Review of Political Economy

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/crpe20

Globalization of Production and Absolute Advantage in a Classical Approach

Pedro S. Machado

To cite this article: Pedro S. Machado (24 Oct 2023): Globalization of Production and Absolute Advantage in a Classical Approach, Review of Political Economy, DOI: 10.1080/09538259.2023.2265102

To link to this article: https://doi.org/10.1080/09538259.2023.2265102

Published online: 24 Oct 2023.

REVIEW OF POLITICAL ECONOMY
https://doi.org/10.1080/09538259.2023.2265102

Routledge
Taylor & Francis Group

Globalization of Production and Absolute Advantage in a Classical Approach

Pedro S. Machado

Department of International Politics, City, University of London, London, United Kingdom

ABSTRACT

Trade in intermediate goods has grown in importance over the past decades. However, there is an apparent inability of trade theory to deal with it. A suitable place to look for an explanation is the classical theory, which puts emphasis in the circular aspect of production. This paper uses a classical-production framework, based on Sraffa's contributions, to investigate the globalization of production. It presents a novel closure to the system of international prices based on given wage disparities. This novel closure emphasizes the relevance of absolute cost advantages in the determination of international prices and the geographical distribution of production.

ARTICLE HISTORY
Received 27 November 2022
Accepted 18 September 2023

KEYWORDS
International trade; classical political economy; absolute advantage

JEL CODES
F10; F12; B51

1. Introduction

Trade in intermediate goods (or inputs) has always been a characteristic of the capitalistic world economy, which has increased in prominence in the last half century or so. Today, world production is an integrated process dispersed amongst different countries. This represents a novel international division of labour, with peripheral countries also producing manufactures. The literature has given different labels to this evolution of productive integration: global commodity/value chains (Gereffi 1994; Hopkins and Wallerstein 1986; Kaplinsky 2013); offshore outsourcing or 'offsourcing' (Winkler and Milberg 2012); and international vertical disintegration (Baldone, Sdogati, and Tajoli 2007). It follows, it might be argued, that an analytical tool that is able to shed light on the drives of Global Value Chains (GVCs) is very important to interpret the modern world.

In empirical work, there is a wealth of literature using input-output techniques to measure and describe GVCs (see the survey by Johnson 2018). Despite the great number of empirical works, however, there is some consensus in the literature that the theoretical tools available do not offer appropriate explanations (Inomata 2017). As Grossman and Rossi-Hansberg (2006) argue, the theoretical models may not be suited to explaining GVCs because they focus on trade in final goods only. Inomata (2017) suggests the need for a 'New-New-New Trade Theory'.

CONTACT Pedro S. Machado pedro.siqueira-machado@city.ac.uk Department of International Politics, City, University of London, London, UK

Contrary to this position, I suggest that, instead of coming up with a new theory, we should go back to classical political economists and Marx. More specifically, Sraffa's reconstruction of classical political economy is a possible starting point (Sraffa 1951, 1960). This framework of analysis puts a lot of emphasis on the role of intermediate goods in production. As noticed by Escaith and Miroudot (2016) there is a lot of overlap between the formal aspects of the empirical input-output analyses and this theoretical framework (which they refer to as neo-Ricardian).

This paper aims at drawing on classical political economy to develop a theoretical framework capable of dealing with some of the salient features of GVCs. Any analytical construct must start by isolating the crucial aspects of a complex phenomenon that it wants to explore. On this basis, the core feature of GVCs under investigation is that there is widespread use of imported inputs. As Gereffi and Korzeniewicz (1994, 1) put it: 'Capitalism today thus entails the detailed disaggregation of stages of production and consumption across national boundaries'. This justifies the use of modern classical political economy, as developed by Sraffa (1960), which emphasizes that commodities are produced by means of commodities.

One of Sraffa's contributions to the revitalization of classical political economy was to provide a production-based price system that considers the interconnectedness of industries. This framework explains price of productions based on technology (the matrices of technical coefficients) and distribution between capitalists and workers. Besides explaining prices, the framework also shows how the method of production is chosen among the available ones; where a method of production is understood as the combination of inputs and labour required to produce a good.

In the case of international trade, the framework must explain not only relative prices inside a country but also those ruling between countries, or the 'terms of trade'. While the question of choice of method can be extended to include which commodities each country produces. Therefore, a production model that attempts to explain international trade must address at least two related questions: first, how are international prices formed?; and second, what determines the geographical distribution of production between countries (i.e., specialization)? As I shall argue, these two questions are inseparable: there is a one-to-one correspondence between price determination and specialization.

The idea of using Sraffa's price equations to study international trade has precedents in the work of Steedman (1979a), Parrinello (1973), and others (see collected essays in Steedman 1979b). One of the main goals of these contributions is to revisit Ricardo's approach to international trade in response to Sraffa's reformulation of classical political economy. Despite the strengths of this reformulation, it can, however, be seen as embodying some of Ricardo's limitations. For the most part, it presupposes an international system where the only stable configuration was characterized by balanced trade. Moreover, this limitation is extended further to a dynamic setting by imposing the assumption that trading countries must grow at the same rate, at least on average:

> [T]he following analysis of growing, trading economics will, unfortunately, have to be carried out under that same assumption, the uniform and constant rate of steady growth now being uniform not only for those output and labour quantities relating to a given country but also as between countries. (Steedman 1979a, 110)

The present paper attempts to free the analysis from a closure based on a uniform rate of growth. In this way, it is possible to establish the fundamentals of international trade,

regardless of the patterns of growth. This does not imply a denial of possible links between countries' growth rates, but these considerations can be investigated at a separate stage of the analysis, after having achieved the fundamentals of international trade.

More recently, a new closure has been pursued by many authors such as Parrinello (2010), Shaikh (1999, 2016), Crespo, Dvoskin, and Ianni (2020), Bellino and Fratini (2021), among others. A common thread among these works is the assumption that, in the modern international capitalist system, capital is free to move between countries. This is framed as an external critique of the way Ricardo separates domestic from international trade by the absence of free movement of capital in the latter case. This new assumption implies that there is a tendency for the establishment of a uniform international rate of profit between countries. From this critique of Ricardo, this literature attempts to establish a role for absolute advantages in international trade.

In the same vein, this paper also argues for a preeminent role for absolute advantages using a two-commodities-two-countries example. However, it manages to do so without the specific assumption regarding the international mobility of capital. In this sense, it advocates for absolute advantage to play a more fundamental role in international trade than in the existing literature. Assumptions regarding the international mobility of capital can be introduced later without altering the main conclusions.

