Exchange Rates and the Balance of Payments:
Reconciling an Inconsistency in Post Keynesian Theory

There already exist Post Keynesian alternatives to Neoclassical trade and exchange rate theories. That focusing on the former explains the direction of trade as a function of absolute advantage which is in turn driven by cost and technological differences. There is no automatic force causing these differences to diminish over time meaning that–unlike in Orthodoxy–it is possible for trade imbalances to be large and long-lasting. Meanwhile, Post Keynesian exchange rate theory argues that currency prices are set almost entirely by autonomous financial capital flows. If international investors' forecast of profit from dollar-denominated assets improves, they buy dollars and the dollar appreciates. On the surface of it, these appear to be satisfactory real world-based approaches that offer much more explanatory power than comparative advantage, purchasing power parity, et al. When viewed together, however, an inconsistency emerges. For, a theory that is predicting the trade balance is also simultaneously predicting the capital account balance and the exchange rate at which these transactions are occurring. If Post Keynesian scholarship suggests that a particular nation would have the absolute advantage and should be experiencing a trade surplus, then it must also argue that autonomous capital flows will cooperate and create a corresponding deficit. There is, according to Post Keynesian exchange rate theorists, absolutely no reason to expect the latter except by coincidence. While a tentative solution to this problem has been forwarded, it conflicts with other well-established Post Keynesian tenets. The goal of this paper is to resolve the matter once and for all and by a means that leaves all the essential conclusions unchanged. The key lies in explicitly modeling the manner in which trade flows are financed. Once it is acknowledged that they are endogenously-created and that they do not have any direct impact on currency prices, then it is possible to show that trade flows are a function of absolute advantages while exchange rates are driven by international finance.

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Whatever other complaints we might have regarding Neoclassical theory, it is certainly true that the various pieces tend to fit together. Each one, whether it be associated with labor, banking, growth theory, real estate markets, or agriculture, contributes in its way to the broad conclusions that markets are efficient and the economy tends to come to rest at full employment. Their argument may not be cogent, but it is (largely) valid and internally consistent.

The same is not necessarily true of Post Keynesian economics, at least not that part related to exchange rates and trade flows. Because these theories evolved largely in isolation of one another and since they lacked the unifying effect of a powerful meta-assumption like full employment, a problem has emerged. It revolves around the question of what ultimately causes trade imbalances. Are they a result of differences in absolute advantage (as argued by Post Keynesian trade theorists) or do they occur when currency prices are moved away from balanced-trade levels by autonomous portfolio capital flows (as explained by Post Keynesian exchange rate theorists)? Unfortunately, both approaches almost completely ignore the other and there has been little attempt at reconciliation. In a world transformed by global value chains and marked by a gargantuan currency market, our framework is woefully incomplete if it cannot offer a consistent view of the determination of exchange rates and the balance of payments.

The goal of this paper is to show that these two approaches can be successfully merged. Indeed, it turns out that they have to be since closer examination reveals that neither really makes sense by itself. One of the keys is the addition of more realistic assumptions regarding trade financing. The extension of credit is an integral part of the process and this endogenous money creation enables the existence of trade imbalances. Furthermore, it occurs in a completely

separate market from that dominated by the international financial investors in search of short-term profit. All this combines to create a world where trade flows are affected by but have little effect on currency prices.

The paper proceeds as follows. In the next section, the Post Keynesian approach to exchange rate determination is explained. Following that, the basics of the trade theory are reviewed. A basic framework for understanding the relationship between exchange rates and the balance of payments is then introduced so that the inconsistencies can be identified. They are then resolved and a complete model is presented. Conclusions follow.

Exchange Rate Theory

A great deal of work has been done on the monetary half of this subject area, with numerous studies of exchange rates and capital flows having been published (see for example Akiba 2004, Andrade and Prates 2013, Davidson 1998, Harvey 2009a, Kaltenbrunner 2015, Lavoie 2002-3, Lavoie 2000, Moosa 2007-8, Moosa 2004, and Smithin 2002). In general, these come to the conclusion that currency prices are driven by the portfolio decisions of financial investors throughout the world, with the latter's primary foci being interest rates, expected exchange rate movements, and forecast own-price changes of financial assets–especially the first two. On those occasions when market participants even bother to pay attention to trade balances, they are secondary. It is assumed that exchange rates are driven by massive financial capital flows and not so much by the much smaller fraction of economic activity associated with imports and exports.

The relevant factors can be summarized following a slightly modified version of the

approaches used by Andrade and Prates (2013) and Kaltenbrunner (2015):

(1) $r_{£} = q_{£} - c_{£} + l_{£}$

where $r_{£}$ is the total expected total return from holding sterling, $q_{£}$ is the own rate of return from holding sterling, $c_{£}$ is the associated carrying cost, and $l_{£}$ is the liquidity premium attached to sterling. This is, of course, the method used by Keynes to analyze differential rates of returns across asset classes (both physical and financial) in chapter 17 of the General Theory. One of the goals of this specification was to emphasize the very different factors that contribute to the attractiveness of, say, highly liquid assets (which are likely to have negligible own rates of return and carrying costs but retire obligations easily) versus illiquid ones (which may require time and effort to transform into a medium that allows the retirement of obligations but can have significant own rates of return and carrying costs). A key assumption is that the overall expected rate of return, r, will be driven to equality across asset classes.

Adapting equation (1) to the currency market requires some clarifications. First and foremost, strictly speaking, there is no own rate of return from holding sterling ($q_{£}$). But then that is precisely why no one building an international portfolio would do so; instead, they would purchase a sterling-denominated asset, possibly a stock or stock index but more likely a bond or interest-bearing account.[1] For that reason, call $q_{£}$ the rate of interest paid on sterling deposits.[2] The liquidity premium ($l_{£}$) would remain the convenience or security associated with the currency in question, with l likely being highest for the world reserve currency. Last, though one

[1]Or they would purchase spot and forward contracts or currency swaps with mismatched maturity dates, which incorporates interest differentials.

[2]Empirical studies often use LIBOR or other interbank rates.

would normally associate very low carrying costs with a currency, some types of capital controls (like, for example, requiring the maintenance of non-interest earning compensating balances) could raise these and would be more reasonably included here than under the liquidity premium (Andrade and Prates 2013).

We could then easily imagine an equation (1) for various currencies:

(1) $r_{£} = q_{£} - c_{£} + l_{£}$

(1') $r_{\$} = q_{\$} - c_{\$} + l_{\$}$

(1") $r_{€} = q_{€} - c_{€} + l_{€}$

(1"') $r_{¥} = q_{¥} - c_{¥} + l_{¥}$

where in equilibrium $r_{£} = r_{\$} = r_{€} = r_{¥}$ (this system actually requires the addition of one more variable, which will be introduced shortly). This simple model already helps to explain some real world phenomena. For example, nations whose currencies are at the bottom of the international hierarchy of monies, implying a low l, will be forced to offer higher rates of interest (↑q) or to liberalize capital markets (↓c) in order to compete for funds (Andrade and Prates 2013 and Kaltenbrunner 2015). Both of these actions could well serve as an impediment to economic development. Meanwhile, among the most advanced industrial nations, where there would likely be little difference between their respective carrying costs and liquidity premiums, financial capital would tend to move based primarily on interest rate differentials. These general characterizations sound very familiar, certainly much more so than anything derived from purchasing power parity.

One essential element of Keynes' original analysis that has not yet been added is the expected appreciation of one asset versus another. For, although it must be true that $r_{£} = r_{\$}$, it is

nevertheless possible that $(q_£ - c_£ + l_£) > (q_\$ - c_\$ + l_\$)$ in equilibrium if agents expect the dollar to appreciate relative to the pound. Showing this requires adding a new variable, $a_£$, or expected pound appreciation. Now, even if $(q_£ - c_£ + l_£) > (q_\$ - c_\$ + l_\$)$, it is possible to write $(q_£ - c_£ + l_£ + a_£) = (q_\$ - c_\$ + l_\$)$ if $a_£$ is a negative number of the right magnitude (implying that market participants expect a pound depreciation relative to the dollar).

