Real Exchange Rates and the International Mobility of Capital

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Abstract

This paper demonstrates that the terms of trade are determined by the equalization of profit rates across international regulating capitals, for socially determined national real wages. This provides a classical/Marxian basis for the explanation of real exchange rates, based on the same principle of absolute cost advantage which rules national prices. Large international flows of direct investment are not necessary for this result, since the international mobility of financial capital is sufficient. Such a determination of the terms of trade implies that international trade will generally give rise to persistent structural trade imbalances covered by endogenously generated capital flows which will fill any existing gaps in the overall balance of payments. It also implies that devaluations will not have a lasting effect on trade balances, unless they are also attended by fundamental changes in national real wages or productivities. Finally, it implies that neither the absolute nor relative version of the Purchasing Power Parity hypothesis (PPP) will generally hold, with the exception that the relative version of PPP will appear to hold when a country experiences a relatively high inflation rate. Such patterns are well documented, and in contrast to comparative advantage or PPP theory, the present approach implies that the existing historical record is perfectly coherent. Empirical tests of the propositions advanced in this paper have been conducted elsewhere, with good results.

The aim of this paper is to demonstrate that real exchange rates between countries are determined by the equalization of profit rates across international regulating capitals, for socially determined national real wages. This provides a classical/marxian explanation of international terms of trade, based on the same principle of absolute cost advantage which rules national prices. Such an approach has the decided virtue that it is quite consistent with the major empirical patterns of international trade. It is also in direct contrast to the principle of comparative advantage upon which so much of international trade theory rests. The theoretical arguments presented here are tested empirically in (Roman, 1997; Napoles; Antonopoulos, 1997; Shaikh, 1998)

Certain assumptions are crucial to what follows. Within a nation, capital and labor are assumed to be fairly mobile, although the latter is assumed to be both slower and more subject to cultural and historical ties-that-bind. For this reason, real wages may differ across regions of a given nation, within limits. There is no presumption of full employment.

On an international scale, it is assumed that financial and nonfinancial capital moves across nations in search of higher returns. Impediments to this mobility, particularly for financial capital, are assumed to much smaller than those to the international mobility of labor. Thus it is assumed that profit rates on new direct investment gravitate around common means across countries. We will see that the mobility of financial capital is sufficient to produce this outcome. On the other hand, real wage differences between countries can be greater, and more persistent, than those within nations.

Within any one industry, be it national or international, new technologies come into being at various intervals, while prior ones decline in their competitiveness and eventually die out (are scrapped). This never-ending dynamic produces a spectrum of technologies in operation in each industry, with the capitals with the lowest reproducible costs regulating the market price. Since the capitals in any one (national or international) industry may be spread out across many regions or nations, the mix and even levels of technology can differ across such geographical boundaries.

None of this precludes international trade from having an impact on either real wages or technologies. It does imply, however, that the substantial determinants of each are located within the political and cultural matrices of the nations involved. These can and do change, sometimes dramatically. But there is no mechanism which will make them change in such a way as to automatically balance trade among nations.

The preceding assumptions about international differences in real wages and technology, the latter expressed in terms of particular input-output coefficients, are familiar ones in the classical and marxian traditions. Indeed, they are the very ground from which Ricardo himself derives the very principle of comparative costs (Shaikh, 1980), a principle which continues to underpin

modern trade theory in almost all trade models, including Heckscher-Ohlin (HO)‘. Most importantly, persistent international wage and technological differences still characterize the world today (Dollar, Wolff, & Baumol, 1988, pp. 3 1,33,42). The point is to explain how free trade is grounded in them, and in turn reproduces them.

The subsequent analytical arguments are posed in terms of a familiar two-sector model. More general derivations of the same basic propositions can be found in (Shaikh, 199 1).

I. The determination of relative prices within one country

Real exchange rates are simply international relative prices in common-currency. In order to understand their determination, it is useful to first consider the formation of competitive relative prices within one nation.

Imagine that there are many producers of any given commodity, grouped according to their unit costs of production. I have argued elsewhere that in this case, the set of producers with the lowest reproducible costs will be the ones whose cost conditions drive the market price, because it is these conditions of production which will be the target of new investment flows. In each industry, the capitals which satisfy these conditions constitute the regulating capitals of that industry.

Since it is the profitability of these new investments which regulates capital flows across industries, the general rate of profit will be formed by the movement of capital across the regulating conditions of production in each industry. For the economy as a whole, given the real wages in each industry, it is these regulating conditions which will determine the relative price and the general rate of profit (Shaikh, 1996, pp. 67-76).

The rates of profit which are equalized by capital flows are the profit rates of new investments in the regulating conditions of production. Non-regulating capitals will be forced by competition to sell at the same price, and will therefore have a variety of profit rates determined by their own various conditions of production. Since each sector will have its own complement of non-regulating capitals, depending on the history of technical change in that sector, ***average*** sectoral profit rates need not be equalized. This is a familiar result in the classical/marxian tradition, since it forms the basis for differential rent in agriculture. As is well known, in the case of agriculture, the ***generally reproducible*** low-cost conditions of production (the ones of which new investment

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‘Differences between potential costs of production are the point of departure for both absolute and comparative cost theories of international trade, since there is no basis for trade if all nations good produce all goods at the same costs. The HO model assumes that comparative cost theory regulates trade, but claims that the underlying potential cost differences arise from the impact of differing national ‘factor endowments’ on a common international production function.

can avail themselves) are on the margin of cultivation precisely because better lands are in full use. In the case of industry, similar differences in costs arise from the fact that ongoing technical change gives rise to a spectrum of vintages still in existence, most of whom are no longer at the cutting edge but still profitable enough to keep in play. Here, it is the best technology generally available for new investments which forms the regulating conditions. In both cases, it is the dominance of the lowest reproducible cost producers that makes 'absolute cost advantage' the regulating principle of competition within a single nation.