In an alternative construct, Baldone, Sdogati, and Tajoli (2007) argues that absolute advantage regulates international trade when production is fragmented between countries. This international fragmentation of production implies in trade in intermediate goods. The authors claim that, in such scenarios, there is a 'lessening of the power of the concept of comparative advantages (…) while it is the concept of absolute advantage that becomes increasingly relevant' (Baldone, Sdogati, and Tajoli 2007, 1727). In a very similar setting, Machado and Trigg (2021) build from a pure labour model to show that the role of absolute cost advantages is independent from trade in intermediate goods. It shows that there is a dimension to this analysis that has been somewhat neglected: it rests on a fundamental assumption that each country has a given money wage, both measured in a common unit of account (Baldone, Sdogati, and Tajoli 2007, 1733). This modelling of wage disparities allows for a comparison between money costs (and absolute advantage) between countries which, it may be argued, is more fundamental than Baldone et al.'s focus on intermediate inputs.

In this paper, I propose a novel formulation and closure for the system of international prices and the pattern of specialization. This is an alternative to the closures available in the literature, as it does not rely on strong assumptions of balanced trade or equilibrium in the balance of payments. Instead, this new closure relies on setting the rates of profit and nominal wages as given, following Pivetti (1991, 171). These variables are determined by the historical process of conflict distribution, which is affected by socio-political factors.

Formally, the given profit rate ensures that the structure of potential costs of production inside a country is known. This is equivalent to a closed economy, or an autarky situation. On the other hand, given nominal wages allows for a comparison between absolute costs in different countries. Comparing absolute costs of production between different countries guarantees that the emerging pattern of specialization is compatible

with the classical process of price competition. These concepts will be made more precise throughout the paper.

The paper is organized in the following way. Section two analyses the methods and costs of production when there are positive rates of profit. Section three scopes out the possible geographical distributions of production and their implications in terms of international prices. Section four introduces the assumption that interest rates determine profit rates, based on Sraffa (1960) and Pivetti (1991). This is enough to determine relative prices only for situations where production is concentrated in a single country, what I call 'closed production systems'. Section five deals with the novel closure for international prices and specialization following Pivetti's insights. It also argues that absolute cost advantages are essential for an analysis of international trade. Section six generalize some of the arguments to a more realistic setting where workers consume different baskets of goods. Finally, section seven provides some links to the previous literature and argues that our contribution is independent of the assumption regarding the degree of international capital mobility.

2. Methods and Costs of Production with Positive Profits

In this paper, I develop a model that builds on the pure labour model proposed by Machado and Trigg (2021). It extends the analysis for a situation with trade in intermediate goods and positive rates of profit. There are two countries, A and U, and two commodities, 1 and 2. Commodity 1 is purely used as an instrument of production in the production of both commodities (a capital good); commodity 2 is a pure consumption good. The quantities of the intermediate good together with labour-hours required to produce one unit of each good define the methods of production. Each country has a single method of production for each commodity; both commodities can be traded between the countries. These methods remain constant throughout the paper. Also, the methods of production are assumed to be different between countries due to technological disparities.[1] For simplification, technology is given, all capital is circulating and there is no joint production.

Therefore, the costs of production for commodity $k = 1,\ 2$ in country $j = A,\ U$ can be represented as:

$$c_k^j = p_1 a_{1k}^j (1 + r^j) + w^j l_k^j \tag{1}$$

where c_k^j is the cost of producing commodity k in country j; p_1 is the international price of the intermediate good; w^j is the nominal wage; r^j is the uniform rate of profit for country j; a_{1k} is the input coefficient (a physical amount of commodity 1) that is used to produce one unit of commodity k; l_k captures the labour-hours necessary to produce one unit of commodity k.

[1] As Pasinetti (1993, 153) argues, a very important facet of international trade is the transference of technology between trading partners. Countries may improve their productivity by learning from the more advanced techniques used in the other countries. The assumption of given methods of production cannot deal with these dynamic transfers of technology, but it can be argued that it represents a situation in which these transfers have already happened. The differences in methods may still arise from factors outside of pure technology, such as different geographical positions and climate. Future extensions of our analysis could develop the role of technological change and economic growth, drawing on the insights provided, for example, by Pasinetti (1981, 163–6). See also Garbellini (2021) for a recent study of how the international diffusion of technology affects international trade in a Pasinetti model.

Equation 1 shows that the costs of production consist of the replacement of circulating capital used up in production ($p_1 a^j_{1k}$), the labour costs ($w^j l^j_k$), and profits upon advanced capital accruing to capitalists ($p_1 a^j_{1k} r^j$). This last term is measured at the uniform normal rate of profits. Throughout most of the paper the countries' rates of profit are allowed to be different from each other (to be relaxed in section six). This can be understood as Ricardo's assumption of immobility of capital between countries.

Equation 1 forms the basis of the analysis in this paper, as specification of potential costs of production. The transition from potential costs to actual costs of production depends on whether the goods are actually produced in that country. It may be argued, based on the mechanism of price competition, that whether the production of these sectors is activated depends on the absolute cheapness to produce these goods as compared to the other country.

Notice that potential costs are defined for unspecified international commodity prices (i.e., p_1 and p_2 are yet to be determined). From the law of one price, the price of tradable commodities is the same in both countries (barring transport costs, which are assumed to be negligible as a first approximation). With a cost-based determination of prices, prices are set at the level that covers the cost of production for the cost-minimizing methods. This justifies Ricardo's claim that 'it is the natural price of commodities in the exporting country, which ultimately regulates the prices at which they shall be sold, if they are not the objects of monopoly, in the importing country' (Ricardo 2005, 238). Therefore, the determination of prices and the patterns of international production are intrinsically related. These issues will be explored in the analysis that follows.

3. Patterns of Trade and Specialization

In this system, there are two countries competing to produce two commodities. By simple combinatorics, four cases (or types) of complete specialization can be identified. Complete specialization is defined as a situation when each commodity is produced by a single country. Table 1 lists all cases (indexed by roman numerals).

Each case implies a different geographical distribution of production with complete specialization. For example, case I occurs when country *A* produces both commodities and country *U* imports the consumption good 2.

Cases I and II have all production concentrated in a single country; I label them as 'closed production systems'. On the other hand, cases III and IV have production dispersed between countries, and more importantly countries trade inputs among themselves; these are called 'integrated production systems'.

Since each case has a different configuration of production, the *relevant* cost of production equations can differ. For example, case I happens when country *A* produces both commodities; therefore, the price of these commodities must be enough to cover

Table 1. Conceivable geographical distributions of production.

