Exchange Rates and Trade Flows:
A Post Keynesian Analysis

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Summary: The Post Keynesian approach assumes that currency prices are determined in the market for financial capital and that trade flows do not tend toward balance. It is further assumed that income effects are more important in determining the current account than are price effects. Thus, this lecture develops a model that shows a simple currency market and its interaction with net exports.

Learning Objectives: By the end of this lecture, the student should be able to:

- explain (graphically and verbally) the role of interest rates in the determination of exchange rates
- explain (graphically and verbally) the role of currency-market participants' expectations in the determination of exchange rates
- explain (graphically and verbally) the role of national price levels, national income, and exchange rates in the determination of the balance of payments

Expected Student Background: This lecture is aimed at upper-level undergraduate students, typically those enrolled in a course on international economics or finance. It is assumed that they understand basics regarding exchange rates and the balance of payments. It is not assumed that they have learned any other theories of exchange rate determination to this point.

Preliminary Comments to Instructor: Post Keynesian economics is based on the premise that the theories put forward in Keynes' *General Theory* represent the most useful way of understanding the macroeconomy (his theories are not to be confused with "Keynesian" economics, which is really another branch of Neoclassicism). Post Keynesianism is marked by a heavy emphasis on real-world applications, the lack of any assumption that the economy tends toward full employment (in the short or long run), and strong skepticism regarding the efficiency and rationality of financial markets. Markets are seen as tools that may provide useful solutions in some contexts but which may need to be regulated or abandoned in others.

Expected Duration: This lecture should require roughly three 60-minute class meetings.

Lecture:

1. Introduction

The most common approaches to exchange rate determination have assumed a strong relationship between currency prices and trade flows. In them, the latter are seen as the most important determinant of the former, and the former are thought to have the most important affect on the latter. Based on these assumptions, these models argue that the currencies of trade deficit countries tend to depreciate and those of trade surplus countries tend to appreciate. They thereby come to the conclusion that exchange rates are automatically drawn to the level that yields a balanced current account.

And, yet, real-world trade relations are marked by large, long-lasting trade imbalances that appear to be terribly resistant to exchange rate movements, but very sensitive to national business cycles. The Post Keynesian approach yields predictions consistent with these observations.

2. The Currency Market

There are only two reasons to purchase foreign exchange: to buy foreign goods or services (imports) or to buy foreign assets (including both speculation and direct investment). The demand for foreign currency rises whenever the demand for either of these two rises and, ceteris paribus, that currency will appreciate. The relationships can be expressed as follows:

$$(1) \qquad \$/FX = f(X_{\$}, M_{\$}, K^{I}_{\$}, K^{O}_{\$})$$
$$\qquad\qquad\qquad\quad - \quad + \quad - \quad +$$

where \$/FX is the price of foreign currency as measured in dollars, $X_{\$}$ is US exports, $M_{\$}$ is US exports, $K^{I}_{\$}$ is US capital inflows (sales of US assets to foreigners), and $K^{O}_{\$}$ is US capital outflows (purchases of foreign assets by US agents). Signs under the variables indicate their effect (ceteris paribus) on the exchange rate. For example, a rise in US exports means an increase in the demand for the dollar, which leads to a dollar appreciation (fall in \$/FX, since a stronger dollar means fewer need be exchanged for a unit of foreign currency); a rise in $K^{O}_{\$}$ means a dollar depreciation (rise in \$/FX); and so on.

A change in any one of the four variables on the right-hand side of equation (1) will lead to a change in the rate as which currency is exchanged. The most popular theories in economics (Purchasing Power Parity, the Monetary Approach, and the Dornbusch Approach) all focus is on the role of $X_{\$}$ and $M_{\$}$ to the almost complete exclusion of $K^{I}_{\$}$ and $K^{O}_{\$}$. Yet, in the real world, capital flows outweigh trade flows by a factor of around ten-to-one. Unless capital flows are white noise or arise only in response to changes in $X_{\$}$ and $M_{\$}$, this emphasis is misplaced. This is precisely what Post Keynesians argue,

saying that while trade flows certainly have some impact on currency prices, it is very minor. In fact, the strongest link between trade flows and exchange rates tends to be via the capital market, when international investors take the periodic announcements of trade balances as a sign of future asset deprecation or appreciation. Yet even this is sporadic, as the market may completely ignore trade flows for long periods of time. In the Post Keynesian view, capital flows rule the roost by driving currency prices to the level to which trade flows must then adjust.

