great inequalities in the return to labour and capital, without causing them to move from one place to the other” (idem, p. 588). The England-Germany example, when England is exporting cloth and Germany linen can be used to explain this. In that case, English cloth would have to be able to pay the same wage and profit as the non-tradable good (good 1). Its price as a function of the price of the wage good was shown to be (equation (6) above): $p_C^E = p_1^E (l_C^E / l_1^E)$. In a similar manner the price of linen in Germany had to be (equation (9)): $p_L^G = p_1^G (l_L^G / l_1^G)$. Those are the natural prices that must be respected in the exporting country. So, in one way or another the terms of trade will have to be equivalent to:

$$\frac{p_C}{p_L} = \frac{p_1^E (l_C^E / l_1^E)}{p_1^G (l_L^G / l_1^G)} \quad (10)$$

Of course, this implies a common measure for the price level in both countries. This is not enough to determine the terms of trade, though, simply because we do not know what is the monetary price of the wage good (p_1^E and p_1^G) in either country. It is just a condition that must hold if each country individually is to have a uniform rate of profit in its sectors, including in non-tradables. It is enough to show that, contrary to Stuart Mill’s conclusion, “permanent value is proportioned to cost of production” even “between commodities produced in distant places” (Mill, 1968[1871], p. 587). It is not proportional to labour embodied though.

How are terms of trade determined then? Or in Stuart Mill’s words: “what are the causes which determine the proportion in which the cloth of England and the linen of Germany will exchange for each other” (idem, p. 597)? To answer this question, he introduces two concepts. The first one we are already familiar with. The second one is particular to his construct, but not without precedent. They are:

- Balanced trade is the only stable situation;
- Each countries’ demand for imports is inversely proportional to the relative price of its imports.

The first assumption is justified by recurring to “all trade is in reality barter (...) an actual trucking of one commodity against another” (idem, p. 595). If trade is barter then the exports and imports in value terms must match every time. After all, for every commodity imported there is a correspondent commodity exported, no matter what. Stuart Mill does relax this hypothesis further on

by introducing money. He does not, however, change his conclusions.¹³ So, we can proceed as if in a barter system and avoid the complications introduced by money.

Let D_L^E and D_C^G be England's demand for linen and Germany's demand for cloth, respectively. Those shall be supplied through importation. Balanced trade requires that exports and imports are equal in value terms. It can be presented as $p_L D_L^E = p_C D_C^G$. Where, from England's point of view, the left-hand side is the imports and the right-hand side the exports. This condition can be manipulated to show explicitly the relationship that must hold between terms of trade and reciprocal demands:

$$\frac{p_C}{p_L} = \frac{D_L^E}{D_C^G} \quad (11)$$

The second assumption is something new in classical political economy. He introduces that the quantity demanded of given good is negatively related to its relative price: "The demand for a commodity, that is, the quantity of it which can find a purchaser, varies as we have before remarked, according to the price" (idem, p. 597).

In fact, he starts his analysis of value with the law of supply and demand (idem, book 3, chapter 2). In there, he separates commodities into three classes with different laws of values. The first class are commodities whose supply is fixed, like paintings from great masters. Their value would be ruled by the law of supply and demand. The second class are commodities that could be reproduced virtually indefinitely. Those would have their value determined by cost of production. The last, intermediate, class of commodities are those that can be increased in quantity only with a higher cost.