1. National competitive prices with unequal real wages

Consider a simple two-country, two-commodity example, in which there are two producers for each type of good. Let p_k = price of capital goods, p_c = price of consumer goods, a = (circulating) capital input, and 1 = labor input, all per unit output of the regulating capitals. Let r = rate of profit, w = money wage, wr = real wage. In anticipation of the international case, we will not assume that each producer faces the same real wage, but only that local real wages are socially determined (think of any two producers as being located in different regions of a country).

As long as competition between sellers of a particular good compels them to sell at roughly the same price', technological and/or real wage differences among producers will give rise to profit rate differentials.

$$1)\quad p_c = (p_k \cdot a_k + p_c \cdot wr_k \cdot l_k)\cdot(1+r_c)$$
$$1')\quad p_c = (p_k \cdot a_k' + p_c \cdot wr_k' \cdot l_k')\cdot(1+r_c')$$

$$2)\quad p_k = (p_k \cdot a_c + p_c \cdot wr_c \cdot l_c)\cdot(1+r_k)$$
$$2')\quad p_k = (p_k \cdot a_c' + p_c \cdot wr_c' \cdot l_c')\cdot(1+r_k')$$

In each sector, the production conditions of one of the producers will be the regulating ones -- i.e. will represent the lowest-cost conditions which new investment in the industry can expect to reproduce[3]. Intersectoral capital flows will therefore enforce those prices which equalize the

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'The law of one price encompasses price differentials due to transportation costs and local surtaxes. If these are high enough to block out nonlocal producers, then the good in question becomes a nontradable and the local producer becomes the regulating capital. This can be accommodated by treating each nontradable as a distinct good, as in section 11.4.

[3]The definition of 'lowest cost' in unambiguous in the case of circulating capital, since the unit materials and wage costs is also the capital advanced, so that the profit margin on costs is also the profit rate on capital advanced. Then the producer with the lowest cost will also the one with both the highest profit margin and profit rate, since all producers face the same prices. However, once fixed capital is introduced into the story, the issue turns on what

profit rates on *these* specific capitals. And these prices in turn will determine the particular profit rates of the nonregulating capitals. It follows that average profit rates will not generally be equalized across sectors.

Assuming the regulating capitals to be the first in each equation, and allowing for profit rate equalization across them, we get

1) $p_c = (p_k \bullet a, + p_c \bullet wr_c \bullet l_c) \bullet (1+r)$
2) $p_k = (p_k \bullet a_k + p_c \bullet wr_k \cdot l_k) \bullet (1+r)$

This in turn can be rewritten in terms of relative prices, the rate of profit, and the two real wages:

1)' $p_c / p_k = a_k \square (p_c/p_k) \bullet wr_k \bullet l_k) \bullet (1+r)$
2)' $1 = (a_c + (p_c/p_k) \bullet wr_c \bullet l_c) \bullet (1+r)$

Given the two real wages, the preceding system reduces to two equations in two variables (r, p_c / p_k), which can then be solved for the rate of profit and relative prices. Except for the differentiation of the two real sectoral wages, all of this is familiar. The resulting equilibrium values are of the form

$r = r(wr_c, wr_k)$
$p_c / p_k = F(wr_c, wr_k, r) = f(wr_c, wr_k)$

2. Effects of real wage increases on relative prices

As is the case of uniform wage systems, an increase in either sector's real wage will lower the general rate of profit (see the Appendix). But the effect on relative price may be more complex. A rise in an industry's real wage raises its unit labor costs, but also lowers the general profit rate (and indirectly affects the prices of its non-labor inputs). The former tends to raise the price in that particular industry. The latter tends to lower the price in all industries, since all are directly affected by the lower general rate of profit. It would not be surprising, therefore, if a fall in a particular industry's real wage almost always lowered its relative price. Nonetheless, it is theoretically possible that the opposite result could hold, because possible falls in the prices of

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determines the highest *expected* profit rate from a new investment. *And this in turn depends on the anticipatedpath of future prices in the face of competition.* If competition is assumed to emulate perfect competition, so that producers are assumed to be passive 'price takers' who expect the present price to continue indefinitely, then the one with the highest profit rate at the current selling price is the regulating capital. However, if competition is viewed as a combative process (real competition) marked by rate in the face of competitively induced cuts in selling prices (Nakatani, 1980; Shaikh, 1980).

materials and capital goods might overcome the direct effect of a wage increase (Sraffa, 1963, Ch. VI).

One can arrive at a more fruitful result, which has the additional advantage that it applies to any prices whatsoever (e.g. market prices, monopoly prices, etc.). The secret is to regroup the components of any price into its regulating vertically integrated unit labor costs and corresponding profit margins(Shaikh, 1984, pp. 65-71)[4]. For simplicity in exposition, consider a circulating capital system with a good whose price p = $10. We can always split this price into its regulating direct unit labor costs ($3), direct unit profits ($2), and its unit material costs ($5). But the last element is simply the price of some bundle of goods, and can therefore be split into its unit labor costs ($2.5), unit profits ($0.5), and the materials costs of the original materials cost ($2). This last component, which is the materials cost of the original materials cost, can once again be decomposed in the same manner. As we continue this process, the residual will get ever smaller, until in the limit we can express the original price ($10) as a sum of direct and indirect unit labor costs ($3 + $2.5 + . . . = $7) and its direct and indirect profit margins ($2 + $0.5 + . . . = $3). The first term in this ultimate decomposition may be called the vertically integrated unit labor cost of a commodity (v = $7), and the second its vertically integrated unit profit ($3). Factoring out the former allows us to express any price as the product of its vertically integrated unit labor costs and a vertically integrated profit-wage ratio: $p = v \bullet (1 + n)$.