For this reason, rather than abstracting away from the roles of $K^I_\$$ and $K^O_\$$ in equation (1), which is the most common approach in explaining exchange rates, Post Keynesians abstract away from $X_\$$ and $M_\$$ (to reiterate, this is not because they believe that trade flows play no role, but that it is sufficiently minor to allow us to ignore it). That leaves us with the following characterization:

$$(1') \qquad \$/FX = f(K^I_\$, K^O_\$)$$
$$\qquad\qquad\qquad\quad - \quad +$$

Exchange rates are driven by capital flows. The begging question now is, what drives capital flows, and in particular financial ones (since these are much larger than direct investment)? It should be noted here that Post Keynesians do not regard the market for portfolio capital as being rational, optimal, or efficient. It is marked by uncertainty and is typically dominated by speculation (forecasting the psychology of the market) rather than enterprise (forecasting the future profitability of the entities issuing the assets). A deeper analysis is unnecessary at this stage, but may be useful as a follow up to this lecture.

While a wide range of factors may affect international financial capital flows, two stand out: interest rates and currency price forecasts. Basically, agents prefer assets that earn more interest and which are denominated in currencies that they expect to appreciate. This is shown in equation (2):

$$(2) \qquad (K^I_\$ - K^O_\$) = f(r_\$, r_{FX}, (\$/FX)^e)$$
$$\qquad\qquad\qquad\quad + \quad - \qquad -$$

where $(K^I_\$ - K^O_\$)$ is net capital flows into the US, $r_\$$ is the US interest rate, r_{FX} is the rate fo interest available on assets denominated in foreign currency, and $(\$/FX)^e$ is market participants' forecast of the exchange rate. As $r_\$$ rises, agents buy US assets and net capital flows into the US rise; as r_{FX} rises, foreign assets become more attractive and net flows into the US fall; and as $(\$/FX)^e$ rises, so agents expect the dollar to fall and they thus shift away from US assets (meaning a fall in net US capital inflows). This is illustrated in Figure 1, the FXM curve:

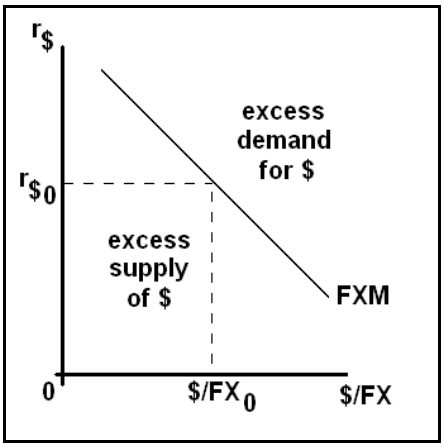

Figure 1: The FXM Curve.

The FXM curve combines equations (1') and (2) to show the effect of changing capital market conditions on the price of foreign exchange. The latter is measured as show in (1') and appears on the horizontal axis. The US interest rate is shown on the vertical axis, and the slope of FXM is a result of the fact that as US interest rates rise, US net capital inflows increase and the dollar appreciates (fall in $/FX). At any point to the right of FXM, there is an excess demand for the dollar, and so $/FX will fall (a dollar appreciation) until the economy is back on FXM; at any point to the left of FXM, there is an excess supply of the dollar, and so $/FX will rise (a dollar depreciation) until the economy is back on FXM. The effects of r_{FX} and $(\$/FX)^e$ appear via shifts in FXM. If foreign interest rates rise, FXM will shift right and cause the dollar to depreciate. If forecasts are revised such that a weaker dollar is expected (rise in $(\$/FX)^e$), this, shifts FXM right and causes a dollar depreciation. Note that Post Keynesians do not expect $\$/FX$, $r_\$$, r_{FX}, and $(\$/FX)^e$ to come to rest only where adjusted rates of return are equal (i.e., where interest-rate parity prevails). Excess returns can and do exist for long periods of time because of endogenous money and less-than-complete confidence in forecasts. These discussions, however, lie outside the scope of the current lecture.