Only n - 1 equations require the addition of such a variable. For example, in a two-country world this would suffice:

(2) $r_£ = q_£ - c_£ + l_£ + a_£$

(1') $r_\$ = q_\$ - c_\$ + l_\$$

When n > 2, it would make sense to set one currency as the standard against which all others are measured. Andrade and Prates (2013) and Kaltenbrunner (2015) argue that this should be the world reserve currency or, in our case, the dollar. This would yield:

(2) $r_£ = q_£ - c_£ + l_£ + a_£$

(2') $r_€ = q_€ - c_€ + l_€ + a_€$

(2") $r_¥ = q_¥ - c_¥ + l_¥ + a_¥$

(1') $r_\$ = q_\$ - c_\$ + l_\$$

where expected currency price movements among the pound, euro, and yen can be derived from $a_£$, $a_€$, and $a_¥$. (For simplicity, I will hereafter restrict my attention to the dollar-pound market.)

It only remains to more clearly define how all this affects the current spot price embedded in $a_£$. Note first that the expected appreciation of the pound relative to the dollar must be:

(3) $a_£ = (E^e - E^s)/E^s$

where E is the dollar price of pounds and the superscripts e and s designate the expected and spot

prices. Now consider equation (4), which sets $r_£ = r_\$$ and solves for $a_£$:

(4) $a_£ = (E^e - E^s)/E^s = (q_\$ - q_£) - (c_\$ - c_£) + (l_\$ - l_£)$.

The impact on the spot price, E^s, of a change in any of the variables on the right depends on how much it also affects agents' expectations, E^e. If we start by assuming those expectations to be completely exogenous/unaffected, then the answer is simple: anything that increases the right-hand side must cause E^s to fall. This is precisely what we would expect as it suggests that anything that makes the dollar more attractive (on the right) will cause a dollar appreciation (on the left). We thus have an operative theory of exchange rate determination. An increase in $(q_\$ - q_£) - (c_\$ - c_£) + (l_\$ - l_£)$ will lead to net capital inflows into the US and a dollar appreciation.

The only potential complication here is what may happen if we also allow expectations (E^e) to adjust. Not only are Post Keynesians generally sensitive to the possibility of functions being interdependent, but holding tight to ceteris paribus seems especially questionable here. For, while it seems reasonable to assume that a rise in US interest rates ($q_\$$), for example, would lead to a dollar appreciation (fall in E^s), it is unlikely that this would leave expectations (E^e) unaffected. And, if both E^e and E^s can change, then it becomes mathematically possible for the dollar to depreciate (rise in E^s) in the face of an increase in US interest rates. However, without going into great detail, the relative movements necessary to make this happen would require very strange circumstances.[3] The bottom line is that while technically we are left with a mathematically ambiguous result once we allow expectations (E^e) to adjust, this problem disappears under any set of realistic behavioral assumptions.

[3]One of the most important is that events today must have a bigger quantitative impact on forecasts of the future than on today's spot prices.

Note the implication here that the burden of adjustment is borne entirely by the spot rate. That would almost certainly be the case in the vast majority of instances. Say, for example that we start in equilibrium but that US interest rates rise. That would create the following situation: $(q_{£} - c_{£} + l_{£} + a_{£}) < (q_{\$} - c_{\$} + l_{\$})$, resulting in net capital flows into the US. However, $c_{£}$, $l_{£}$, $c_{\$}$, and $l_{\$}$ are unlikely to change simply as a result of this. One may be tempted to argue that such flows would cause $\uparrow q_{£}$ and $\downarrow q_{\$}$, but not in an endogenous money world with central bank interest-rate targeting. The flows would be easily–in fact, automatically–sterilized (Lavoie 2002-3 and 2000). So this leaves only $a_{£}$ and indeed that is what the Post Keynesian theory argues. Generally speaking, it is the spot exchange rate that adjusts to create the new equilibrium. Note, too, the important role played by expectations (E^{e}) alone. It is not only possible, but it is expected, that changing forecasts will have a significant effect on spot rates. A rise in E^{e}, for example, means that agents expect a weaker dollar in the future than they had originally. This leads to an increase in $(q_{£} - c_{£} + l_{£} + a_{£})$ and net capital outflows from the US. The resulting dollar depreciation returns the market to equilibrium.[4]

One last point worth making is that even if we could precisely quantify each of the variables, there is no assumption that we actually reach $r_{£} = r_{\$} = r_{€} = r_{¥}$. This is not because of market imperfections or frictions, but a function of the fact that agents lack complete confidence in their estimations. If I believe that Arsenal Football Club is going to defeat Tottenham, that does not mean I am going to place a wager. And even if I do, I am unlikely to sell all my worldly possessions in order to raise money for the bet–unless, of course, I am able to time travel and I

[4]Considerable work has been done on how currency market participates form their expectations in Harvey 2012, 2009a, 2009b, and 2006.

know for a fact that Arsenal is going to win! The more confident I am, the more I will wager. Analogously, the more confident are economic agents, the more likely they will act on their forecast and create the net capital flows necessary for us to reach $r_{£} = r_{\$} = r_{€} = r_{¥}$. But, as confidence declines, so agents will become less willing to commit funds faced with a given gap between the expected rates of return (r). Hence, $r_{£} = 5\%$ and $r_{\$} = 6\%$ may represent the point at which net capital flows become zero under one set of circumstances while it may be $r_{£} = 5\%$ and $r_{\$} = 5.2\%$ under another.[5] Though this does not, at least for present purposes, change anything significant in the theory, it serves as an important reminder that the objects of our study are not coldly rational, mechanistic utility maximizing individuals operating in an environment of complete certainty or risk, but social beings struggling to make sense of the uncertain world around them.

This, in a nutshell, is the Post Keynesian exchange rate theory. The assumption is that currency prices are almost entirely a function of the financial flows that dominate the international economy. Exchange rates come to rest at levels that equalize the expected return on world currencies, where the latter is driven by interest rates (and, to a lesser extent, other returns on assets), carrying costs, liquidity premia, and agents' forecast. Once $r_{£} = r_{\$} = r_{€} = r_{¥}$ (assuming, for simplicity, complete confidence–this will be maintained for the rest of the paper) net capital flows will equal zero. There is absolutely no role for goods and services trade here. *Capital flows set the currency price and then importers and exporters must transact at that price.*

[5]Harvey 2004 offers empirical evidence for the fact that currency market participants are less willing to commit funds under conditions likely to reduce their levels of confidence.

Trade theory

Post Keynesian and other heterodox authors have also established an alternate trade theory. They have made a strong case that it should be based on absolute advantage, technology gaps, value chains, and vertically-integrated labor costs (Cagatay 1994, Davidson 2015, Milberg and Winkler 2013, Vieira and Elmslie 1999). This alternative to the Neoclassical comparative advantage/Heckscher-Ohlin-Samuelson approach not only boasts a well-developed theoretical foundation, but there is also considerable empirical support. Just as with domestic macro and micro analyses, one comes to very different conclusions when market efficiency, full employment, and perfect foresight or risk are not simply assumed at the outset. Among the lessons of Post Keynesian trade theory is that one should not expect the economy to automatically resolve trade deficits and surpluses (a la Neoclassicism). Rather, they can remain indefinitely and are a function of nations' absolute, not comparative, advantages.

It may be easiest to explain the Post Keynesian alternative by starting with the standard theory. As is well known, the core of the Neoclassical approach is Ricardian comparative advantage. The key lesson is that absolute advantages are irrelevant and only opportunity costs matter. Because of this, free trade is always the optimal policy for both countries. If one nation has the absolute advantage in both goods, the other will still be able to export that at which their disadvantage is less, and in sufficient volume to generate balanced trade.

Of course, consumers and firms do not calculate comparative advantage when they are shopping, they merely look at the price. Hence, it must be possible to express Ricardo's theory in those terms. Table 1 does just that, showing autarkic cost/unit conditions in England and Portugal for wine and cloth. Initially, Portugal will export everything and England nothing. As

full employment is already assumed, however, the only effect is a rise in the money supply and prices in Portugal and a fall in both in England. If these adjustments are proportional, England should eventually catch up with Portugal in wine since that is where the latter's advantage was the smallest (the cost of producing wine in Portugal was 1/2 of England, but 1/5 in cloth).

Table 1: Autarkic Cost/Unit.