It follows that we can always express the ratio of any two prices as the product of two terms: the vertically integrated unit labor cost ratio (which can be expressed in real terms by dividing both elements by the price of consumption goods), and the relative gross margins. So in our case, we can always write

$$p_c / p_k = (vr_c/vr_k) \bullet [(1 + \pi_c)/(1 + \pi_k)]$$

where $vr = v/p_c$, and π = the vertically integrated profit-wage ratio.

In arriving at the vertically integrated unit labor costs, we summed direct and indirect wage costs per unit output. We could also construct a parallel measure of vertically integrated unit labor requirements by summing direct and indirect labor requirements, which gives us the total labor per unit output (λ) required directly or indirectly in the production of a commodity. But since wage costs are simply wage rates times quantity of labor required, we can also express vertically integrated unit labor costs as the product of an average vertically integrated wage ($wr = vr/\lambda$) and the total labor requirement (h).

$$3)\quad p_c / p_k = (wr_c \bullet \lambda_c / wr_k \bullet \lambda_k) \bullet z_{ck}$$

where $z_{ck} = [(1 + \pi_c)/(1 + \pi_k)]$, and $wr = vr/\lambda$.

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[4]It is the costs of the regulating capitals which drive the market price. Those of nonregulating capitals do not.

The term z_{ck} maybe thought of as a 'disturbance' term whose size depends on the extent of the dispersion between the vertically integrated profit-wage ratios of the two sectors. And here, it is very important to recognize that each of these vertically integrated profit wage ratios is merely some sort of weighted average of the direct profit-wage ratios of the two sectors. This means that the dispersion of the vertically integrated profit-wage ratios will be smaller than that of the direct ratios -- generally much smaller. In addition, since the direct profit-wage ratios tend to smaller than 1, so too will the vertically integrated ratios. Adding one to each of the latter, which is necessary to form z_{ck}, will further dampen the dispersion of the resultant variables.

A simple illustration will suffice. Suppose the direct profit-wage ratios are 2/3, 1/3 (a variation of 100%), and the vertically integrated ones are 3/5, 2/5 (a variation of 50%). Then the disturbance term z = (1 + 3/5)/(1 + 2/5) = 1.14, which implies that price ratios will deviate from real unit labor cost ratios by less than 15%. As it turns out actual empirical deviations in the United States, at the level of 80-sector input-output tables, are even smaller (Shaikh, 1998a)(Chilcote, 1997)(Bienenfeld, 1988)(Ochoa, 1984).
It is therefore an extremely good approximation to write

4) $p_c / p_k \cong (wr_c \bullet \quad 3L, / wr_k \bullet \lambda_k)$ = relative real vertically integrated unit labor costs

It is worth recalling that in the preceding expression each vertically integrated real unit labor cost is a weighted average of various direct real unit labor costs, including the sector's own. Therefore, if a sector's direct real unit labor cost fall, other thing being equal, so too will its vertically integrated one. It follows that *the relativeprice of a sector will tend to fall -- i.e. tend to depreciate -- when the real unit labor cost of its regulating capitals falls.*

The preceding approximation is very useful for further theoretical and empirical analysis. But must be noted that the determinacy of relative prices (and subsequently of international terms of trade) does not depend upon this approximation.

3. National relative prices with unequal profit rates

We now consider what would happen if, instead of common profit rates across sectors, there existed *different* profit rates determined by (say) differing sectoral levels of 'monopoly power'? The surprising answer is that *arbitrary differentials in regulating profit rates are notpossible.* There is an underlying connection between them arising from the exchange relations between the sectors.

If we were to allow for differing rates of profit r_c, r_k in equations 1'-2', we would have a system in three variables (p_c/p_k , r_c, r_k), but only two equations. Each equation taken separately would yield a given value of relative prices for any given profit rate. But since these equations represent sectors that exchange products with one another or with common third parties (such as workers), the same relative prices must hold for both. Thus only certain combinations of regulating profit rates are sustainable among sectors, precisely because the sectors are linked. This has several

implications.

First, one cannot suppose that sectoral regulating profit rates can be independently determined, say by something like the sectoral degree of concentration or some other index of 'monopoly power'. Suppose that an increase in 'concentration' in the consumption goods sector enabled regulating firms to raise their relative prices by 20% over the competitive level, thereby raising their sectoral rate of profit by some amount and lowering that in the capital goods sector by some other amount[5]. Let us suppose that this fall in profits in turn provokes a shakeout in the capital goods sector, i.e. to an increase in its own concentration ratio, so that now this sector's relative prices rise by 20%. Such a rise would then restore the competitive price ratio and restore the equality of profit rates[6]. *A general rise in 'concentration' and 'monopoly power' would therefore produce exactly the same sectoral distribution of profit rates as would ongoing competition.*

For exactly the same reasons, we cannot speak of independently determined national profit rates when there is international exchange among sectoral products. National profit rates are linked once commodity trade exists, even in the absence of international capital flows.

We can turn the problem around by noting that if the sectoral relative price were given by some set of forces, this would immediately determine the two sectoral profit rates. While there appears to be little basis for arguing in favor of an independent determination of *national* relative prices, we will see that this is precisely the independent determination of *international* relative prices which is essential to the theory of comparative advantage.