Commodities brought from different countries fall into the second class. They could in principle be "increased or diminished to a great, and even an unlimited extent" (idem, p. 469). Nevertheless, their "value never depends upon anything but demand and supply" (ibid.).¹⁴ From there, Stuart Mill establishes that each country's demand for imports are a function of the terms of trade:

$$\begin{aligned} D_L^E &= f\left(\frac{p_L}{p_C}\right) \\ D_C^G &= g\left(\frac{p_C}{p_L}\right) \end{aligned} \quad (12)$$

The specific format of the curves is not given. Instead he says that they "cannot be reduced to any rule" (idem, p. 599). The shape becomes a matter of statistical determination, at best. The only general rule they shall follow is to be negatively related to the commodity's relative price.¹⁵

With equations (11) and (12) it is very easy to find the equilibrium term of trade. It will simply be the one that is equal to the ratio between the two demand functions. This one will be just enough to allow for balanced trade, determining price and quantity.

$$\frac{p_C}{p_L} = \frac{f\left(\frac{p_L}{p_C}\right)}{g\left(\frac{p_C}{p_L}\right)} \quad (13)$$

¹³ The introduction of money does not change the characterization of balanced trade as the resting position: "whether money is employed or not, things are only in their permanent state when the exports and imports exactly pay for each other" (idem, p. 630). What change is the mechanism through which equilibrium is restored. With barter there can only be equilibrium. With money, however, disequilibrium can occur. The difference of export and imports will be offset by flows of "gold" from the deficit country to the surplus country. Through the quantity theory of money, this will enforce the "correct" price level in each country.

¹⁴ Stuart Mill says the same about labour. He is thus bringing supply and demand into the theory of distribution. Hence into the determination of every commodity's value, since they all use labour in their production. This has further implications for the transition between classical and marginal economics (see Bharadwaj, 1989).

¹⁵ A caveat is in place. We do not wish to claim that those demand functions are based on marginalist concepts. As a matter of fact, they seem to lack a solid theoretical foundation and resort to common sense. However, it opens the possibility for later authors to explain it in terms of "marginal utility" theory of demand.

The solution for this equation is the equilibrium term of trade $\left(\frac{p_C}{p_L}\right)^*$. Stuart Mill summarizes it well in the following passage:

when two countries trade together in two commodities, the exchange value of these commodities relatively to each other will adjust itself to the inclinations and circumstances of the consumers on both sides, in such manner that the quantities required by each country, of the articles which it imports from its neighbour, shall be exactly sufficient to pay for one another (idem, p. 598-9)

Again, there is no reason for this to fall into the region where both countries benefit from trade. In other words, it could be lower or higher than both cost ratios. In this case, trade would not be profitable for both countries. We will assume that it does fall inside the interval defined by the cost ratios. Inside it, it can assume any value.

In equation (10) we have established the relationship between terms of trade and price level that must happen for specialization to occur according to comparative costs. So, in the end, Stuart Mill is also determining the proportion between price levels that has to prevail for this:

$$\frac{p_1^E}{p_1^G} = \left(\frac{p_C}{p_L}\right)^* \frac{(l_L^G/l_1^G)}{(l_C^E/l_1^E)} \quad (14)$$

When this happens, comparative advantage will also imply a lower monetary cost in the exporting country. By this we mean that, if the ratio of price levels adjust to the equilibrium terms of trade as in (14), the monetary price of English cloth will be lower than the monetary cost that Portugal would have to incur to produce itself. The same is valid for Portuguese wine. These two facts can be represented by:¹⁶

$$\begin{aligned} p_C^E &< p_C^G \\ p_L^G &< p_L^E \end{aligned}$$

Evidently this has to hold, at least in the long-run resting position. After all, for products of the same quality and characteristics, consumers do not care where they come from. If German cloth is cheaper than the English one in a common standard, consumers will buy it. They do not care that England has a comparative advantage in cloth. This explains the seemingly conflicting quote from

¹⁶ We will prove it for the case of English cloth, but the same kind of reasoning could be used for the German linen. Remember that we have established (in equations (6) and (9) above) the prices of cloth that would have to be observed in England and in Germany as a function of the corresponding wage good price. Those would allow for a normal profit rate in this sector. They were, respectively: $p_C^E = p_1^E (l_C^E/l_1^E)$ and $p_C^G = p_1^G (l_C^G/l_1^G)$. Divide one for the other to get:

$$\frac{p_C^E}{p_C^G} = \frac{p_1^E}{p_1^G} \frac{(l_C^E/l_1^E)}{(l_C^G/l_1^G)}$$