	England	Portugal
wine	£10	£5
cloth	£5	£1

According to the theory, this process should eventually lead to a situation like that shown in Table 2 (for simplicity, I have left Portugal's costs constant and adjusted only England's). This now allows England to export wine. If this has restored balanced trade, then we are done. If not, English costs continue to fall until that is the case.

Table 2: Post-Trade Cost/Unit.

	England	Portugal
wine	£4.99	£5
cloth	£2.495	£1

It is via this process that Neoclassicals explain both the tendency of economies to move toward balanced current accounts and the unqualified benefits of free trade (which holds in this case despite the fact that everyone is now forced to drink English wine!).

Post Keynesians and others have asked, however, what happens if we suspend the assumption of full employment? The first and frankly insurmountable problem is that since

opportunity costs do not exist at less than full employment, neither does comparative advantage.[6] There is absolutely no basis for making the necessary calculations since one can make more wine without giving up any cloth, and vice versa. But even if we forgive this serious flaw, more problems remain. For example, in the above scenario, what if the result of the English inability to export after opening trade is unemployment rather than deflation? England might never become competitive in either good and simply end up mired in a slump. This is even more likely if their erstwhile comparative advantage good experiences increasing costs. Were this true of wine (perhaps because land useful for growing grapes is in limited supply), then it may be impossible for England to accommodate the new, larger market in a cost-effective manner. This problem is compounded if cloth production experiences decreasing costs. This, of course, describes the situation in which many developing nations find themselves when all they can export are primary goods while developed nations can export manufactured or technological ones.

The consequence of all this is that, while it might be possible for comparative advantage to remain relevant under special circumstances, generally speaking it is absolute advantage that drives trade flows. In this simple example, nations with lower costs enjoy current account surpluses; those with higher suffer deficits. There is no force driving us toward balanced trade and England finds itself at an increasing economic and no doubt political disadvantage to Portugal.

This begs the question of what causes cost differentials in the first place. This is a complex question from the Post Keynesian perspective as not only are factors beyond capital and

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[6]Prasch 1996 reviews an entire series of problems with the theory of comparative advantage.

labor considered, but non-price competition is also seen as key. In addition and in contrast to the Orthodox approach, the source of the differentials that determine trade flows are not assumed to be derived from nature à la Heckscher-Ohlin. Rather, agents will actively innovate in an attempt to develop and maintain advantages. Furthermore, the character of trade has changed dramatically as global value chains have come to dominate. Accompanying the latter have been a shift from trade in goods to trade in tasks and an increase in the importance of lead firms' behavior in those chains in setting the strategies followed. The assumption of perfect competition is also rejected. My review will not include all these factors but give enough to get a sense of the Post Keynesian approach (see Milberg and Winkler 2013 for a much more comprehensive treatment).

Marxist theory emphasizes labor costs as the key determinant of absolute advantage and, while there are clearly many differences between their approach and ours, William Milberg argues that "for the purposes of international trade theory the commonalities dominate the differences" (Milberg 1994: 219). Taking Anwar Shaikh and Rania Antonopoulos as representative, they model competitiveness as a function of the "vertically integrated labor cost of the *regulating* producer" (Shaikh and Antonopoulos 1998).[7] Essentially, the lower those costs, the more likely a nation will be able to run a trade surplus. Nor does this advantage automatically diminish over time. Rather, they argue that real exchange rates come to rest at levels that maintain them: "This determination of real exchange rates through real unit costs allows one to

[7]Though this particular paper is focusing on exchange rates, their ultimate goal is to explain why these do not automatically adjust to generate balanced trade and hence the latter plays a key role. By regulating producer they mean the best-practice producer. In other words, the relevant cost for market competition is that generated by the most efficient firm.

explain why trade imbalances remain persistent" (Shaikh and Antonopoulos 1998). Post Keynesians have adopted part of this approach, agreeing in principle that the cheaper a nation's labor (and other factors of production), the more likely it will run a trade surplus. This would imply that in Table 1 above, for example, unit labor (and other) costs must be lower in Portugal than England.

That said, this may not be a cause for celebration in Portugal for, as suggested earlier, the existence of global value chains has changed the nature of trade from being focused on goods to tasks (Milberg and Winkler 2010: 2). It is quite possible that the only role Portugal is playing is in providing the labor necessary to produce wine and cloth and that international competition among laborers may have forced wages, along with working conditions, to very low levels. This is very much like the situation in which we find ourselves today, particularly in the wake of the near doubling of the world's labor supply following "The collapse of the Soviet Union and of communist governments throughout Eastern Europe and East Asia, the capitalist turn of communist China's economic plan, and even the opening of India's economy" (Milberg and Winkler 2013: 51). Combined with the fact that the dominant firms in the global value chains will actively and aggressively shop for the low-cost producer of their product, this has depressed working conditions worldwide. So far, it is not clear that it's better to be Portugal.

This is even more likely to be the case if the lead firms in the global value chain are based in London because they will have worked to retain the highest value-added stages for themselves, outsourcing the least profitable ones (Milberg and Winkler 2009). While this does not necessarily help English workers (though some may be in a position to benefit from low-cost imports from Portugal), it is a boon to owners of capital both in terms of financial profits and their ability to

maintain any technological advantages they have. Those who own the brand, organization, and intellectual property are best positioned to dominate the value chain and earn the lion's share of profits. This is a result of the global disaggregation of the production process and it has made it much more difficult to identify the winners and losers in the case of a chronic trade imbalance–though it might be safe to say that, in general, capital wins and labor loses. In the midst of all this, it is ironic (though not surprising) that there is also evidence that:

> ...more generous social spending and more cooperative labor relations are not uniformly associated with poor national performance in the international economy, and in some contexts—even in an era of globalization—are associated with improved international competitiveness (Milberg and Houston 2005: 158).

Unfortunately, it does not appear that this is generally recognized and pursued as part of a national strategy, at least not in the US and its imitators.

The above discussion alludes to but does not directly address the role of technology gaps. These are viewed, along with costs, as major drivers of trade flows (Milberg 1988). Proprietary knowledge not only affects who exports what (whether we consider that in terms of goods or tasks), but it determines the identity of lead firms in the value chain and the distribution of profits. In addition, technological advantages tend to be subject to cumulative causation and increasing returns. It would be difficult to explain the pattern of trade today without reference to these factors (Elmslie and Milberg 1996, Tebaldi and Elmslie 2013, Viera and Elmslie 1999)

This short survey suggests a much more complex but realistic version of trade than Ricardian comparative advantage combined with Heckscher-Ohlin. Absolute advantages, driven by cost and technological factors, play the dominant role; trade patterns are affected by lead-firm

strategies; labor operates at a disadvantage to capital; and trade imbalances can exist indefinitely. Clearly, determining the welfare effects of "free" trade are far more complex than argued in Neoclassicism.

The inconsistency

Though the above introductions are brief, they nevertheless suggest that the Post Keynesian theories of exchange rate determination and trade represent much more reasonable and realistic approaches than those found in Orthodoxy. Considered individually, they give the impression that we have accomplished a great deal in terms of developing viable alternatives to Ricardian comparative advantage and purchasing power parity. But, when considered together, problems emerge. As suggested earlier, perhaps the most fundamental is this: the exchange rate theory argues that capital flows drive the exchange rate which then determines trade flows; however, the trade theory says that those same trade flows are instead a function of absolute advantage and related factors and that currency prices and the capital account balance come to rest at levels consistent with that trade (im)balance. Which is it? Do capital flows determine trade flows or do trade flows determine capital flows?

One might be tempted to say that it is a bit of both, and there is some truth to that. But, leaving the story there would obscure some important and heretofore overlooked factors. In order to delve deeper, I will employ a framework that highlights the relationship between the balance of payments and currency prices (Harvey 2009a, chapter 4). Figure 1 shows a basic currency market diagram with quantity of foreign currency (Q of FX) on the horizontal axis and the price of foreign currency in domestic currency units ($/FX) on the vertical (assuming the US to be the

home country). The equilibrium is simply the intersection of the supply of foreign currency (S_{fx}) and the demand for foreign currency (D_{fx}). D_{fx} results from the US desire to buy foreign currency in order to purchase foreign goods, services, and assets and S_{fx} is a function of the foreign desire to acquire US currency in order to buy US goods, services, and assets. Since, in a closed system, the demand for one money is equal to the supply of the other and as demand is the action associated with specific economic activities while supply is simply a reflection of which currency one has in one's pocket, both curves will hereafter be treated as demand curves: $D_{\$}$ (= S_{fx}) and D_{fx} (= $S_{\$}$). This notation is used on Figure 1.