4. Regional variations arising from competition within one nation

I have emphasized throughout that the regulating capitals are not the sole, but only the dominant, producers of a product. Suppose therefore that there existed two distinct regions in the nation, one of which was blessed with many regulating capitals and the other with only a few. It would be then perfectly understandable if consumers in the competitively weaker region tended to buy many goods which were produced elsewhere. At the same time, producers in this same region would tend to have difficulty selling many of their products outside their region. And so it would not be surprising if the weak region's 'imports' from other regions *within the same nation* tended to exceed its 'exports' from them. Such a region, in other words, would tend to run an internal balance of trade deficit, which could only be sustained if there were other flows (such as

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[5] We can see this by noting that Equations 1'-2' with separate rates of profit imply that each sector's profit rate rises with its own relative price.

[6] It is not even true that successive rises in 'monopoly power' would necessarily raise the general price level, since a rise in the price of one sector may be attended by a fall in the prices of some others. One cannot analyze these issues without addressing the the theory of the general price level, which is beyond the scope of this paper.

remittances, outside investments, loans, etc.) to cover it. This is a completely normal outcome arising from competition in the context of uneven regional development within a nation, and there is no automatic financial mechanism which will somehow balance things out (McCombie & Thirwall, 1994, pp. xxiv-xxvi).

It is also obvious that any two regions need not have similar average price indexes even though they might face similar individual prices for all tradable goods, because they need not produce (or consume) similar baskets of goods over time. And of course, when one takes into account the local nontradable goods and services, then the price index differences can widen even further. Only if the production (or consumption) baskets were the same, and if tradable/nontradable price ratios were also the same, and both remained so over time, would the regional price indexes tend to move in essentially the same way over time.

The preceding two points are really aimed at the theory of long run international terms of trade (real exchange rates). Comparative Advantage theory claims that if the two regions under discussion happened to be separate *nations* instead, then the real exchange rate between them would automatically move to balance their trade -- i.e. to make them in effect equally competitive. And Purchasing Power Parity (PPP) claims that nations will tend to have the same average price levels, or at least the same price index changes, so that over time the real exchange rate will be roughly constant, i.e. stationary (Schumpeter, 1954, p. 1106)(Harrod, 1933), (Dornbusch, 1988). We turn to such issues next.

II. The determination of common-currency international prices

1. The consequences of trade among nations

We now consider two nations (A,B) with currencies (£,$) and an exchange rate e ($/£). Each nation has its own regulating producers in each industry, its own rate of profit on regulating capitals, and its own corresponding prices. These prices now represent potential international prices, and to make them comparable, it is necessary to express them all in a common currency ($).

Table 1

Country A (national currency = £)	Country B (national currency = $)
5) $p_{cA} \cdot e = (p_{kA} \cdot e \cdot a_{cA} + p_{cA} \cdot e \cdot wr_{cA} \cdot l_{cA}) \cdot (1 + r_A)$	5') $p_{cB} = (p_{cB} \cdot a_{cB} + p_{cB} \cdot wr_{cB} \cdot l_{cB}) \cdot (1 + r_B)$
6) $p_{kA} \cdot e = (p_{kA} \cdot e \cdot a_{kA} + p_{cA} \cdot e \cdot wr_{kA} \cdot l_{kA}) \cdot (1 + r_A)$	6') $p_{kB} = (p_{kB} \cdot a_{kB} + p_{cB} \cdot wr_{kB} \cdot l_{kB}) \cdot (1 + r_B)$

At the opening of trade, there will initially be two prices for each commodity, since each country

produces each good. For a given good, the lower cost producer will become the regulating one, and will therefore be able to seize some part of the other's market through its own exports.

Let us assume that country A ends up exporting consumption goods, and country B capital goods'. Then country A determines the international currency price of consumption goods in both countries, country B that of capital goods, and the price system reduces to those equations which arise from the regulating conditions of production -- that is, from equations 5 and 6', respectively, subject to the requirement (the law of one price) that $p_{kA} \cdot e = p_{kB}$, and p_{cB} $p_{cA} \cdot e$.

7) $p_{cA} \cdot e = (p_{kA} \cdot a_{cA} + p_{cA} \cdot e \cdot wr_{cA} \cdot l_{cA}) \cdot (1+r_A)$
8) $p_{kB} = (p_{kB} \cdot a_{kB} + p_{cB} \cdot e \cdot wr_{kB} \cdot l_{kB}) \cdot (1+r_B)$

Rewriting, we get

7') $p_{cA} \cdot e / p_{kB} = (a_{cA} + (p_{cA} \cdot e / p_{kB}) \cdot wr_{cA} \cdot l_{cA}) \cdot (1+r_A)$
8') $1 = (a_{kB} + (p_{cA} \cdot e / p_{kB}) \cdot wr_{kB} \cdot l_{kB}) \cdot (1+r_B)$

The preceding price system is structurally identical to that in the national case with profit differentials across sectors. It is a two equation system in three variables: *the international terms of trade* (real exchange rate) $\tau = p_{cA} \cdot e / p_{kB}$, and two national profit rates r_A, r_B. As before, the two different profit rates cannot independently determined (say by some degrees of national 'monopoly' power)[8]. Fixing one will determine both the terms of trade and the remaining profit rate.

But now the alternate possibility takes on great significance: might not the international relative price $p_{cA} \cdot e / p_{kB}$ be determined through some other set of relations, which would in turn determine the two national rates of profit? *This is precisely the closure proposed by the theory of comparative advantage,* because it argues that the terms of trade will move in such a way as to be ultimately determined by the requirement that trade be balanced.
There is no reason to expect that when trade opens, it will be already be balanced. Assume therefore that country A has an initial trade deficit, so that it is paying out money to finance its excess imports. In the case of fixed exchange rates, comparative advantage theory assumes that the decrease in the domestic money supply resulting from such an outflow would lower the

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'The story would be the same if initially one country were to dominate trade in both goods — as in Ricardo's own famous exposition. In this case, one country would determine the prices of both goods, hence also the terms of trade.