The FXM curve offers a simple view of the currency market based on the assumption that capital flows dominate exchange rates and that the latter are a function of interest rates and forecasts. However, FXM tells nothing about the balance of payments as there is no way to know whether a particular exchange rate yields a trade deficit or surplus. For that, a second diagram is required.

3. Trade Flows and the Balance of Payments

Any current account imbalance must be offset by an equal but oppositely signed imbalance in the capital account. Depending on the circumstances, one could argue that one imbalance created the other. For example, a small, developing country with a large trade deficit may find it necessary to approach foreign banks to finance the shortfall. This would result in a capital inflow that arose directly as a result of the trade deficit. But, the same balance of payments scenario could arise if a nation's financial assets were terribly popular, prompting large capital inflows. This would cause an increase in the value of their currency, reducing their exports and raising imports. In that situation, the capital account surplus creates a trade deficit.

As explained above, the Post Keynesian approach assumes that, generally speaking, the capital account sets the exchange rate and that the exchange rate then impacts on trade flows (though as a secondary factor). The process by which capital flows set the exchange rate is shown by FXM, while the effect of subsequent exchange rate movements on trade flows (and hence the balance of payments in general) is the focus of the next section.

Trade flows are determined as shown in equations (3) and (4):

$$(3) \qquad X_{\$} = f(\$/FX, P_{\$}, P_{FX}, y_{FX})$$
$$\qquad\qquad\quad + \quad - \quad + \quad +$$

where $X_{\$}$ is US exports, \$/FX is the exchange rate, $P_{\$}$ is the US price level, P_{FX} is the foreign price level, and y_{FX} is foreign national income or gdp. A rise in either \$/FX or P_{FX} makes US goods and services more attractive, while a rise in $P_{\$}$ makes them less so. A rise in y_{FX} leads to a rise in foreign consumption, including of US goods and services. Meanwhile, since imports are exports, too, but for the other country, they are determined similarly:

$$(4) \qquad M_{\$} = f(\$/FX, P_{\$}, P_{FX}, y_{\$})$$
$$\qquad\qquad\quad - \quad + \quad - \quad +$$

All variables are defined as above, $y_{\$}$ is US national income or gdp, and the effects of the independent variables in (4) are analogous to those in (3). Combining (3) and (4) shows the determinants of net US exports:

$$(5) \qquad (X_{\$} - M_{\$}) = f(\$/FX, P_{\$}, P_{FX}, y_{FX}, y_{\$})$$
$$\qquad\qquad\qquad\quad + \quad - \quad + \quad + \quad -$$

In terms of equation (5), there exist combinations of the determinants that would yield $X_{\$} = M_{\$}$, or balanced trade, while other combinations create either a trade deficit (and capital account surplus) or a trade surplus (and capital account deficit). Function BTFX in

Figure 2 is drawn to show all combinations of $Py_{\$}$ (or $P_{\$}$ x $y_{\$}$) and \$/FX that would yield balanced trade.

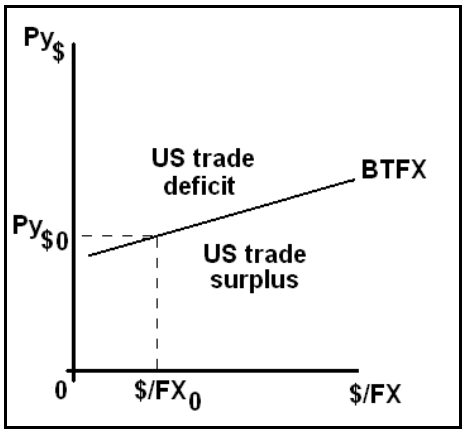

Figure 2: BTFX curve and the trade balance.