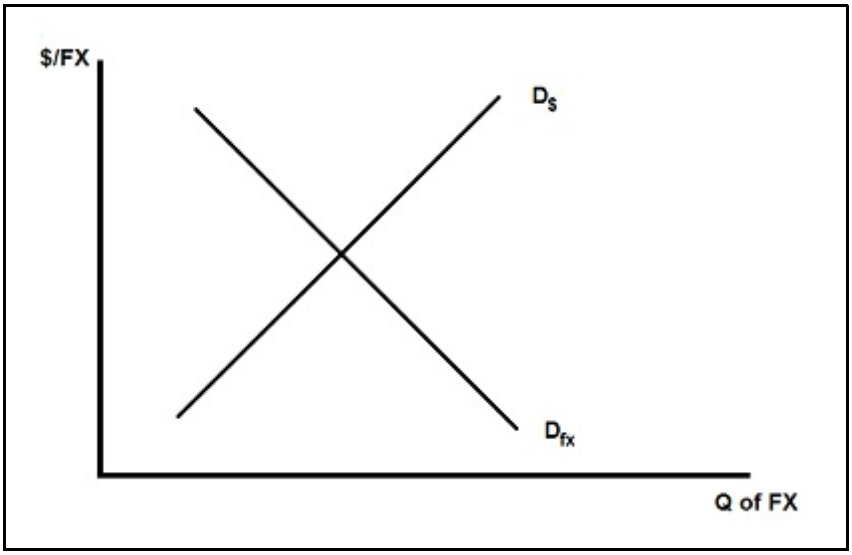

Figure 1: Simple currency market diagram.

In order to understand the relationship between the currency market and the balance of payments, the demand for each currency must be divided between that intended for use in the purchase of goods and services (current account) and that desired for the acquisition of financial assets (capital account). Figure 2 breaks D_{fx} into its component parts. $D_{fx}(M_{\$})$ shows the FX demanded by US citizens to buy foreign goods and services (where $M_{\$}$ is US imports) while the

total demand for foreign currency is $D_{fx}(M_{\$} + K^{o}_{\$})$. The difference between the two must therefore be the foreign currency used to buy foreign financial assets, or US capital outflows: $K^{o}_{\$}$ (US capital inflows would be $K^{i}_{\$}$). Note that $D_{fx}(M_{\$} + K^{o}_{\$})$ is flatter than $D_{fx}(M_{\$})$ on the assumption that, ceteris paribus, the quantity of foreign capital demanded is higher as the price of foreign currency falls.

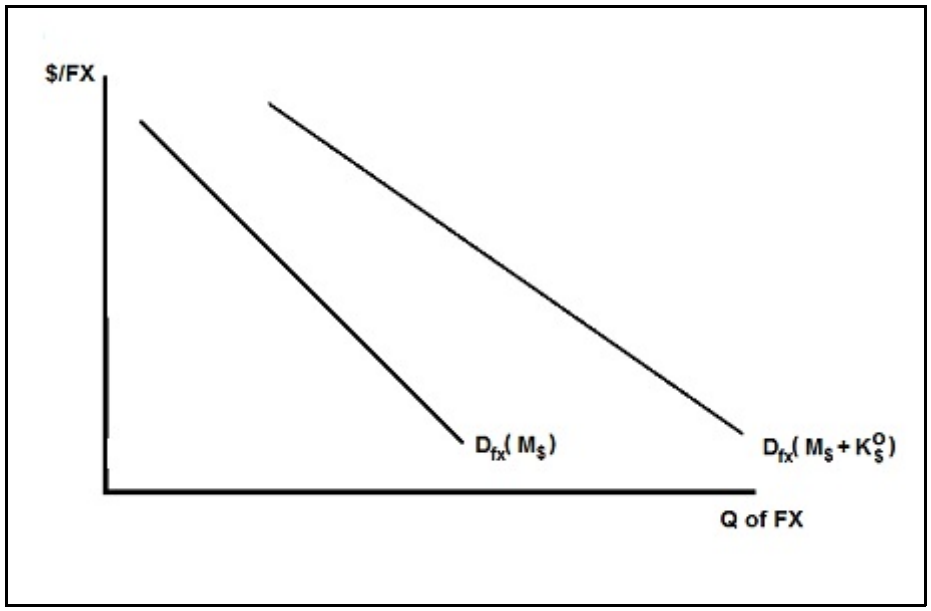

Figure 2: Breakdown of demand for foreign currency.

Figure 3 shows the demands for both currencies divided between the two types of transactions. BTER is the balanced trade exchange rate. If the exchange rate were, by chance, at that level, then the quantity of dollars demanded to buy US goods and services (US exports) would be exactly equal to the quantity of foreign exchange demanded by Americans to buy foreign goods and services (US imports). In other words, trade would be balanced. This is, according to Neoclassicism, the only long-run equilibrium position for the exchange rate. That is not the case here, however, as $D_{\$}(X_{\$})$ and $D_{fx}(M_{\$})$ do not represent the total demands for

currency. Those are $D_{\$}(X_{\$} + K^{i}_{\$})$ and $D_{fx}(M_{\$} + K^{o}_{\$})$. On Figure 3, US exports are on the line segment ab, US imports are ac, US capital inflows are bd, and US capital outflows cd. Note that it is easily shown that the US trade deficit is precisely the same size as the US capital account surplus–indeed, they are the same line segment (bc).

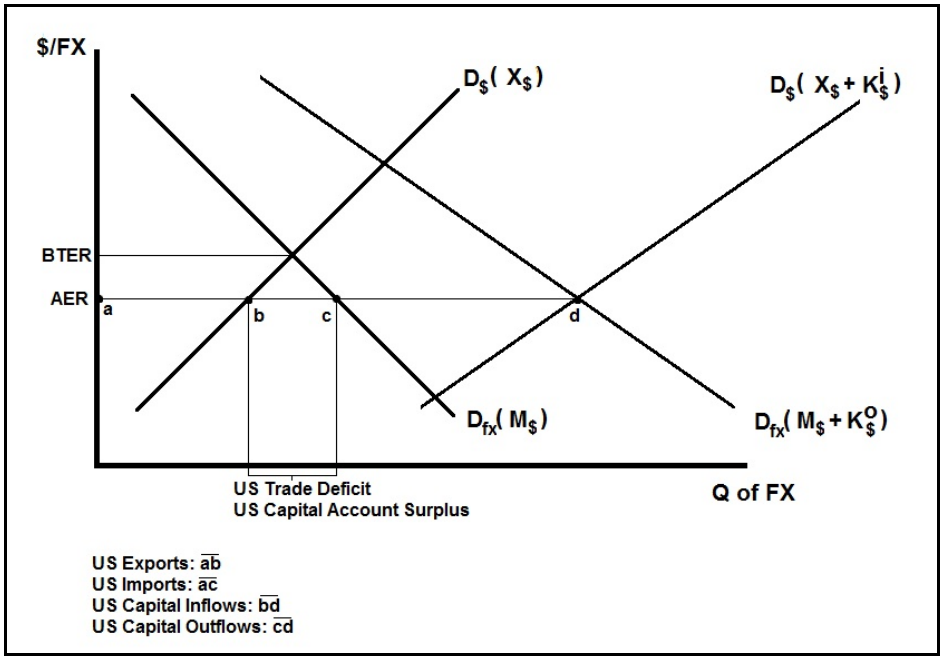

Figure 3: Currency market diagram, US trade deficit.

This, of course, leaves open the question of what caused the imbalance in the first place–did capital flows set the exchange rate which then determined trade flows, or did absolute advantage determine the trade balance to which capital flows and the exchange rate then adjusted? Consider first the Post Keynesian exchange rate theory by itself. This is shown in Figure 4. All trade flows have been omitted on the assumption that Post Keynesian exchange rate theorists do not consider them relevant to the determination of currency prices. Rather, they believe that whenever expected overall rates of return from holding particular currencies are not

equal this causes net capital flows which continue until those rates of return are equal again (primarily via changes in the spot price). At that point, the capital account returns to balance and $r_{\$} = r_{fx}$. Therefore, in equilibrium, the actual exchange rate (AER) must be the same level as that which will generate a balanced capital account (BKER). If AER > BKER, then $r_{\$} > r_{fx}$ and the US will experience net capital inflows and a dollar appreciation until AER = BKER and $r_{\$} = r_{fx}$; if AER < BKER, then $r_{\$} < r_{fx}$ and the US will experience net capital outflows and a dollar depreciation until AER = BKER and $r_{\$} = r_{fx}$.