[8]If, however, trade barriers permitted all the prices in a given country to be higher than those which international competition might impose, the profit rates would be partially dependent on local conditions. When barriers are sufficient to altogether choke trade off, we revert to two separate national systems with their locally determined profit rates.

relative domestic price level, via the quantity theory of money. Since the nominal exchange rate is fixed, this is equivalent to lowering the terms of trade τ (= $p_{cB} \bullet e / p_{kA}$). In the case of flexible exchange rates, it assumes that a balance of trade deficit depreciates the nominal exchange rate leaving relative national prices remain unchanged, so once again the terms of trade fall. In either case, it is further assumed that the resulting decline in the terms of trade improves the country's trade balance. The terms of trade then come to rest when exports equal imports, and are therefore ultimately determined by this requirement. As is well known, they are then no longer regulated by the cost of the producers of the goods involved.

There are several well-known objections to the comparative advantage argument (McCombie & Thirwall, 1994, p. 124). Partial adjustment may take place through output and employment declines (relative to trend), because a trade deficit will to reduce aggregate demand, output and hence imports, thereby ameliorating the initial trade deficit. At the same time, the outflow of money due to an ongoing balance of trade deficit is likely to reduce liquidity at home and raise interest rates, thus attracting capital flows which would then counterbalance, rather than rectify, the trade imbalance. Even if the terms of trade did fall somewhat, there is the ever present question of whether export and import demand would be sufficiently elastic to lead to an improvement in the trade balance. And finally, there is the inescapable empirical fact that international trade has generally not been balanced, neither under fixed nor flexible exchange rate regimes (Amdt & Richardson, 1987).

Our present framework provides us with additional grounds for skepticism, because the terms of trade affect not only the trade balance but also the dispersion of national profit rates. The balance of trade effect is familiar, since for country A

9) b = trade ratio = $p_{xA} \cdot X_A / [(p_{mA}/e) \cdot M_A] = \tau \cdot X(\tau, Y_B)/M(\tau, Y_A) = f(\tau, Y_A, Y,)$

10) $B = b - 1 = f(\tau, Y_A, Y_B)$ = trade balance relative to imports, country A

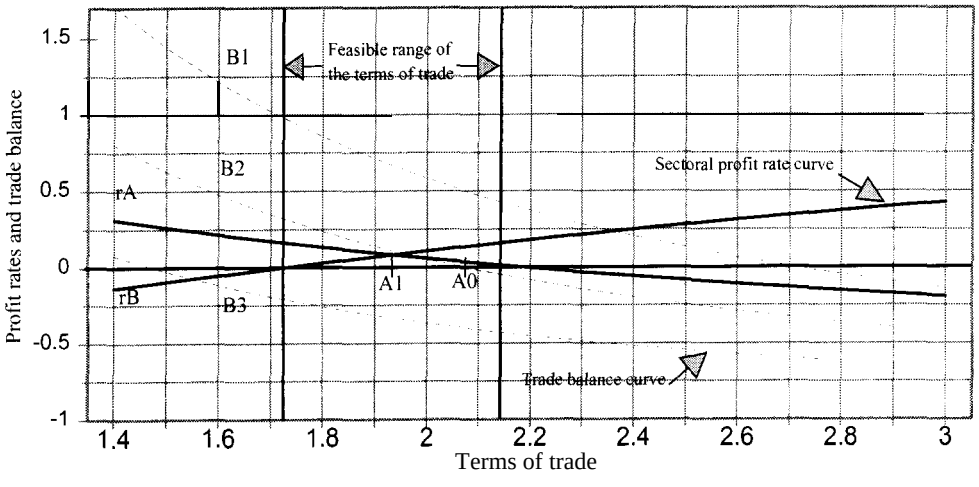
where p_x , p_m are the local currency export and foreign currency import prices, e is the nominal exchange rate (foreign/local currency), τ is the previously defined terms of trade, $X(\tau, Y_B)$, $M(\tau, Y_A)$ are export and import functions, and Y is output. Then the trade balance depends on the terms of trade, though a decline in the latter will improve the former only if all the relevant elasticity conditions are satisfied. Even in this case, the trade balance will also vary positively with foreign output and negatively with domestic output.

The profit-rate effect follows from the fact that in equations 7'-8', any fall in country A's terms of trade τ would lower r_A and raises r_B [9]. Since negative profit rates are unsustainable, all feasible variations in the real exchange rate must be confined between the points defined by $r_A, r_B > 0$, or perhaps by the even narrower range $r_A - i_A, r_B - i_B > 0$ where i is the interest rate.

'Equations 7'-8' yields $1 + r_A = \tau/(a_c + e_r \bullet wr_c \bullet l_c)$, $1 + r_B = 1/(a_k + \tau \bullet wr_k \bullet l_k)$.

Figure 1 illustrates both sets of relations. Assuming log linear functional forms for import and export function, and even assuming that elasticity conditions are fulfilled, as the terms of trade vary curves B 1 -B3 trace out the response of the relative trade balance for three alternate levels of national output Y_A , while curves rA and rB trace out the response of national profit rates. It is easy to see that even under these best of all circumstances it is entirely possible that many curves (e.g. B 1, B3) may fall outside the feasible range of profit rates[10].

Figure 1: Terms of trade, the trade balance, and national profit rates



We are now in a position to evaluate the adjustment process implicit in the comparative cost story. For any given B-curve, the point at which it crosses the x-axis represents a situation of balanced trade. It is immediately apparent that only certain curves will even yield a trade balance which is consistent with positive profit rates. In our present example, only curve B2 satisfies this requirement, at point A_0. Conversely, the point at which profit rates are equalized will generally correspond to a trade imbalance (extending the vertical line through point Al indicates a surplus for country A if it is on curves B 1 and B2, and a deficit on curve B3).