Note first the introduction of $Py_{\$}$ instead of $P_{\$}$ and $y_{\$}$. This is done so that this diagram can be used in conjunction with Keynes' Z-D diagram, which is written in Py and employment space.[1] This convenience is possible because the effect of a rise in $P_{\$}$ or $y_{\$}$ is the same–a fall in US net exports. Note second that Py_{FX} is held constant along a particular BTFX. Note third that BTFX is not a locus of equilibrium points–it is a reference. The economy is not drawn towards BTFX. If, by coincidence, the prevailing combination of $Py_{\$}$ and \$/FX (given Py_{FX}) lies on BTFX, then trade (and the capital account) is balanced. Points above BTFX indicate a relatively strong dollar and a relatively high level of US nominal income–factors, according to equation (5), consistent with a US trade deficit. Below the line, the US experiences surplus because the dollar is weaker and US nominal income lower than the levels consistent with balance. But the existence of an imbalance does not set into motion any forces that then automatically correct it. A nation may experience trade deficits for years and while there may be some forces that place downward pressure on the currency value, the adjustment mechanism present in other theories is absent. Changes in Py_{FX} will shift BTFX, with a rise moving it to the left (improving the US trade balance) and a fall moving it to the right (causing the trade balance to deteriorate). The slope is a function of the relative sensitivity of trade flows to changes in national income and exchange rates. A steep BTFX would suggest that trade flows are more responsive to exchange rates than national income; a flat one means that currency prices have little impact while national income quickly moves trade flows.

[1]If preferred, one can model this with $y_{\$}$ on the vertical axis, adding $P_{\$}$ to the variables that shift BTFX. Keynes used nominal income in his model because of his conviction that firms reacted to the dollar value of sales rather than real sales.

4. Complete Model

Figure 3 combines the FXM and BTFX curves to show the relationship among capital flows, exchange rates, and trade balances.

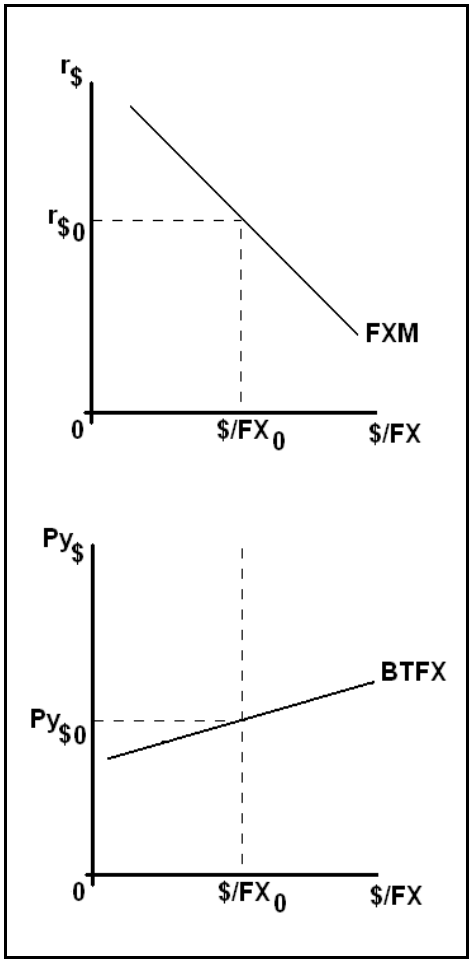

Figure 3: Complete Model.

On Figure 3, capital market conditions yield an exchange rate of $\$/FX_0$. If nominal gdp (determined elsewhere–as suggested above, this model can be supplemented with Keynes' Z-D diagram to show the determination of $Py_\$$) happens to be $Py_{\$0}$, then trade is balanced. If it is higher, the US experiences a trade deficit; lower, and there is a trade surplus. Note that BTFX is drawn relatively flat to reflect the fact that real-world trade flows react more significantly to changes in national income than exchange rates.

The model can now be used to analyze various situations. For example, take a rise in the US rate of interest. Assuming that we start with a situation like that shown in Figure 3, the result is an increase in the value of the dollar and a moderate shift toward a trade deficit. This is shown in Figure 4.