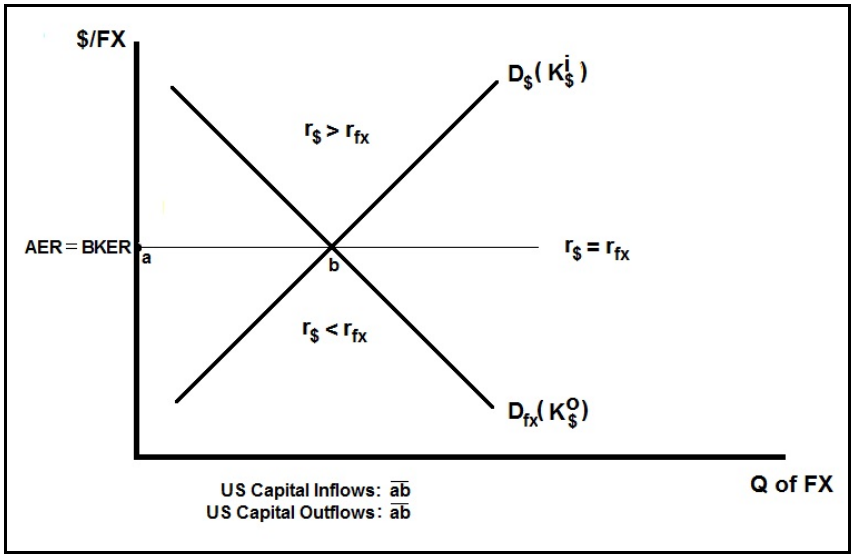

Figure 4: Post Keynesian exchange rate theory.

This brings us to a very important and problematic conclusion: by itself, Post Keynesian exchange rate theory predicts that currency prices will be driven to the level that guarantees $r_{\$} = r_{fx}$, which also guarantees a balanced capital account. *And if the capital account is balanced, so is trade*. This is the inescapable conclusion of limiting the currency price determinants as indicated. While it might seem unfair to do this when no scholars in this area have ever made the argument

that they expect the trade or capital balance to equal zero, then neither have they explained why this would not happen. If we are to take Andrade, Harvey, Kaltenbrunner, Prades, and others at their word, we are left with Figure 4 and a real problem in terms of explaining what we observe in the real world.

Meanwhile, a similar problem exists in the trade theory. To start, take the situation illustrated in Figure 5. Assume that by coincidence, the actual exchange rate (AER) equals the one that generates balanced trade (BTER), with both US imports and US exports as line segment ab. Now say that foreign exporters develop an advantage that makes them more competitive. This would raise US imports at every exchange rate, shifting $D_{fx}(M_{us})$ to the right and, according to the theory, create a US trade deficit. This is illustrated in Figure 6 and while $D_{fx}(M_{us})$ does, indeed, shift, *trade stays balanced*. This is so because US importers, in competition for the limited supply of foreign currency, cause the price of the latter to rise until we have balanced trade once again but at a new and different exchange rate (AER' = BTER'). Clearly, something is missing here, too.

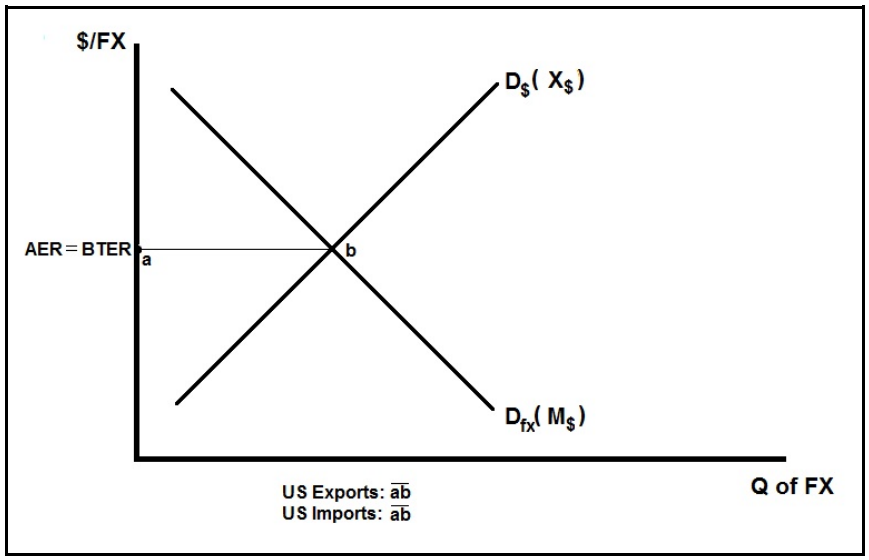

Figure 5: Post Keynesian trade theory, balanced trade.

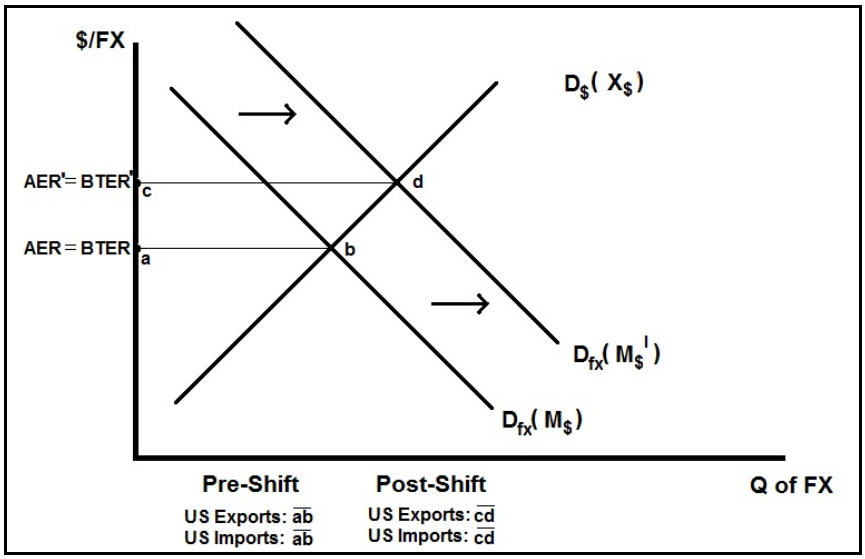

Figure 6: Post Keynesian trade theory, increase in competitiveness of foreign goods and services.

To their credit, this has not gone unnoticed by Post Keynesian trade theorists. Unfortunately, no convincing explanation has yet been devised. Some have followed the Marxists' lead and suggested the following line of causation: trade deficits lower domestic liquidity, thereby raising relative interest rates and attracting the funds necessary to finance the imports (Milberg 1994, Milberg and Winkler 2013: 81, and Shaikh 2013). In this scenario, they argue that what we would witness is something closer to Figure 7. There, after the rightward shift in $D_{fx}(M_{us})$ discussed above, the US trade deficit (be) would cause rising interest rates, attracting the capital inflows ($K^{i}_{\$}$) necessary to finance it. The final result is a US trade deficit of line segment be and a capital account surplus of the same size. BTER still adjusts but AER remains stable.