	Cases			
	I	II	III	IV
Commodity 1	Country *A*	Country *U*	Country *A*	Country *U*
Commodity 2	Country *A*	Country *U*	Country *U*	Country *A*

the costs of production in country A. While for case II to work, it is necessary that the international prices are enough to cover the costs of production in country U. By contrast, the integrated production systems require that the international prices cover the cross-country costs of production.

What this means is that the determination of necessary international prices changes between the different cases. More importantly, there is a one-to-one correspondence between the international prices and the patterns of specialization: if one knows the long-period position for international prices, it should be possible to infer the pattern of specialization and vice-versa. One must solve both at the same time.

The next two subsections provide a systematic exploration of how the patterns of specialization relate to international prices. It uses the method of dated quantities of labour (Sraffa 1960, chap. 6; see also Petri 2021, chapters 1 and 2) to show how prices depend on technical coefficients and distribution.

3.1. Closed Production Systems

As argued above, there are two possible geographical distributions of production that concentrate production in either country A or country U. These are the closed production systems. The structure of prices and costs will be considered for both systems.

With a cost-based determination of prices, for country $j = A, U$ to produce (and be able to export) both commodities it is necessary that their international prices be enough to cover the costs of production in that country. Hence, the following relations should hold:

$$p_k^x = c_k^j \tag{2}$$

where p_k^x is the international price for commodity $k = 1,\ 2$ inside case $x = \text{I, II}$, and $j = A$ when $x = \text{I}$ or $j = U$ when $x = \text{II}$. Equation 2 implies that the costs of production of the producing country determine international prices for both goods.

Substituting the necessary prices from (2) into the cost equations for country j (equation 1):

$$p_k^x = p_1^x a_{1k}^j (1 + r^j) + w^j l_k^j$$

which, solving for p_k^x, becomes:

$$p_k^x = w^j L_k^j \tag{3}$$

Based on Sraffa (1960, chap. 6), L_k^j is the result of a process called 'reduction to dated quantities of labour' if both commodities are produced inside country j.[2] It is important

[2]The reduction to dated quantities of labour is an alternative way to represent the methods of production. Technically, L_k^j is the value to which the reductions converge if taken to their limits. This is achieved by the same process of vertical integration (see Pasinetti 1973), with the exception that the each 'past' labour term is weighted by $(1 + r)^s$, where r is the ruling rate of profit and s is how far back one has gone in the reduction. The procedure to calculate these reductions is aptly described by Sraffa (1960, chap. 6). For example, the reduction to dated quantities of labour for commodity 1 in country A is: $p_1^A = w^A[l_1^A + l_1^A a_{11}^A (1 + r^A) + w^A l_1^A (a_{11}^A)^2 (1 + r^A)^2 + \ldots]$. Mathematically, this is an infinite geometric series with ratio $a_{11}^A (1 + r^A)$. If the ratio is less than one, then the series converge to the value (for more details on the mathematical process see also Pasinetti 1977, 89–92; Kurz and Salvadori 1995, 165–68; and Steedman 1977,

to notice that these terms are themselves functions of the technical conditions of production *and* the rate of profit (r^A).

Equation 3 fully characterizes the necessary international prices for the closed production systems. It shows that the prices of commodities depend also on the distribution among classes because the dated quantities of labour depend on the rate of profit; this is a key result established by Sraffa (1960). Money prices depend on the nominal wage, the technical coefficients, and the rate of profit. Since country j produces everything, this result is indistinguishable from Sraffa's 'closed' production model. The next subsection investigates the determination of international relative prices for these closed production systems.

3.2. Integrated Production Systems

Up to this point, I have analysed the conditions of production when all production processes are concentrated in one country. The analysis now turns to cases where production is fragmented between the two countries (cases III and IV in Table 1). For these integrated production systems, the conditions of production in the country that produces the capital good (commodity 1) affects the costs of production of both countries. Because of that, the distributive conditions in one country affect the costs in the other.

The first case of an integrated production system is where country A produces the intermediate good 1 and exports it to country U to be transformed into the consumption good 2; country U then exports the consumption good to country A. This corresponds to case III in Table 1. Evidently, the relevant costs of production are the cost of producing commodity 1 in country A and the cost of producing commodity 2 in country U.

For case III to happen, the international price of commodity 1 must be enough to cover its cost in country A, while the international price of commodity 2 must cover its cost in country U. These conditions can be represented as:

$$p_1^{\mathrm{III}} = c_1^A \tag{4}$$

$$p_2^{\mathrm{III}} = c_2^U \tag{5}$$

where p_1^{III} and p_2^{III} are the international prices associated with case III for commodities 1 and 2, respectively.

Substituting conditions (4) and (5) into the respective cost equation 1, it is possible to determine the international prices as functions of the two nominal wages (w^A and w^U), the two profit rates (r^A and r^U), and the technical coefficients. Solving it for p_1^{III} and p_2^{III}:

$$p_1^{\mathrm{III}} = w^A L_1^A \tag{6}$$

$$p_2^{\mathrm{III}} = w^A L_1^A a_{12}^U (1 + r^U) + w^U l_2^U \tag{7}$$

chap. 5): $p_1^{\mathrm{A}} = w^A \left[\frac{l_1^A}{1 - a_{11}^A (1 + r^A)} \right]$. The term inside brackets is the dated quantity of labour. It is important to note that the dated quantity of labour is not a purely technical magnitude, as it also depends on the level of the profit rate. For most of the paper, the argument of this function is omitted to not overburden the notation. So, whenever the reader sees L_k^j it should be understood as a function of the profit rate: $L_k^j(r^j)$, where $k = 1,\ 2$ indexes the commodity and $j = A, U$ indexes the country.

The international price of commodity 1 depends only on country A's conditions of production because there are no inputs imported into country A (i.e., equation 6 is equal to equation 3). But, on the other hand, the international price of commodity 2 depends on the conditions of production of both countries which is caused by the commodity being produced in country U with intermediate goods from country A. This result is just a consequence of the simplifying assumptions, in particular of the idea that the intermediate good only uses itself as input; otherwise (i.e., production of commodity 1 requires commodity 2 as input), both prices would depend on the technology and distribution in the two countries.

This means that the dated quantities of labour for commodity 2 resolve into weighted amounts of labour from both country A and country U. This is a dated quantity of labour if properly defined. The weights of the reduction include the profit rates from country A and from country U.[3] Country U provides the direct labour used, l_2^U, while country A provides the indirect labour, which is weighted as $L_1^A a_{12}^U(1+r^U)$. Since L_1^A is a function of country A's rate of profit, the international price of commodity 2 depends on the distribution of income in both countries.