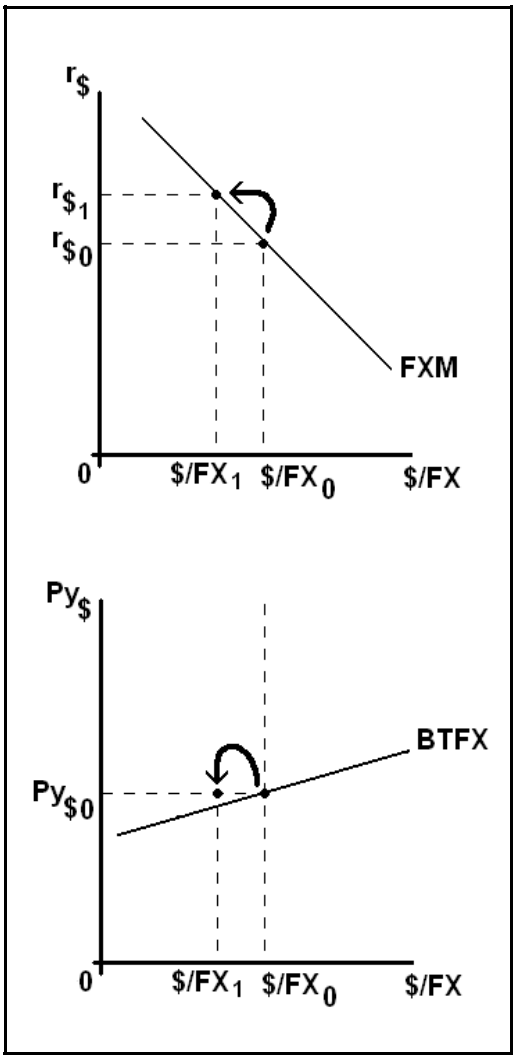

Figure 4: Effect of a rise in US interest rates.

The rise in US interest rates makes dollar-denominated assets more attractive and causes capital inflows. These cause a dollar appreciation. The trade deficit is relatively small as imports and exports tend to be exchange-rate (and price) inelastic (note that this implies that the capital account surplus must not be very large, either–please see *Suggested Follow-Up Lectures* for more on this). On the other hand, a rise in nominal income in the US can lead to a very large trade deficit, as shown in Figure 5.

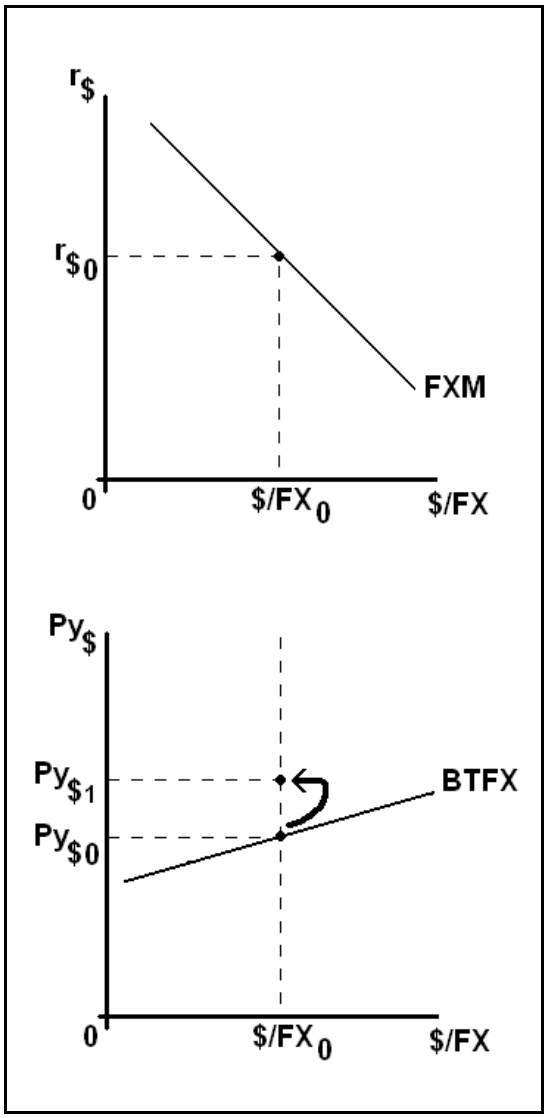

Figure 5: Effect of a rise in US nominal income.