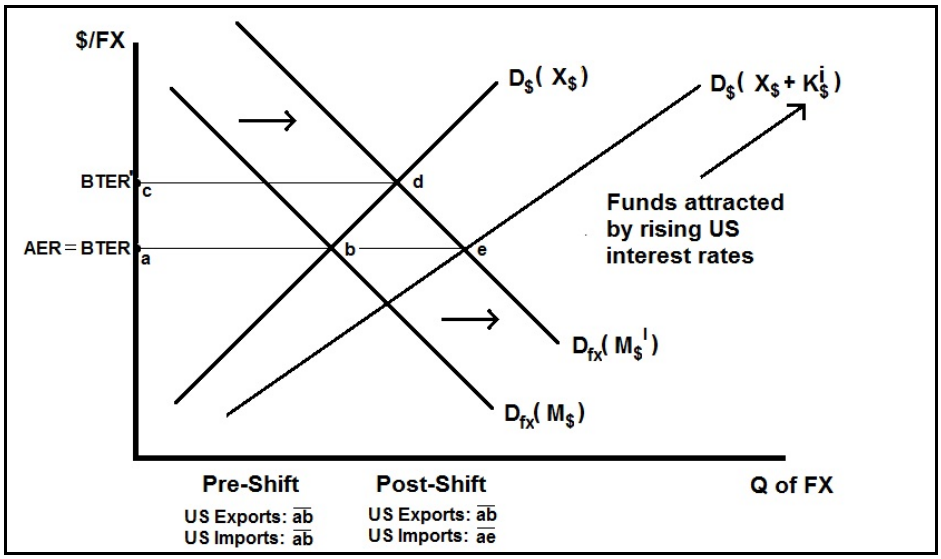

Figure 7: Post Keynesian trade theory with a US trade deficit causing rising US interest rates, thereby attracting the funds that finance the trade deficit.

Shifting the focus away from a Humian price-specie flow mechanism and toward the financial system is definitely an improvement. However, while this solves one problem, it creates two others. First, in a school of thought that emphasizes endogenous money and central bank targeting, there is absolutely no reason to assume that interest rates would behave in this manner. We do not witness higher interest rates in trade deficit countries because, for all intents and purposes, interest rates are exogenous variables set by the monetary authority. As suggested above, central banks can and do sterilize inflows and outflows (Lavoie 2002-3 and 2000). If they do not, this represents a conscious policy choice. In short, while one can imagine circumstances under which trade imbalances might have the impact suggested, this is in general a very poor explanation.[8]

[8]To be fair, it is clear from the tone of his occasional references that Milberg is not nearly as convinced that this represents a defensible explanation.

The second problem is the inconsistency with the exchange rate theory argument summarized in Figure 4. There, any capital account imbalance represents disequilibrium. If net capital flows were initially zero in Figure 5 (pre-shift), then any rise in the rate of interest used to explain events in Figure 7 has caused $r_{\$} > r_{fx}$ (recall that r is not the interest rate, but the overall expected return of which the interest rate is one determinant). While this creates the net US capital inflows necessary to support the US trade deficit, Post Keynesian exchange rate theorists would then be forced to argue that the market is no longer in equilibrium and will not be until $r_{\$} = r_{fx}$. This would eliminate both the current and capital account imbalances.

Therein lies the problem. Post Keynesian trade theory argues that trade imbalances are persistent and caused by differences in absolute advantage. However, you cannot have a trade imbalance if net capital flows equal zero, and Post Keynesian exchange rate theory maintains that the latter will prevail in equilibrium.

The missing link

A logical explanation exists, however, one that not only preserves the key predictions of each theory but does so by drawing on another well-established Post Keynesian theory. Ironically, it has been the Neoclassicals who have been active in highlighting its role (though without realizing its wider significance). Consider the following passage from an IMF report (the first sentence of which sounds very Post Keynesian!):

> Exchange takes time. For example, when a seller receives a purchase order that stipulates payment after delivery, the seller has to produce and ship a product before the buyer pays. This requires financing over short horizons because the

> seller may need to borrow working capital to complete the order or may purchase credit insurance to protect against counterparty defaults. That is the essence of trade finance. It is often described as the lifeline of business transactions because more than 90% of transactions involves some form of credit, insurance or guarantee (International Trade Center, 2009) (Ahn 2011: 3).

In short, trade finance is endogenously created. Those seeking to import goods and services do not compete for a limited supply of foreign currency. If they did then that would, indeed, lead to the situation illustrated in Figure 6 where we move from one position of balanced trade to another despite any changes in competitiveness.

While such a scenario is not impossible, it is exceedingly unlikely. The far more typical situation involves exporters and financial institutions extending credit–brand new currency–to importers. This means that, generally speaking, the supply of currency rises along with the demand and thus autonomous changes in trade flows have little impact on the exchange rate. In such a world, when there is an increase in the competitiveness of foreign goods, the foreign trade balance improves. This is illustrated in Figure 8. Just as in Figure 7 (where funding had been attracted by rising US interest rates), transactions on the new $D_{fx}(M_{\$}')$ take place at the same actual exchange rate (AER) as on the old $D_{fx}(M_{\$})$ because $K^{i\$}$ has been added to the demand for the dollar (which in this instance might be better imagined as the supply of foreign currency, though technically it makes no differnce). Only the exchange rate at which balanced trade would occur has changed (from BTER to BTER'). The US therefore ends up with a trade deficit of be. (Note that only the net financing necessary for the imbalance is shown on Figure 8, not the gross flows. This will be relaxed later.)

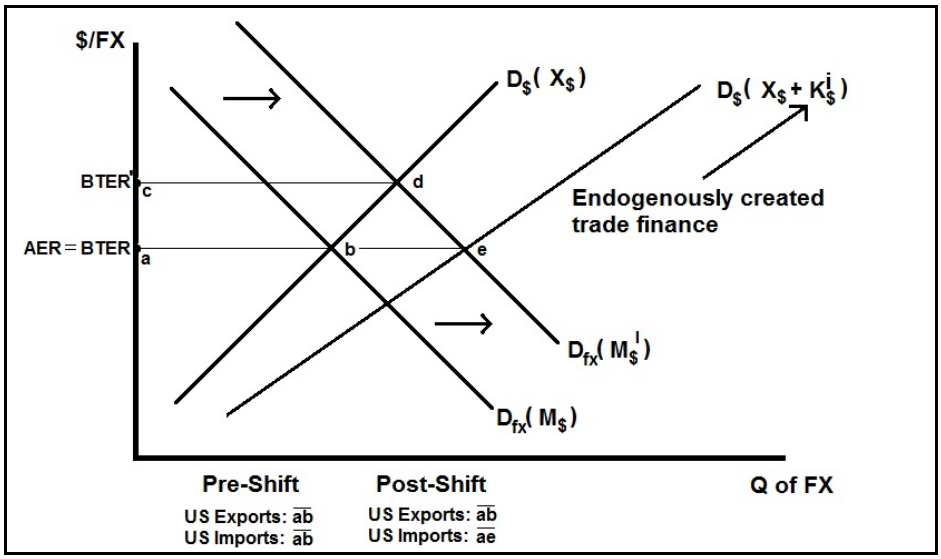

Figure 8: Post Keynesian trade theory with the trade deficit financed by endogenously created credit.

As suggested above, a wide range of mainstream publications, from scholarly to those of international organizations, have pointed to the key role played by trade finance. That this has become a topic of interest is a function of their well-founded belief that part of the post-Financial Crisis collapse in international trade was caused by a shortage of trade credit (Ahn 2011, Amiti and Weinstein 2011, Auboin 2011, Auboin and Engemann 2014, Chor and Manova 2012, Contessi and de Nicola 2012, World Bank 2011). This raises another important point for the Post Keynesian approach: there is no reason to believe that every firm wishing to access finance will actually succeed and therefore $D_{\$}(X_{\$})$ and $D_{fx}(M_{\$})$ must be drawn to reflect this. Everything else being equal, they would shift left when credit is tight and right when it is easily available. In Figure 8, for example, the rightward shift in $D_{fx}(M_{\$})$ is not simply the new quantity demanded by US importers, but that which they could actually finance. Just as with domestic consumption and investment, $D_{\$}(X_{\$})$ and $D_{fx}(M_{\$})$ will only shift as far as banks as let them.

Post Keynesian trade theory is thus rescued without resort to any questionable premises or

mechanics. Indeed, the answer is drawn from a well-established literature. Offsetting capital account imbalances come into existence because they are created in the process of negotiation among firms. If credit is not forthcoming, the trade flow does not take place. This does not deny the possibility that competition for foreign currency resulting from the rightward shift in $D_{fx}(M_{us})$ in Figures 6, 7 ,and 8 could drive up the price of foreign currency, thereby offsetting the increase in competitiveness. However, were this a significant factor then we would not witness such large and stubborn trade imbalances in the real world. Instead, in our endogenous-trade finance world, Post Keynesian trade theorists are right: ceteris paribus, an increase in competitiveness leads to an improvement in the current account.