The second integrated production system, and last geographical distribution of production, is when country A produces the consumption good 2 and country U produces the intermediate good 1 (case IV in Table 1). The determination of international prices is analogous to the previous case, but the relevant cost equations are now based on the cost to produce commodity 2 in country A and the cost to produce commodity 1 in country U. These can be arrived at by simple changes on indexes in equations 4 through to 7

Equations 3, 6 and 7 (with appropriate changes in the indexes) characterize the international prices for each conceivable geographical distribution of production: the prices necessary to cover the relevant costs of production.[4] So, there is a one-to-one relationship between the ongoing pattern of specialization and the ruling international prices. In other words, to determine the pattern of specialization is equivalent to determine international prices. However, so far, the analysis is not enough to determine either one of them. Notice that each geographical distribution of production has two equations (one for each good) and six variables (the two nominal wages, the two rates of profit, and the two prices). The systems of production are clearly indeterminate; the next sections introduce elements to make them determinate.

4. Relative Prices and the Indeterminacy of International Prices

Section three shows how international prices depend on the patterns of specialization and vice-versa. This section investigates the rate of exchange between commodities for each specialization case. This is the same as defining relative prices for each price

[3]Equation 7 can also be represented as an infinite geometric series (see footnote 2) in the following way: $p_2^{III} = w^U l_2^U + w^A[l_1^A a_{12}^U(1+r^U) + l_1^A a_{12}^U(1+r^U)a_{11}^A(1+r^A) + \ldots]$, which has also a ratio of $a_{11}^A(1+r^A)$. If the ratio is less than one, then the infinite series converge to the value in equation 7. The value to which the series converge is the dated quantity of labour; this involves two types of labour: from country A and from country U.

[4]Note that cases where the two countries produce a common commodity at the same time have not been discussed. This would be a case of incomplete specialization; while possible, these can be subsumed in the cases with no two countries sharing the production of any good. For example, let a variation of case I be where country A produces both goods but country U produces at the same time the intermediate good 1. That can only persist if the costs of production for commodity 1 are the same in country A and country U: $c_1^A = c_1^U$. However, if the costs are the same, I may choose one of them to represent the cost of production for commodity 1. Choosing c_1^A would yield a determination of international prices that is indistinguishable from case I.

Table 2. International relative prices.

	Relative prices
I	$\frac{p_1^{\mathrm{I}}}{p_2^{\mathrm{I}}} = \frac{L_1^A}{L_2^A}$
II	$\frac{p_1^{\mathrm{II}}}{p_2^{\mathrm{II}}} = \frac{L_1^U}{L_2^U}$
III	$\frac{p_1^{\mathrm{III}}}{p_2^{\mathrm{III}}} = \frac{w^A L_1^A}{w^A L_1^A a_{12}^U (1+r^U) + w^U l_2^U}$
IV	$\frac{p_1^{\mathrm{IV}}}{p_2^{\mathrm{IV}}} = \frac{w^U L_1^U}{w^U L_1^U a_{12}^A (1+r^A) + w^A l_2^A}$

system. International relative prices for each pattern of specialization can be found by dividing the price of 1 by the price of 2 in equations 3, 6 and 7. These can be readily summarized in Table 2 below.

Since the dated quantities of labour are functions of the unknown rate of profit, none of these relative prices are determinate. Therefore, to determine relative prices it is necessary to introduce an additional assumption regarding one of the distributive variables. An exogenously determined distributive variable is a well-known feature of linear production models with positive profit rates.[5] Bharadwaj (1963) refers to this procedure as 'value through exogenous distribution'. The given variable could be either the real wage or the rate of profit; the former option is that chosen by classical political economists and Marx (see Garegnani 1984), while the latter is the one used by Sraffa for parts of his book (Sraffa 1960, §44). The recent literature on trade tends to align with the former (for example, Parrinello 2010; and Shaikh 2016), while this paper chooses the later. The only analytical difference is that, in this paper, the real wage emerges as a residual variable instead of profit rates.

Following Sraffa's suggestion, the rates of profit are taken to be 'determined (…) by the level of the money rates of interest' (Sraffa 1960, 33).[6] This kind of determination was explored further by Pivetti (1991) and Panico (1988). So, the profit rate in country j is set at the level of its interest rate (i^j):

$$r^j = i^j \tag{8}$$

The profit rate need not be exactly equal to the interest rate. This interest rate represents the return on assets free of risk. Productive investment caries some inherent risk; indeed, different productive sectors may be more or less prone to risks. This means that, for real investment to happen, the profit rate in each sector must be somewhat above the interest rate 'in consideration of the security, cleanliness, ease, or any other real or fancied advantage which one employment may possess over another' (Ricardo 2005, 88). Pivetti calls this excess of profit over interest as the 'normal profit of entreprise' and says that the

[5]Sraffa (1960, chap. 2) calls these systems as 'production with a surplus', which is more general than just positive profits. It is more general in the sense that the surplus generated may be absorbed by different classes, and not only as profits for capitalists.

[6]This suggestion generated an intense debate on how to interpret Sraffa's remark and on how an exogenous determination of the rate of profits would look like (see Panico 1988; Pivetti 1991; Serrano 1993). I do not intend to solve or even contribute to this debate. For the argument, it is sufficient to assume that the rates of profit are determined outside of the system of production.

only requirement is that this normal profit of enterprise is 'a sufficiently stable magnitude, and one which is independent of *i* [the interest rate]' (Pivetti 1991, 25–26). Therefore, given the stability of these normal profits of enterprise, it is possible to abstract from their existence and treat the profit rate as equal to the interest rate.

Fixing the rate of profits also determines the dated quantities of labour, as these are functions of the rate of profit and the given technology. This is enough to determine international relative prices in the closed production systems, as these depend solely on the dated quantities of labour from a single country (cases I and II in Table 2). Therefore, these are determinate systems. What this means is the traditional method of classical political economy of taking one distributive variable as given is *sufficient* to determine relative prices in closed production systems.

However, this is not true for the integrated production systems. As is evident from cases III and IV in Table 2, the relative prices depend not only on the dated quantities of labour and the profit rate but also on both countries' nominal wages. So, fixing the rate of profit by the money rate of interest is still not enough to make these systems determinate. For each integrated production case, there is only one equation and three variables: the international relative prices, w^A, and w^U. The distribution between workers in both countries is still affecting the system.

What this section shows is that there is an indeterminacy of international prices when countries are allowed to trade inputs (see Vasudevan 2012). The traditional method of classical political economy of setting one distributive variable as given is *not enough* to determine international relative prices for the integrated production systems. In the next section, I explore a novel closure to the system of international prices based on given nominal wages.