Using the fact that $\frac{p_1^E}{p_1^G} = \left(\frac{p_C}{p_L}\right)^* \frac{(l_L^G/l_1^G)}{(l_C^E/l_1^E)}$ and after some manipulation:

$$\frac{p_C^E}{p_C^G} = \left(\frac{p_C}{p_L}\right)^* \left(\frac{l_L^G}{l_C^G}\right)$$

However, by equation (8) above, the second term on the right is just Germany's cost ratio ($=p_L^G/p_C^G$). So, we can rewrite it as:

$$\frac{p_C^E}{p_C^G} = \frac{(p_C/p_L)^*}{(p_L^G/p_C^G)}$$

We have assumed that trade is profitable for both countries, then $(p_C/p_L)^* < p_C^G/p_L^G \Rightarrow \frac{(p_C/p_L)^*}{(p_L^G/p_C^G)} < 1$. This proves that $p_C^E < p_C^G$.

Ricardo above where the price in the importing country is equal to the natural price in the exporting country.

This result explains Stuart Mill's remark that "there are many things which, though they could be produced at home without difficulty, and in any quantity, are yet imported from a distance. The explanation which would be popularly given of this would be, that it is cheaper to import than to produce them: and this is the true reason. But this reason itself requires that a reason be given for it." (idem, p. 587). At any one point the exporting country is that which can offer the good for the lowest monetary price. However, for Stuart Mill there are forces that compel the country with a comparative advantage to be the one with lowest monetary costs. This is the reason behind the reason Stuart Mill alluded to. The country's monetary prices will be defined by the ratio of reciprocal demands as in the solution to equation (13). This guarantees that the country with the competitive advantage will have the lowest monetary price for its exporting good.

So, through the introduction of functions of reciprocal demands, Stuart Mill is able to determine the terms of trade. This allows him to close the theoretical gap his father had left open. However, to do so he gives a twist to classical thought by introducing foreign concepts.

6. Conclusion

In this paper we have set the task to clarify two interrelated points in the history of economic thought. The first one was how James Mill committed an analytical error in his exposition of the theory of trade. As we have seen, he sets his model with England and Germany trading cloth and linen. He proceeds as if each country faces different ratios of international prices. England would trade its cloth for Polish linen at a rate different from which Poland would do the reverse. This is clearly unattainable. The error persisted for two editions of his book, being eventually corrected in the third edition. The correction was not fully satisfactory though, leaving the terms of trade undefined.

His son, Stuart Mill, started from this theoretical gap to present his contribution. He believed that the error was somewhat fundamental, attributing it also to Ricardo. He thought it was justified to bring into the picture foreign concepts. He introduces the law of supply and demand as a determination of values (not only in the international scheme). This is not without consequences. Our second goal was to clarify how he uses it to determine international values.

Through explicitly introducing a non-tradable wage good in the model, we have been able to derive some properties the countries must show to export the commodities in which they have a competitive advantage. This helped to dispel some apparent puzzles regarding Ricardo's affirmation of different laws of value for domestic and international goods. If trade happens, competition forces monetary costs in the exporting country to be bounded by international values. So, while being true that the terms of trade are not determined by either country's cost ratio, they have to converge in some way or another. Otherwise, the country with the competitive advantage might not be the one with lowest monetary costs.

By examining James Mill and Stuart Mill, we wish to contribute to the renewed interest in classical trade theory. The new Sraffa-Ruffin interpretation sets Ricardo free from incompleteness and error. It puts itself in a clash with the standard/Stuart Mill's interpretation. We have employed the modern tools Sraffa gave us to understand classical economists to study how this standard interpretation was built. It not only gives us a clearer view of the differences brought by the Sraffa-Ruffin literature as it also gives us some insight into the history of economic thought. From Ricardo to the "Ricardian model" there is a story of misunderstandings, errors, and shifts in different directions.