An open question remains, however. Even if the above is accepted as reasonable, what is driving the actual exchange rate (AER) on Figure 8? One could contrive various ad hoc explanations, but something systematic must be taking place, and indeed it is. It was already explained in Figure 4. Currency values are determined by the international market for financial capital. The process that drives $r_{\$} = r_{fx}$ also sets the spot price of foreign exchange, and it is at this price that importers and exports must transact. In that sense, the story told by Post Keynesian exchange rate theorists is also correct. Where they are wrong, however, is in treating all capital flows the same for if we do so then we must come to the conclusion that the capital account–and the current–must be in balance once $r_{\$} = r_{fx}$ (also as shown on Figure 4). This reintroduces the problem supposedly resolved above.

But the flows created by the financing of world trade are only tangentially related to those dominated by agents seeking short-term capital gain. Post Keynesian exchange rate theory only explains the latter. What is portrayed on Figure 4 is the result of portfolio managers struggling to

position themselves to best profit from future currency fluctuations and the own-price movements of international financial assets. *It does not include capital flows that result from the extension of credit to importers.* To take this into account it is necessary to differentiate between the different types:

(5) $K^{i\$} = tK^{i}_{\$} + sK^{i\$}$

(6) $K^{o}_{\$} = tK^{o}_{\$} + sK^{o}_{\$}$

where tK is that associated with financing trade and sK is related to speculative financial flows. Seen this way, all that Post Keynesian exchange rate theory is arguing is that in equilibrium it must be true that $sK^{i}_{\$} = sK^{o}_{\$}$. However, there is no reason to believe that $tK^{i}_{\$} = tK^{i\$}$, which further means that it is possible for $K^{i}_{\$} \neq K^{o}_{\$}$–a necessary condition for trade imbalances to exist.

Taking this further, equation (7) shows what must be true in equilibrium for the currency market in aggregate. The total quantity of foreign currency supplied (by foreigners wishing to buy US goods, services and assets or to finance US purchases of their products) must be equal to that demanded (by US agents wishing to buy foreign goods, services and assets or to finance foreign purchases of US products):

(7) $X_{\$} + tK^{i\$} + sK^{i}_{\$} = M_{\$} + tK^{o}_{\$} + sK^{o}_{\$}$.

Since the exchange rate theory dictates that $sK^{i}_{\$} = sK^{o}_{\$}$, then it must also be true that:

(8) $X_{\$} + tK^{i\$} = M_{\$} + tK^{o}_{\$}$.

Rearranging shows that the trade imbalance must be equal to the excess of financing:

(8') $X_{\$} - M_{\$} = tK^{o}_{\$} - tK^{i}_{\$}$.

In other words, the amount by which US exports exceed US imports must be equal to the extra credit extended to those foreign importers. This must be the case because if not, then at least

some foreign importers were competing for a fixed supply of dollars, thereby causing a dollar appreciation, a fall in US exports, and a rise in US imports. This would continue until the condition shown in (8') prevailed.

The complete model with endogenous trade finance

With this simple adjustment everything falls into place. It is now possible for absolute advantage to be a determining factor in trade flows while at the same time autonomous international financial capital flows set currency prices. Net capital flows are still driven toward zero, except for those associated solely with the financing of current account. Since the latter do not need to be equal, trade can be imbalanced in equilibrium. Figure 9 offers an illustration of this new approach. Here, as a starting point, all accounts are shown in balance with the actual and balanced-trade exchange rates equal. It does add, however, a new set of curves that include the capital flows related to trade finance, $D_{\$}(X_{\$} + tK^{i}_{\$})$ and $D_{fx}(M_{\$} + tK^{o}_{\$})$, which puts us in a position to finally answer the question posed in the introduction: are trade imbalances a result of differences in absolute advantage or do they occur when currency prices are moved away from balanced-trade levels by autonomous portfolio capital flows?

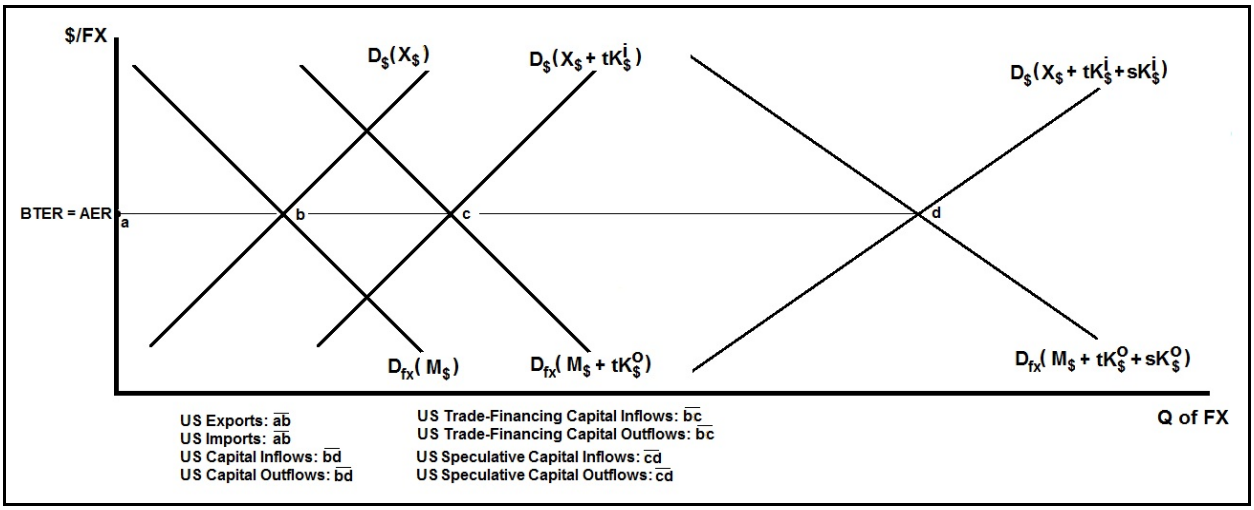

Figure 9: Complete Post Keynesian model, balanced trade.

To look at the first half of this, Figure 10 takes Figure 9 and assumes an increase in competitiveness on the part of foreign exporters. Figure 8 already showed one version of this but prior to the introduction of the complete background and terminology. Figure 10 thus expands Figure 9 but differentiating between both kinds of capital flows.[9] Unfortunately, this makes it rather cluttered as it now has six functions in initial positions and proceeds to shift five of them! In order to improve readability, shifted curves are in grey and labels on curves that later shift are in a noticeably smaller font. Given this, just as on Figure 8, the increase in foreign competitiveness shifts $D_{fx}(M_{\$})$ to the right. This (again as in Figure 8) moves the balanced-trade exchange rate to BTER'. But, because new financing ($tK^{i}_{\$}$) is forthcoming, which shifts $D_{\$}(X_{\$} + tK^{i}_{\$})$ by the same amount, the actual exchange rate does not move.[10] The US has a trade deficit of

[9]Note that the trade-financing capital flows are drawn parallel to the trade flows on the assumption that changes in the price of foreign currency would have no effect (though it clearly would on the trade flows themselves).

[10]The latter actually results specifically because $D_{\$}(X_{\$} + tK^{i}_{\$} + sK^{i}_{\$})$ and $D_{fx}(M_{\$} + tK^{o}_{\$} + sK^{o}_{\$})$ shifted the same distance, but for the identical reason: $M_{\$}$ and $tK^{i}_{\$}$ shifted by the same amount.

line segment bc and this is matched by trade-financing capital account surplus of bc. While five curves have shifted, only two variables changed: $M_{\$}$ and $tK^{i}_{\$}$, the latter in order to finance the former. Significantly, the increase in foreign competitiveness did just what Post Keynesian trade theorists would predict: it created an equilibrium trade deficit for the US.[11]