Figure 1 makes it clear that, at best, the terms of trade can only vary within the strict limits imposed by the positivity of sectoral profit rates (which may be net of interest). Thus even if the

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[10] Following (McCombie & Thirwall, 1994, pp. 234-35), Figure 1 assumes $M = a \cdot \tau^{\eta} \cdot (Y_A)^{\pi}$, $X = b \cdot \tau^{\eta^*} \cdot (Y_B)^{\pi^*}$, with the parameters b/a= 0.68, $\eta + \eta^* - 1 = 1.5$, $\pi = 1.3$, $\pi^* = 1.95$, $Y_A = 15$, and $Y_B = 10, 13, 16$, successively, to generate curves Bl-B3.

terms of trade were to fall in response to a trade deficit, and even if all elasticity conditions were assumed to hold'], the end result might be the collapse of trade rather than its automatic balance (i.e. curve B1 is only compatible with a trade deficit for country A, and B3 with a trade surplus)". Secondly, even where a balanced trade situation happens to be feasible on profitability grounds, as in point A_0, this will generally correspond to unequal profit rates among nations. *And so we come back to our originalpoint of departure.* Unequal profit rates will provoke international capital flows, move the terms of trade toward point A,, and thereby create a trade imbalance sustained by these very same capital flows. From this point of view, general trade imbalances are perfectly normal consequences of free trade in the face of international capital mobility.

2. International competitive prices

Let us suppose that international profit rate differentials do indeed provoke capital flows sufficient to (roughly) equalize profit rates on new investments. Then we may write the international price equations 7'-8' as

11) $p_{cA} \cdot e / p_{kB} = (a_{cA} + (p_{cA} \cdot e / p_{kB}) \cdot wr_{cA} \cdot l_{cA}) \cdot (1 + r)$

12) $1 = (a_{kB} + (p_{cA} \cdot e / p_{kB}) \cdot wr_{kB} \cdot l_{kB}) \cdot (1 + r)$

The preceding equation system is identical to our previous one for national competitive prices (equations 1'-2'). Only now, in addition to the international profit rate, *the international terms of trade $p_{cA} \cdot e / p_{kB}$ are also determined,* for any given national real wages. This is a direct extension of the results of national competition to the case of international competition, and it yields similar results for the equilibrium international rate of profit and terms of trade (real exchange rate). It should be emphasized that since only regulating rates of profit are equalized across sectors, average profit rates across nations (which encompass nonregulating capitals and nontradable goods) need not be equal.

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[11] Equation 11 in the next section sheds more light on the potential flexibility of the terms of trade

[12] Ricardo's original example is instructive in this regard. When trade is opened, the initial absolute cost advantage of Portuguese producers allows them invade both English wine and cloth markets. Ofcourse, the fall in commodity prices there must lower the profits of English producers, which could well drive one or both sectors out of production. Ricardo does not dwell on this aspect. Instead, he assumes that the English continue to purchase Portuguese goods. The resulting flow of funds from England to Portugal is assumed to lower costs in the former and raise them in the latter, until the Portuguese cloth industry succumbs and the English one is revived or or even resurrected.

$r = r(wr_{cA}, wr_{kB})$
$\tau \equiv p_{cB} \bullet {}_2 / p_{kA} = F(wr_{cA}, wr_{kB}, r) = f(wr_{cA}, wr_{kB})$

Exactly as in the national case, we can provide a powerful approximation to the international relative price via relative real vertically integrated unit labor costs (Shaikh, 1998a).This implies that *unless real wages themselves are altered in theprocess of adjustment,* the terms of trade will not be very flexible at all.

13) $\tau \equiv p_{cB} \bullet e / p_{kA} \cong (wr_{cB} \bullet \lambda_{cB} / wr_{kA} \bullet \lambda_{kA})$

3. Implications of a determinate terms-of-trade for the balance of trade

Equations l 1 ▪ 13 makes it clear that the terms of trade are determined by the international equalization of profit rates, and that they will generally follow the evolution of real unit labor costs over time. But precisely because of this, they cannot also serve to balance trade among nations -- at least, not unless the real unit labor costs (i.e. real wages and productivities) which underly them were to themselves make the required adjustments. But no such automatic mechanism exists.

The upshot of the preceding discussion is that a structurally determined terms of trade will tend to result in *structural trade imbalances,* even though demand and real exchange rate movements may produce substantial variations in the short run. This is a critical difference between absolute and comparative advantage theories.

4. An alternate route to Thirwall's Law

Equation 10 demonstrated that the relative trade balance depends not only on the terms of trade, but also on both national outputs: $B = f(\tau, Y_A, Y_B)$. Keynesian theory has long noted that there will be a feedback effect between the two nation's outputs and their trade balance. But this mutual interdependence does not imply that national outputs will automatically adjust so as to make B = 0. Indeed, we can turn the problem around. If the time paths of Y_A, Y_B are nationally determined (albeit linked by their mutual trade balance), then given the terms of trade determined by international profit-rate equalization, the time path of B is determined.