5. Monetary Determination of International Prices

In this section, I argue that there is a connection between the indeterminacy of the international prices (see section four) and the definition of absolute advantage. So far, I have shown the characterization of the different geographical distributions of production (section three). I now turn to a discussion on how to determine the international prices and the related question of which geographical distribution of production prevails.

Section three showed that for each geographical distribution of production there is a corresponding price system. On the other hand, section four introduced the assumption of given profit rates. It may be convenient to reproduce here the characteristics of each price system: with given profit rates, there are two price equations (one for each good) and four variables (the two nominal wages and the two prices). These are indeterminate systems. This section introduces the last piece that makes the systems capable of determining international prices.

As argued in section three, in this model with two countries and two tradable commodities, there are four conceivable geographical distributions of production. Each one carries its own required pattern of international prices to cover the costs of production So, there is a one-to-one correspondence between the determination of the international prices and the pattern of specialization.

What, it might be argued, should the criteria to determine the pattern of specialization be? In keeping with the classical political economy notion of price competitiveness as a

cost minimization process (Eatwell 1982; Salvadori and Signorino 2011), the relevant criteria should be minimum cost. In other words, a country produces and exports a good if it can supply that good at the cheapest cost. This is the same criteria adopted for specialization in Machado and Trigg (2021).

In the particular setting studied here, the condition of cost minimization is coherent if it is capable of generating the highest real wage. After having fixed the rates of profit, the residual income variables are the real wages. Under our simplifying assumptions, the only wage good is the consumption good 2; hence, real wages will be the highest whenever the money price of commodity 2 is the lowest with respect to nominal wages. That means that a comparison of the price of the consumption good 2 in the different geographical distributions of production is enough to investigate the process of international price competition.

Simply fixing the rates of profit is not enough to establish the pattern of specialization. The reason is easy to see if one attempts to compare the money price of the consumption good in two geographical distributions of production. For example, consider the closed production systems (cases I and II in Table 1). Country A will prefer to produce both commodities instead of buying from a vertically integrated production in country U (i.e., case I is chosen when compared to case II) if and only if:[7]

$$p_2^{\mathrm{I}} < p_2^{\mathrm{II}} \Leftrightarrow w^A L_2^A < w^U L_2^U \tag{9}$$

Inequality (9) is none other than the condition that country A has an *absolute* cost advantage in the production of commodity 2 (see Bellino and Fratini 2021; Brewer 1985; and Machado and Trigg 2021). In other words, if the integrated process in country A produces the consumption good at an absolutely cheaper price than the equivalent integrated process in country U, then the former will be able to generate higher real wages.

In sum, the notion of price competitiveness requires a comparison between absolute costs of production; but the classical closure of exogenously fixing one of the distributive variables (the rates of profit) is insufficient (see section four). Therefore, there is a missing piece that allows for a comparison between absolute costs. Our contribution is to determine absolute costs by introducing an assumption regarding nominal wages; this, together with given profit rates, fixes absolute costs in the different geographical distributions of production.

Following Pivetti (1991), nominal wages are assumed given.[8] These are affected by socioeconomic conflicts over distribution that resolve themselves, through institutions, in a given level of the nominal wages:

> The money wage rate in our system of equations is now taken as given. The money wage is the direct outcome of wage bargaining and depends on economic as well as institutional conditions, such as the levels of employment and the forms of organization of the workers. (Pivetti 1991, 71, emphasis in the original)

It is only possible to properly measure the prices associated with each pattern of specialization as money prices with given nominal wages.[9]

[7] For simplicity, from now on we will omit the rate of profit from the argument of the dated quantities of labour functions. The profit rates are assumed to be at the same level as the money rate of interest throughout.

[8] I would like to thank Gustavo Bhering who, in an informal conversation, suggested me to adopt Pivetti's closure.

After grounding money prices on nominal wages, it is unambiguous to find the pattern of specialization that produces the consumption good at the cheapest price. The given nominal wage rates determine a unique set of money prices for each specialization pattern; these prices can be compared to find the cheapest configuration (the one with the highest real wages). This is the same thing as arguing that the absolute costs are given by the nominal wage rates; and, if the latter are relatively stable, then absolute costs determine the direction of trade. Below I provide an illustration to show how this works.

Illustration. Here I provide a hypothetical scenario to show how nominal wages determine absolute costs and the pattern of trade (for given profit rates). There are two countries: A and U; these countries compete in the production of two commodities: corn (commodity 1) and bread (commodity 2). Corn is produced by means of itself and labour; while bread is produced by means of corn and labour. The matrices of technical coefficients and the vectors of labour coefficients for countries A and U are given by:

$$\boldsymbol{A}^A = \begin{bmatrix} 0.5 & 0.2 \\ 0 & 0 \end{bmatrix}; \quad \boldsymbol{l}^A = \begin{pmatrix} 1 & 2 \end{pmatrix}$$

and

$$\boldsymbol{A}^U = \begin{bmatrix} 0.7 & 0.3 \\ 0 & 0 \end{bmatrix}; \quad \boldsymbol{l}^U = \begin{pmatrix} 0.7 & 1 \end{pmatrix}$$

This means that to produce one unit of corn in country A it requires 0.5 units of corn and 1 hour of direct labour; and so on.

The costs of production in each country are then:

$$c_1^A = 0.5p_1(1 + r^A) + 1w^A$$

$$c_2^A = 0.2p_1(1 + r^A) + 2w^A$$

and

$$c_1^U = 0.7p_1(1 + r^U) + 0.7w^U$$

$$c_2^U = 0.3p_1(1 + r^U) + 1w^U$$

Cost equations are measured at the international price for commodity 1 (p_1), which is uniform across countries due to the law of one price for tradable goods.

Following Sraffa's remark (see section four), I assume that the rates of profit in each country are set at the levels of the nominal rate of interest:

$$r^A = i^A = 0.1$$

$$r^U = i^U = 0.15$$

which means that capitalists in country A receive 10% of advanced capital as net profits; and capitalists in country U receive 15%.[10]

[9]Technically, it would also be possible to ground the system on a given nominal price for some commodity. This could be interpreted as the result of capitalists' bargaining over distribution (Okishio 1977; Serrano 2010).

Table 3. Absolute differences in costs (for $w^A = 2$ and $w^U = 5$).