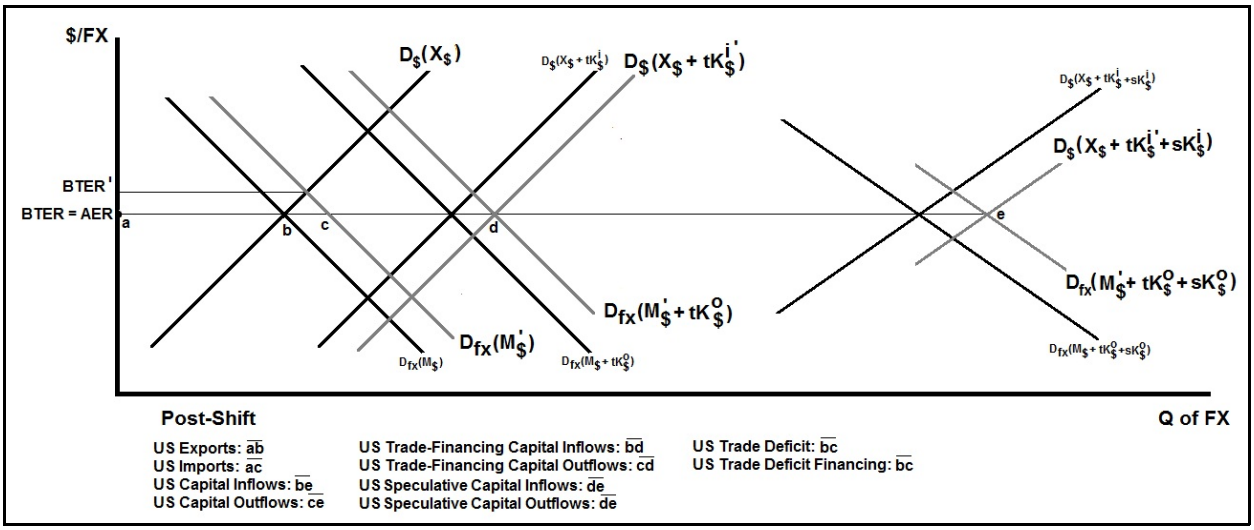

Figure 10: Complete Post Keynesian model, increase in foreign competitiveness.

Figure 10 appears to answer the original question as follows: trade imbalances occur as a result of differences in absolute advantage. Because an increase in competitiveness does not lead to an offsetting currency appreciation as in Neoclassicism, it causes a once-and-for-all change in the trade balance. But that is not the whole story for, while trade flows have little impact on the exchange rate, the reverse is not true. This is shown in Figure 11. This also assumes that we start with the same situation as in Figure 9. Rather than an increase in foreign competitiveness, however, there is a rise in the foreign interest rate. This then causes $r_{fx} > r_{\$}$ at the original actual

[11]Had some portion of the imports not been financed then either $D_{fx}(M_{\$})$ would not have have shifted as far to the right or those US importers would have, indeed, had to compete for foreign currency, thereby causing the actual exchange rate to appreciate.

exchange rate (AER), meaning that speculative capital flows to the rest of the world increase. This is shown by a rightward shift in $D_{fx}(M_\$ + tK^o_\$ + sK^o_\$)$, where the responsible party is the last variable. Note that in keeping with the method adopted in Figure 10, the initial labeling of curves that shift is in a smaller font and shifted curves are shown in grey.

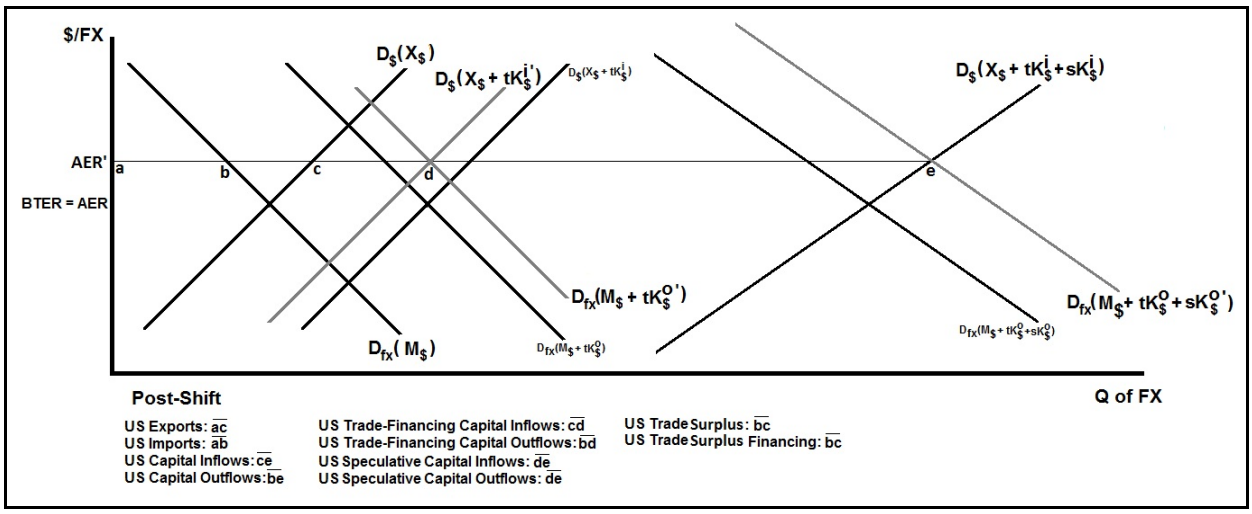

Figure 11: Complete Post Keynesian model, increase in foreign interest rates.

The key question here is whether or not the pattern of trade can be affected by something other than absolute advantage. The answer turns out to be yes. As shown here, the depreciation of the dollar from AER to AER', which was caused by the rise in foreign interest rates, led to a US trade surplus of line segment bc. As the financing needs for US exports rose, so $tK^o_\$$ increased and $D_{fx}(M_\$ + tK^o_\$)$ shifted to the right. Meanwhile, as those for US imports fell, $tK^i_\$$ decreased, shifting $D_\$(X_\$ + tK^i_\$)$ to the left. Had these movements (the magnitudes of which depend on various elasticities and credit conditions) not left $sK^i_\$ = sK^o_\$$, then the exchange rate would have continued to adjust until that was the case.

This then makes a case for two forces determining trade balances: absolute advantage

(and related factors) and autonomous speculative capital flows driving currency prices away from balanced trade levels. Both are relevant and important and we have witnessed distinct instances of each in the real world. Many nations, especially in Asia, have pursued policies designed to improve their international competitiveness and have enjoyed trade surpluses as a result. While China may be the most outstanding example (see Felipe, Kumar, Usui, and Abdon 2013, Lo and Li 2007, Rima 2004), many others exist (Barnes, Kaplinsky, and Morris 2004, Felipe, Kumar, and Abdon 2013, Hopewell 2016, Schneider 2007, Tomer 1987). Not that a competitive advantage has to emerge from industrial policy. Certainly, Saudi Arabia's persistent trade surplus is not a result of policy makers simply deciding to develop an oil industry. It is nevertheless more significant for policy that, according to Post Keynesian trade theory, the conditions do, indeed, exist under which one may be able to engineer a current-account surplus. And the exchange rate theory is finally supportive of such a view.

That said, currency prices matter and there is nothing forcing them to conform to nations' absolute advantages such that low-cost countries enjoy trade surpluses and vice versa.[12] This means that, in the trade example in Table 1, it is possible for Portugal's currency to have been driven to such heights by speculative capital flows that either its trade surplus is reduced or it even experiences a trade deficit. Though the fact that trade flows tend to be price inelastic would reduce the impact of this factor (something that global value chains and the oligopolistic nature of exporters is likely to made even more true), the are not talking about small changes in currency prices. Foreign exchange rates are extremely volatile and over a wide range. In addition,

[12]See Leigh, et al., for an comprehensive and particularly well-designed review of the impact of exchange rates on trade flows (2015).

the fact that many countries (particularly in Asia) are apparently pursuing a national strategy aimed at keeping the value of their national currency low also suggests that this is significant (Filardo and Grenville 2012).

Conclusions

The basic inconsistency between Post Keynesian trade and exchange rate theory has been a long-standing and nagging issue. Though perhaps only well known to those actively involved in developing these alternatives, it was fundamental. Furthermore, closer inspection revealed even more problems. Hopefully, the incorporation of endogenous money has gone a long way toward resolution. What would be particularly satisfying would be an empirical study that broke down the various flows. Unfortunately, not only are the lines of causation very blurry, but it is not evident that the necessary data even exist (see Bull and Miles 1978 for an outstanding analysis of the relevant issues). We may not be able to hope for much more than some case studies. Fortunately, however, the idea that production takes time and credit is hardly a new one in our school of thought. Perhaps this is, indeed, the answer to the puzzle.

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