B will, and does, generally vary over time. But *if* it happens to be roughly stable, then there will necessarily exist a particular association between a country's output growth and its export growth called Thirwall's Law (Davidson, 1994, pp. 220-22 1). But the causation is different here. To see this, we return to the formula for the relative balance of trade B in equations 9-10, which we now write as

14) $B = b - 1 = \tau \cdot X_A / M(\tau, Y_A) ▪ 1$

Since the terms of trade are determined by real costs, they are likely to change relatively slowly

over time. If in addition the path of national output happens to result in a stable relative trade balance, country A's exports and imports must be growing at roughly the same rates, which necessarily implies that growth of exports and of domestic output are linked via country A's income elasticity of imports:

15) $g_Y = g_X / \epsilon_{M,Y}$

where g_Y, g_X = rates of growth of Y_A, X_A, respectively, and $\epsilon_{M,Y}$ = the income elasticity of imports for country A[13]. This is the same association posited in Thirwall's Law. McCombie and Thirwall derive it from the theoretical assumption trade is balanced in the long run (B = 0, b = 1), coupled with the empirical observation that terms of trade change slowly over time ($\tau \approx$ constant) (McCombie & Thirwall, 1994, p. 236, equation 3.8, and pp. 301-304). In our case, however, it results from a contingent empirical stability of any particular trade imbalance (B ≈ constant) coupled with the theoretically derived stability of the terms of trade ($\tau = wr_{cB} \bullet \lambda_{cB} / wr_{kA} \bullet \lambda_{kA}$).

A further implication of the structural determination of terms of trade is that the devaluation of a currency will not have a lasting effect unless it indirectly affects real unit labor costs. Insofar as prices take time to adapt to a devaluation, the initial effect might well be to lower a country's international terms of trade (its real exchange rate) and hence improve its balance of trade. But unless the resulting rise in import prices were to always reduce the real wage to the point of trade balance (which would at the very least require that workers were totally unable to defend any particular standard of living) the long run terms of trade would be still be 'wrong' and a structural trade balance would reappear.

Finally, the assumption that the Law of One Price holds for each traded good does not necessarily imply that national price indexes will be similar, because tradable baskets may differ across nations (see section 5 below). Thus absolute Purchasing Power Parity (PPP) will not generally hold. But now the existence of exchange rates allows for a particular exception: a country experiencing a relatively rapid rate of inflation would experience a currency depreciation of comparable magnitude, so that relative PPP will appear to hold in this particular case. From equation 7 we see that the product of national relative prices and the nominal exchange rate must track the evolution of relative real vertically integrated unit labor costs. But because the latter will move fairly slowly, the bulk of any substantial inflationary rise in relative prices must be

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[13] With the relative trade balance $B = \tau \cdot X_A / M(\tau, Y_A) - 1$ = constant, and with the terms of trade τ changing slowly, exports and imports growth rates must be roughly equal: $g_X \approx g_M$ The latter term can be further broken down by noting that total derivative of the import function $dM = (\partial M/\partial \tau) \cdot d\tau + (\partial M/\partial Y_A) \cdot dY_A$. Then with τ changing slowly, $g_M = (dM/dt) \cdot (1/M) \approx (\epsilon_{M,Y}) \cdot g_Y$, where $\epsilon_{M,Y} = (\partial M/\partial Y_A) \cdot (Y_A/M)$ = income elasticity of imports, and $g_Y = (dY_A/dt) \cdot (1/Y_A)$. Substituting the expression for g_M back into the expression $g_X \approx g_M$ gives us equation 15, Thirwall's Law.

attended by a corresponding depreciation in the nominal currency'". Therefore relative purchasing power parity will appear to hold when relative inflation rates are high, but will tend ***not*** to hold otherwise. This is precisely what we find empirically .

5. Nontradable goods

Like regions, countries will generally have some goods which are nontradables, because they are too expensive to transport across nations. Since price arbitrage is not feasible, even otherwise similar nontradable goods produced in two countries must be treated as distinct national goods. Suppose therefore that each country has a distinct nontradable good.

If the nontradables were pure 'luxury' (non-basic) goods which did not enter into either production or the real wage basket, then nothing much would change in our analysis. We could append two distinct national price equations to our system in equations 1 l - 12. The price of nontradables would be affected by the prices of traded consumption and capital goods, but not vice versa. The terms of trade in particular would not be altered. Even so, the real exchange rate in terms of general national price indexes would now depend on both the terms of trade and the mixture of tradable/nontradable goods.

But if nontradables enter into production or workers' consumption, then the analysis gets more complicated. The two additional commodities in the system can now affect both the terms of trade (through real wages and materials costs) and the real exchange rate (Shaikh 1999, 1998). The long run terms of trade are still determined by the international equalization of profit rates, but now they also reflect the costs of nontradables.

6. The conditions for international profit rate equalization

The argument put forth in the previous section has depended on a presumed tendency for profit rates to equalize across international investments. It is therefore useful to note that while competitive flows of direct investment are sufficient, they are not strictly necessary. Short term international capital flows can equally well provide a sufficient force.

If financial capital moves across nations, it will tend to equalize international rates of return on bonds. But since these are competitively linked to national rates of return on (new) real investment, the latter will also tend to be equalized -- without the need for international direct investment flows! This means that the international mobility of financial capital, which is as old

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[14]The depreciation of a currency subject to substantial inflationary pressure comes about in part because more stable foreign currencies becomes a substitute for domestic money when inflation rates are high and variable (Agenor & Montiel, 1996, pp. 89-95).

as capitalism itself, is sufficient to produce a substantial tendency toward the equalization of international rates of return on new investment. Direct investment of course furthers this process, but it need not be its sole, or even principal, instrument. Large flows of direct investment flows are therefore not required.

7. The balance of payments and the nominal exchange rate

Determinate terms of trade and given national output paths are consistent with persistent structural trade imbalances. Suppose a country has a trade deficit. It may also have particular net long term capital flows (in or out) arising from the equalization of rates of return, corresponding flows of wages, profits and dividends, and various other exogenous items. If these flows cover the trade deficit, then the balance of payments will be zero and the nominal exchange rate will be stable. If they overfill or underfill the gap in the balance of payments left by the trade deficit, then there exists endogenous mechanisms which will bring the balance of payments back into line.