	Cases			
	I	II	III	IV
Price of corn	$p_1^{\mathrm{I}} = 4.44$	$p_1^{\mathrm{II}} = 17.95$	$p_1^{\mathrm{III}} = 4.44$	$p_1^{\mathrm{IV}} = 17.95$
Price of bread	$p_2^{\mathrm{I}} = 4.98$	$p_2^{\mathrm{II}} = 11.19$	$p_2^{\mathrm{III}} = 6.53$	$p_2^{\mathrm{IV}} = 7.95$

From these assumptions, it is possible to calculate the dated quantities of labour if both goods are produced inside either country A or country U. These are the closed production systems:

$$L_1^A = 2.22$$

$$L_2^A = 2.48$$

and

$$L_1^U = 3.59$$

$$L_2^U = 2.24$$

Relative prices are proportional to these dated quantities of labour in the closed production systems.

As argued in section four, knowing profit rates and the dated quantities of labour is not enough to determine absolute costs of production; whereas the absolute costs of production are the only way to measure which geographical distribution of production produces which good at the cheapest price. Therefore, we introduce an assumption regarding nominal wages,[11] where both nominal wages are measured in the same unit of account:

$$w^A = 2 \text{ and } w^U = 5$$

The information so far is sufficient to calculate absolute prices of production of both goods for all possible geographical distributions of production. These are shown in the table below:[12]

From Table 3, it is evident that the cheapest way to produce bread under these circumstances is if country A concentrates all stages of production (i.e., case I is the cheapest configuration to procure the consumption good). Country U cannot compete in the production of any good, despite any possible comparative advantage.

Cost minimization is the process that selects the pattern of specialization. The lowest cost guarantees the highest real wage in both countries. For this example, the real wages are:

which clearly shows that, under these circumstances, case I generates the highest real wages in both countries.

[10]These are normal profit rates as defined for long-period positions (for a discussion of the methods of long period positions, see Garegnani 1976; Petri 2021, chapter 2). At any time, an individual capitalist may receive more or less than the normal rate of profit.

[11]The only necessary condition is that the *ratio* between nominal wages (w^A/w^U) is known. For exposition, I treat both nominal wages as given which obviously fixes the ratio between them.

[12]The numbers reported in the following tables have been rounded to two decimal places.

This pattern of trade may be different if nominal wages are different. For the same configuration of techniques and profit rates, nominal wages sufficiently different will generate alternative geographical distributions of production. For example, if nominal wages are instead:

$$w^A = 2 \text{ and } w^U = 3$$

If that holds, then for the same technologies and rates of profit, the costs of production in each specialization case are:

Table 5 indicates that, under these circumstances, it is cheaper to produce corn in country A and bread in country U. International production then happens with international inputs exported from country A to be transformed into consumption good by country U.

What this section shows is that, under the novel closure proposed here, absolute cost advantages dominate international trade; it is not even necessary to define comparative advantage. The given nominal wages, together with profit rates, are sufficient to determine the costs of production and the pattern of specialization based on cost minimization. International prices are simply defined by the country with the lowest cost of production.

6. Different Wage Baskets

Up to this point, the analysis has relied on the assumption that the wage basket consisted of a single good (commodity 2) in both countries. As a consequence, the composition of the wage basket was the same in both countries. In this section, I generalize the argument for when workers include more than one good in their wage baskets. I also let the wage baskets differ between countries.

To do so, I will maintain all assumptions regarding the methods of production and costs (see sections two and three) but allow workers to also consume commodity 1. Therefore, commodity 1 is still the sole mean of production, but it may also enter the wage baskets (it is not a *pure* capital good); while commodity 2 is still a pure consumption good. There are only two things that change: first, workers take the price of commodity 1 into consideration; second, the composition of the wage basket may not be uniform between countries. Formally, real wages may be represented as:

$$w_r^A = \frac{w^A}{p_1 b_1^A + p_2 b_2^A} \tag{10}$$

and

$$w_r^U = \frac{w^U}{p_1 b_1^U + p_2 b_2^U} \tag{11}$$

where w^A and w^U are the nominal wages; w_r^A and w_r^U are the real wages; p_1 and p_2 are the international prices of commodities 1 and 2; and the b_k^js represent of the proportion of commodity k that enters into the wage basket in country j, such as $\sum_k b_k^j = 1$.

For the monetary determination of international prices to work, there must exist a geographical distribution of production that minimizes the cost of *both* wage baskets.[13] Otherwise, the geographical distribution that minimizes the cost of the wage

basket for country A may not minimize it for country U: the choice would be contradictory depending on which country is used as a parameter.

The proposition that such geographical distribution of production exists is not trivial. The proof is in three steps. First, we show that there is a geographical distribution that minimizes the cost/price of commodity 1. Second, we argue that there is also a geographical distribution that minimizes the cost/price of commodity 2. Finally, we show that both geographical distributions of production are the same; hence, it minimizes the cost/price of any linear combination of commodities 1 and 2.

To prove the first part of the argument, one need only consider the money price of production for commodity 1 in all four geographical distributions of production. These are entirely determined by the given profit rates and nominal wages (see section five). Hence, there will be a rank of geographical distributions from the lowest to the highest cost/price for commodity 1. The one with the lowest price for commodity 1 also maximizes workers' purchasing power in terms of commodity 1.

By the same logic, there will be a geographical distribution of production that minimizes the price of commodity 2. It will also maximize workers' purchasing power in terms of commodity 2. This proves the second part of the statement.

Finally, it is necessary to prove that the geographical distribution of production that minimizes the price of commodity 1 is the same as the one that minimizes the price of commodity 2. Notice that the price of commodity 1 enters as an input into the costs of production for commodity 2. This implies that, irrespective of the country analysed, the cost of production for commodity 2 depends *positively* on the price of the input good 1. This is easy to see by taking the first partial derivative of the cost of production for commodity 2 in either country:

$$\frac{\partial c_2^j}{\partial p_1} = a_{12}^j(1 + r^j) > 0 \tag{12}$$

where j stands for either country A or country U. Therefore, in either country, the cost of production for commodity 2 is the lowest whenever the price of the input good 1 is the lowest. If the price of commodity 1 is the same in two or more specialization cases (as in Tables 3–5), one must choose which among the specialization cases has the lowest cost for commodity 2. Regardless, there is a geographical distribution of production that minimizes the price of commodity 1 and also has the lowest price for commodity 2.[14] This proves the last part of the argument.

Therefore, this geographical distribution of production has a higher purchase power of workers in both commodities. This must also be true for any linear combination of the commodities. In particular, the purchasing power in terms of the wage baskets (equations 10 and 11) will also be the highest. So, for given nominal wages, the geographical distribution that maximizes the real wage in country A also maximizes it in country U.