Because of the relative slope of BTFX, it takes less of a change in $Py_{\$}$ (depending on the scale of the axes, of course) to create a relatively larger change in trade flows than in \$/FX (note that there must also have been a change in the capital account, which may have occurred for a number of reasons–only if a student asks about this do I raise it as the issue can be complex and really requires the introduction of more tools of analysis). This is consistent with observations of real-world international monetary relations. While there is certainly some downward pressure on the dollar, it is weak: the imbalances shown in Figures 4 and 5 can continue indefinitely. Students **are not** taught that imbalances are self correcting or that exchange rates are driven primarily by trade flows.

5. Final Notes

The Post Keynesian view is not, incidentally, intended to be a short-run one, where over the long term more traditional forces come into play. In fact, Post Keynesians generally view the distinction between the short and long run with suspicion, as they believe that the latter is typically invoked when the real world fails to correspond to the model's predictions. The long run is just the accumulation of short runs. While there may be factors that play a more lasting or frequent role, these are to be discovered and not assumed.

Also, as noted above, there is no assumption that interest rate parity operates. Endogenous money and lack of complete confidence in forecasts prevents exchange-rate adjusted rates of return throughout the world from being drawn inexorably toward equality. An additional lecture is being developed on this topic.

Suggested Reading

The following would be useful assignments before the lecture as they take the form of encyclopedia entries covering the basic issues involved (both are non-technical):

Harvey, John T. "Exchange Rates." In Philip O'Hara's (editor) *The Encyclopedia of Political Economy*, edited by Philip O'Hara, London: Routledge (1999).

_____. "Exchange Rates." In John King's (editor) *Elgar Companion to Post Keynesian Economics*, Cheltenham: Edward Elgar (2003).

After the lectures, the lesson could be supplemented with readings from the financial press highlighting the relationship between interest rates and exchange rates. Examples are easily found via a Google news search for keywords such as libor, currency price, exchange rate, interest rate spread, et cetera.

Class Discussion

If students have already learned other exchange rate models, it would be very useful to pose various scenarios and have them compare the effects using the various approaches. Particularly important is that they understand the specific processes involved and that they don't simply say, "When this goes up, that goes down." Why? What are economic agents doing to cause this and for what reason?

Suggested Follow-Up Lectures

"The Mental Model: A Post Keynesian Explanation of Currency-Market Forecasts"

COMPLETE

The biggest hole left by the lecture is the determination of exchange rate forecasts. These are included as an independent variable in equation (2), but are left completely unexplained despite their critical importance. The instructor who is able to devote more time to the Post Keynesian approach may therefore want to follow this with the lecture. It proposes a framework for understanding the mental model used by exchange-market participants.

"BOP and Exchange Rates: A Post Keynesian Explanation"

PLANNED

Something left to the imagination above is the specific relationship between the current and capital accounts. As these must always sum to zero, one may ask how and why trade flows automatically match capital flows. The answer is that exchange rates adjust to make this so, but a complete explanation really requires a graphical analysis, which is what this lecture offers. I actually do this one before the current module, but it can be done either way.

"Exchange Rate Psychology: A Post Keynesian Explanation"

PLANNED

Currency markets are simply another part of international financial markets, and as such they are heavily influenced by various psychological factors. This lecture draws on Keynes and the work of psychologists Daniel Kahneman and Amos Tversky to explain the existence of market volatility and bandwagons (plus there is a section on trading rules).

"UIRP: A Post Keynesian Explanation"

PLANNED

It was mentioned above that Post Keynesians argue that uncovered interest rate parity does not hold in the real world due to the existence of endogenous money and less-than-complete confidence in forecasts. This lecture is an explanation of this view.

For those in search of more real-world examples, chapter six of Harvey 2009 (listed in the references below) is a history of the post-Bretton Woods dollar. Six periods are identified and the appropriate shifts are shown on the graphs. The instructor will have a to do a little work to adapt the lectures as the diagrams in the book use four quadrants (the two extra graphs show the determination of domestic employment and the money market), but the students may appreciate the extra practice with the model.

References

Harvey, John T. "Teaching Post Keynesian Exchange Rate Theory," *Journal of Post Keynesian Economics*, vol.30, no.2 (Winter 2007-8), pp.147-68.

_____. *Currencies, Capital Flows, and Crises: A Post Keynesian Analysis of Exchange Rate Determination*, London: Routledge (2009).