References

- Bharadwaj, K. (1989). *Themes in Value and Distribution: Classical Theory Reappraised*. London: Unwin Hyman.
- Bhering, G. (2017). *Princípio de Say, Distribuição Internacional do Ouro e Demandas Efetivas Recíprocas em Ricardo*. Unpublished PhD Thesis: IE-UFRJ.
- Chipman, J. S. (1965). A Survey of the Theory of International Trade: Part 1, The Classical Theory. *Econometrica*, 477-519.
- Eatwell, J. (1982). Competition. In I. Bradley, & M. Howard (Eds.), *Classical and Marxian Political Economy: essays in honour of Ronald L. Meek* (pp. 203–228). London: Macmillan.
- Faccarello, G. (2017). A Calm Investigation into Mr Ricardo's Principles of International Trade. In S. Senga, M. Fujimoto, & T. Tabuchi (Eds.), *Ricardo and International Trade* (pp. 85-119). New York: Routledge.
- Garegnani, P. (1984). Value and Distribution in the Classical Economists and Marx. *Oxford Economic Papers*, 36(2), 291-325.
- Krugman, P. (2002). Ricardo's Difficult Idea: Why intellectuals don't understand comparative advantage. In G. Cook (Ed.), *Freedom and Trade: The Economics and Politics of International Trade* (Vol. 2, pp. 22-36). London: Taylor & Francis.
- Maneschi, A. (2004). The True Meaning of David Ricardo's Four Magic Numbers. *Journal of International Economics*, 62(2), 433-42.
- Mill, J. (1821). *Elements of Political Economy* (1st ed.). London: Baldwin, Cradock, and Joy.
- Mill, J. (1824). *Elements of Political Economy* (2nd ed.). London: Baldwin, Cradock, and Joy.
- Mill, J. (1844[1826]). *Elements of Political Economy* (3rd ed.). London: Henry G. Bohn. Retrieved from <http://oll.libertyfund.org/titles/302>
- Mill, J. S. (1844). Of the Laws of Interchange between Nations; and the Distribution of the Gains of Commerce among the Countries of the Commercial World. In J. S. Mill, *Essays on Some Unsettled Questions of Political Economy*. London: John W. Parker.
- Mill, J. S. (1968[1871]). Principles of Political Economy. In J. M. Robson (Ed.), *Collected Works of John Stuart Mill* (Vols. 2-3). London: Routledge & Kegan Paul.
- Ricardo, D. (2005). *The Works and Correspondence of David Ricardo*. (P. Sraffa, & M. Dobb, Eds.) Indianapolis: Liberty Fund.
- Ruffin, R. (2002). David Ricardo's Discovery of Comparative Advantage. *History of Political Economy*, 34, 727- 48.
- Senga, S., Fujimoto, M., & Tabuchi, T. (2017). *Ricardo and International Trade*. New York: Routledge.
- Shaikh, A. (2016). *Capitalism: Competition, Conflict, Crises*. New York: Oxford University Press.
- Smith, A. (2001[1776]). *An Inquire into the Nature and Causes of the Wealth of Nations*. London: The Electric Book Company.
- Sraffa, P. (1930). An Alleged Correction of Ricardo. *The Quarterly Journal of Economics*, 44(3), 539-545.
- Sraffa, P. (1960). *Production of Commodities by Means of Commodities*. Cambridge: Cambridge University Press.

Stirati, A. (1992). Unemployment, Institutions and the Living Standard in the Classical Theory of Wages. *Contributions to Political Economy*, 11, 41-66.

Thweatt, W. O. (1987). James and John Mill on Comparative Advantage: Sraffa's Account Corrected. In H. Visser, & E. School (Eds.), *Trade in Transit* (pp. 33-43). Dordrecht: Springer.