This justifies the assumption that there is only one consumption good. This does not affect the results as a higher real wage in terms of this single consumption good also

[13]Alternatively, it maximizes both real wages.

[14]This is a consequence of the argument that the technique with the highest real wage has the lowest labour commanded price, or lowest money costs (see Pasinetti 1977, 159–60).

Table 4. Real wages (for $w^A = 2$ and $w^U = 5$).

	Cases			
	I	II	III	IV
Real Wage in *A*	$w^A/p_2^{\text{I}} = 0.4$	$w^A/p_2^{\text{II}} = 0.2$	$w^A/p_2^{\text{III}} = 0.3$	$w^A/p_2^{\text{IV}} = 0.3$
Real Wage in *U*	$w^U/p_2^{\text{I}} = 1$	$w^U/p_2^{\text{II}} = 0.4$	$w^U/p_2^{\text{III}} = 0.8$	$w^U/p_2^{\text{IV}} = 0.6$

Table 5. Absolute differences in costs (for $w^A = 2$ and $w^U = 3$).

	Cases			
	I	II	III	IV
Price of corn	$p_1^{\text{I}} = 4.44$	$p_1^{\text{II}} = 10.77$	$p_1^{\text{III}} = 4.44$	$p_1^{\text{IV}} = 10.77$
Price of bread	$p_2^{\text{I}} = 4.98$	$p_2^{\text{II}} = 6.72$	$p_2^{\text{III}} = 4.53$	$p_2^{\text{IV}} = 6.37$

imply a higher real wage in terms of any basket of goods.[15] As a consequence, it also justifies the assumption that the wage basket is the same in all countries. One may proceed with these simplifications without loss of generality.

7. Brief Remark on the Degree of International Capital Mobility

Up to this point, the analysis has assumed non-uniformity of profit rates between countries. This follows from Ricardo's remark that capital is relatively immobile internationally. As mentioned previously, some of the modern literature on absolute advantages has questioned this assumption. They criticize the idea of comparative advantages based on the idea that there is a tendency for uniformity of the rates of profit between countries (see Parrinello (2010); Shaikh (2016); Crespo, Dvoskin, and Ianni (2020); Bellino and Fratini (2021); among others).[16]

It would represent too much of a detour to discuss which assumption fits better with the current configuration of the international economy; this would require a careful empirical analysis. What this section intends to achieve is to clarify that the monetary determination offered in this paper (see section five) is open to either assumption.

Notice that the assumption regarding the profit rates was introduced to determine relative costs in the closed production systems. Following Sraffa's suggestion, the rates of profit were assumed to be equal to the money rates of interest. The only requirement is that the profit rates are known before production. There is no analytical difference if profit rates are uniform or not between countries.

Therefore, the idea of free mobility of international capital could be easily introduced in this framework. This free mobility of capital establishes a uniform money rate of profit (i^*):

$$r^A = r^U = i^* \tag{13}$$

The rest of the analysis would follow in the exact same way. There would be no implications to the relevance of absolute advantages. So, the analysis can incorporate any assumption regarding the international mobility of capital, as long as the ratio of

[15]This argument relies on the idea that the composition of the wage basket does not change *because* of changes in prices. So, the comparison must have the same wage basket in the situation 'before' and 'after' trade.

[16]Brondino (2021) and Dvoskin and Ianni (2021) start from this literature to criticize the marginalist version of comparative advantage.

nominal wages is taken as given. This expands the realm of scenarios where absolute advantage is the main driver of international prices and competition.

8. Conclusion

This paper proposes a monetary determination of international prices to a capitalist system of production. It shows how a classical production-based approach can deal with trade in intermediate goods, the core component of Global Value Chains. The paper starts with the main building blocks of the analysis such as technology and the determinants of costs of production. It shows that there is a one-to-one correspondence between the determination of international prices and the pattern of specialization since one implies the other. The paper then explores to what extent comparative advantage and absolute advantage could act as the determinants of international prices.

The main contribution of the paper is a novel closure to the system of international prices: a closure that relies on Pivetti's (1991) monetary theory of distribution. Following Pivetti's suggestions, I take the rates of profit as governed by the money rates of interest and also the nominal wages as given. Together with the given technology, these two new assumptions form the basis for the new closure.

The first of these assumptions is required because of the circularity of the production system. Circular production models require that one of the distributive variables is given from the outside. Classical political economists closed the system with a given real wage; while Sraffa (1960) showed that a given profit rate is also possible. Fixing the rates of profit by the money rates of interest achieves this result, as suggested by Sraffa (1960).

This assumption regarding profit rates allowed for a determination of relative prices when production is concentrated in a single country. However, it is not enough to determine international prices when there is trade in intermediate goods because of an unknown distribution between workers in different countries. This is how the indeterminacy of the international prices reappears in this Sraffa-inspired formulation.

The second assumption fixes the nominal wages in each country. At this stage of the analysis, fixing nominal wages amounts to fixing the money costs in both countries. In other words, it defines the *scale* of prices and not only their relative values. The scale of prices is useful as it allows a comparison between the costs of producers in both countries, even with different profit rates and/or real wages.

This novel closure argues that absolute cost advantages dominate international trade; it is also supported by the classical process of price competition. With respect to the previous literature, this extends the role of absolute advantage to more general settings. The monetary closure proposed implies that absolute advantage is the main driver of specialization. This novel closure is able to determine the direction of trade based on the criteria of minimum cost of production.

Finally, the paper relaxes some of the assumptions. In section six, it allows workers from each country to consume different wage baskets. This shows that the analysis does not depend on the composition of the wage basket assumed. In section seven, the paper shows that the monetary closure is open to different assumptions regarding the international mobility of capital.

Acknowledgements

I wish to thank Gustavo Bhering, Guilherme Morlin, Andrew Trigg, and José Bruno Fevereiro for comments and discussions on previous versions of this paper. I would also like to thank two anonymous referees. All remaining errors are my own. This paper is an abridged version of chapter 5 from my PhD Thesis.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

ORCID

Pedro S. Machado http://orcid.org/0000-0002-5613-728X

References

Baldone, S., F. Sdogati, and L. Tajoli. 2007. 'On Some Effects of International Fragmentation of Production on Comparative Advantages, Trade Flows, and the Income of Countries.' *The World Economy* 30 (11): 1726–1769.

Bellino, E., and S. Fratini. 2021. 'Absolute Advantages and Capital Mobility in International Trade Theory.' *The European Journal of the History of Economic Thought* 29 (2): 271–293.

Bharadwaj, K. 1963. 'Value Through Exogenous Distribution.' *The Economic Weekly*, 1450–54.