The mechanism in question arises from the effect of balance of payments surpluses or deficits on domestic liquidity. For instance, an ongoing balance of payments deficit implies a net outflow of funds from the country, which will lower liquidity and hence tend to raise interest rates and rates of return on financial assets (Harrod, 1933, p. 53)[15]. The raised rates of return will in turn attract short term international capital inflows to fill the balance of payments gap, which will also raise liquidity and drive domestic (risk-adjusted) rates of return back down towards equality with foreign ones[16].

In the case of managed exchange rates, the government will have to counteract the potential funds outflow so as to maintain the nominal exchange rate. Thus the balance of trade deficit is covered through an outflow of government reserves and interest rates need not change on this account. In the absence of such intervention (flexible exchange rates), the drain on liquidity will raise interest rates and attract short term capital into the country — until at some point the balance of trade deficit is fully covered[17]. In effect, the short term capital inflows or outflows serve to 'top

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[15] This is also Ricardo's point of departure, but he argues that the outflow of money induced by persistent trade deficit lowers the national price level, via the Hume Specie Flow mechanism.

[16] In a growing economy, which is the rule, the equalization of rates of return across sectors is compatible with persistent net investment in each sector. Sectoral investment flows then *accelerate* when returns are above normal. In the same manner, persistent net capital flows across nations are compatible with equalized international rates of return.

"In all of this, the nominal exchange rate may initially fall due to the initial balance of payments deficit, and then rise back as the latter is filled in. To the extent that terms of trade

off' any balance of payments deficit or surplus resulting from the sum of the trade balance and exogenous capital flows.

These particular 'topping off' flows are driven by arbitrage between international rates of return on assets. A similar mechanism is implicit in The Monetary Approach to the Balance of Payments (MAB), since it assumes equalized international interest rates. Portfolio Balance (PB) models, one the other hand, tend to treat domestic financial assets as different from foreign ones, by positing different national agents with distinct asset demand functions. The two approaches are if the PB approach is viewed as an analysis of the risk-premium between the assets (Isard, 1995, p. 111). But if that is not the case, then we would need supplement the PB formulation with an additional set of agents, arbitrageurs, whose sole concern would be to move their capital in response to differentials in risk-adjusted rates of return, thereby providing the necessary balancing flows. In this way we are led back to the classical (and MAB) result on the international equalization of financial rates of return — regardless of the intents or psychologies of agents who are not arbitrageurs.

III. Summary and some implications

Comparative advantage theory is generally presented in two forms. As a normative proposition about what should happen in free trade. And as a positive statement about the actual tendencies of free trade among capitalist nations. The latter claims that free trade will automatically make all nations equally competitive in the world arena, no matter how different their existing levels of development. The theory admits that such differences may initially produce trade patterns in which the strong dominate the weak. But it argues that if market forces are given free rein, they will drive the real exchange rate to that level which will make trade balance among all countries. Given sufficient time" (and sufficient faith), free trade will supposedly level the international playing field.

No such tendencies are discernable at an empirical level. Trade imbalances have been endemic during fixed, flexible, and mixed exchange rate regimes. This paper argues that the historical record is perfectly coherent, because the long run real exchange rate is actually regulated by relative real costs of production, through the international mobility of capital. Rather than moving to automatically eliminate existing inequalities in international competitiveness, free trade actually reflects these existing inequalities.

From this point of view, it is absolute advantage which regulates international competition, just

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remain tied to costs, relative prices will then fluctuate in the opposite manner.

[18](Froot, 1995, pp. 1657, 1662) suggest that it might take 75 or even a 100 years for the real exchange rate to converge to PPP.

as it does competition within a nation. Absolute advantage theory implies that trade imbalances will tend to persist, because they reflect structural inequalities in the real production costs of nations. It implies that devaluations will not have a lasting effect on trade balances, unless they are also attended by fundamental changes in these very same costs (i.e. in national real wages and productivities). If not, trade imbalances will provoke counterbalancing international capital flows, with a concomitant build-up of international debt burdens. Finally, it implies that neither the absolute nor relative versions of the Purchasing Power Parity hypothesis (PPP) will generally hold, because the path of real exchange rates will reflect the slow but persistent evolution of these relative real costs. The one exception is that the relative version of PPP will appear to hold if a country experiences a relatively high inflation rate -- for then its nominal exchange rate will depreciate by close to the same rate, in order to keep the real exchange rate on track with relative real costs. All of these propositions, and others, are documented in (Shaikh, 1998b), along with empirical tests of the hypothesis that the terms of trade are determined by real unit labor costs.

Appendix: effects of real wage increases on the general rate of profit

The effects in question do not depend on a 2x2 model. Denoting n-dimensional vectors and square matrices in bold, and letting **B** stand for the matrix of the standard-of-living bundles of the workers in each sector and **L** stand for a diagonal matrix of labor coefficients, we can write

1) $\mathbf{p} = \mathbf{p} \bullet (\mathbf{A} + \mathbf{B} \bullet \mathbf{L}) \bullet (1 + r)$
2) $\mathbf{p} \bullet [(1/(1 + r)) \cdot (\mathbf{A} + \mathbf{B} \bullet \mathbf{L})] = \mathbf{0}$

As is well known, the term $1/(1 + r)$ is the dominant characteristic root of the matrix $(\mathbf{A} + \mathbf{B} \bullet \mathbf{L})$, while the vector of relative prices **p** (determined up to a constant) is the dominant characteristic vector. Of interest is the result that a rise in any of the coefficients of the the matrix $(\mathbf{A} + \mathbf{B} \bullet \mathbf{L})$ will raise the dominant root and hence lower the general rate of profit. Subsumed under this are increases in any element of the workers' standard-of-living matrix **B.**

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