Brewer, A. 1985. 'Trade with Fixed Real Wages and Mobile Capital.' *Journal of International Economics* 18: 177–186.

Brondino, G. 2021. 'Fragmentation of Production, Comparative Advantage, and the Heckscher-Ohlin Theory.' *Review of Political Economy* 35 (3): 803–822.

Crespo, E., A. Dvoskin, and G. Ianni. 2020. 'Exclusion in 'Ricardian' Trade Models.' *Review of Political Economy* 33 (2): 194–211.

Dvoskin, A., and G. Ianni. 2021. 'Produced Means of Production and the Chain of Comparative Advantages.' *Structural Change and Economic Dynamics* 59: 635–647.

Eatwell, J. 1982. 'Competition.' In *Classical and Marxian Political Economy: Essays in Honour of Ronald L. Meek*, edited by I. Bradley, and M. Howard. London: Macmillan.

Escaith, H., and S. Miroudot. 2016. 'Industry-Level Competitiveness and Inefficiency Spillovers in Global Value.' *24th International Input-Output Conference*. Seoul.

Garbellini, N. 2021. 'International Trade as a Process of Choice of Technique.' *Structural Change and Economic Dynamics* 59: 42–50.

Garegnani, P. 1976. 'On a Change in the Notion of Equilibrium in Recent Work on Value and Distribution.' In *Essays in Modern Capital Theory*, edited by M. Brown, K. Sato, and P. Zarembka. London: North-Holland Publishing Company.

Garegnani, P. 1984. 'Value and Distribution in the Classical Economists and Marx.' *Oxford Economic Papers*.

Gereffi, G. 1994. 'The Organisation of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks.' In *Commodity Chains and Global Capitalism*, edited by G. Gereffi, and M. Korzeniewicz. Westport, CT: Praeger Publishers.

Gereffi, G., and M. Korzeniewicz, eds. 1994. *Commodity Chains and Global Capitalism*. London: Praeger.

Grossman, G., and E. Rossi-Hansberg. 2006. 'The Rise of Offshoring: It's Not Wine for Cloth Anymore.' In *The New Economic Geography: Effects and Policy Implications*. edited by the Federal Reserve Bank of Kansas City. Jackson Hole, Wyoming.

Hopkins, T. K., and I. Wallerstein. 1986. 'Commodity Chains in the World-Economy Prior to 1800.' *Review (Fernand Braudel Center)* 10 (1): 157–170.

Inomata, S. 2017. 'Analytical Frameworks for Global Value Chains: An Overview.' In *Global Value Chain Development Report 2017*, edited by the World Trade Organization, Washington, DC: The World Bank Group.
Johnson, R. C. 2018. 'Measuring Global Value Chains.' *Annual Review of Economics* 10: 207–236.
Kaplinsky, R. 2013. Global Value Chains, Where They Came from, Where They are Going and Why This is Important. *IKD Working Paper No. 68*.
Kurz, H., and N. Salvadori. 1995. *Theory of Production: A Long-Period Analysis*. Cambridge: Cambridge University Press.
Machado, P. S., and A. B. Trigg. 2021. 'On Absolute and Comparative Advantage in International Trade: A Pasinetti Pure Labour Approach.' *Structural Change and Economic Dynamics* 59: 375–383.
Okishio, N. 1977. 'Inflation as an Expression of Class Antagonisms.' *Kobe University Economic Review* 23: 17–29.
Panico, C. 1988. *Interest and Profit in the Theories of Value and Distribution*. London: Macmillan.
Parrinello, S. 1973. 'Distribuzione, Sviluppo e Commercio Internazionale.' *Economia Internazionale* 26 (2): 197–229.
Parrinello, S. 2010. 'The Notion of National Competitiveness in a Global Economy.' In *Economic Theory and Economic Thought: Essays in Honour of Ian Steedman*, edited by J. Vint, J. S. Metcalfe, H. D. Kurz, N. Salvadori, and P. A. Samuelson. London: Routledge.
Pasinetti, L. L. 1973. 'The Notion of Vertical Integration in Economic Analysis.' *Metroeconomica* 25 (1): 1–29.
Pasinetti, L. L. 1977. *Lectures on the Theory of Production*. London: The MacMillan Press.
Pasinetti, L. L. 1981. *Structural Change and Economic Growth*. Cambridge: Cambridge University Press.
Pasinetti, L. L. 1993. *Structural Economic Dynamics: A Theory of the Economic Consequences of Human Learning*. Cambridge: Cambridge University Press.
Petri, F. 2021. *Microeconomics for the Critical Mind: Mainstream and Heterodox Analyses*. Cham: Springer.
Pivetti, M. 1991. *An Essay on Money and Distribution*. London: MacMillan.
Ricardo, D. 2005. *The Works and Correspondence of David Ricardo (Vol. 1)*, edited by P. Sraffa, and M. Dobb. Indianapolis: Liberty Fund.
Salvadori, N., and R. Signorino. 2011. Competition. *Munich Personal RePEc Archive*.
Serrano, F. 1993. 'Review of Pivetti (1991).' *Contributions to Political Economy* 12: 119–123.
Serrano, F. 2010. 'O conflito distributivo e a teoria da inflação inercial.' *Revista de Economia Contemporânea* 14 (2): 395–421.
Shaikh, A. 1999. Real Exchange Rates and the International Mobility of Capital. *Levy Institute Working Papers 265*.
Shaikh, A. 2016. *Capitalism: Competition, Conflict, Crises*. New York: Oxford University Press.
Sraffa, P. 1951. 'Introduction.' In *The Works and Correspondence of David Ricardo (Vol. I)*, edited by D. Ricardo, P. Sraffa, and M. Dobb. Indianapolis: Liberty Fund.
Sraffa, P. 1960. *Production of Commodities by Means of Commodities*. Cambridge: Cambridge University Press.
Steedman, I. 1977. *Marx After Sraffa*. London: Verso.
Steedman, I. 1979a. *Trade Amongst Growing Economies*. Cambridge: Cambridge University Press.
Steedman, I., ed. 1979b. *Fundamental Issues in Trade Theory*. London: The Macmillan Press Ltd.
Vasudevan, R. 2012. 'Terms of Trade, Competitive Advantage, and Trade Patterns.' *Review of Political Economy* 24 (2): 183–202.
Winkler, D., and W. Milberg. 2012. 'Classical and Neoclassical Theories of Offshore Outsourcing.' In *Macroeconomics and the History of Economic Thought*, edited by H. Krämer, H. Kurz, and H.-M. Trautwein. New York: Routledge.