ANTICIPATORY CAPITAL FLOWS AND THE BEHAVIOR OF THE DOLLAR

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Abstract

In this paper, I argue that the value of the dollar is
influenced by the "state of long-term expectation" and that market
expectations do not appear to embody a return to steady state. I suggest
that the recent strength of investment in the United States reflects
"animal spirits" and that investors appear to expect the investment boom
to be sustained indefinitely. Finally, I show how an adverse shift in
perceptions concerning the profitability of investment, by altering this
state of expectations and thereby affecting international capital flows,
conceivably could put upward pressure on interest rates that would
outweigh the downward pressure coming from the actual slowdown in
investment.

Introduction

International capital flows and the appreciation of the dollar were central characters in the macroeconomic drama of the early 1980's. Moreover, many economists expect the dollar to experience a large depreciation over the latter half of the decade, in which case movement in the exchange rate will remain on center stage. While some economists suggest that the dollar's fall will be associated with lower real interest rates caused by a change in the mix of fiscal and monetary policy, in this paper I suggest that a decline in the dollar could be accompanied by higher real interest rates. I argue that the value of the dollar is influenced by the "state of long-term expectation" and that market expectations do not appear to embody a return to steady state. I suggest that the recent strength of investment in the United States reflects "animal spirits"[2] and that investors appear to expect the investment boom to be sustained indefinitely. Finally, I show how an adverse shift in perceptions concerning the profitability of investment, by altering this state of expectations and thereby affecting international capital flows, conceivably could put upward pressure on interest rates that would outweigh the downward pressure coming from the actual slowdown in investment.

In the first section of the paper, I argue that several features of international asset prices appear to be consistent with the hypothesis that investors anticipate a high rate of return on capital in the United States to persist for several years. In particular, the term structure of international interest differentials appears to embody such an expectation. This raises the issue of how a change in the pattern of expectations could affect the near-term equilibrium of the economy.

Section two of the paper presents a static model which may be used to analyze four types of shocks that would produce a capital inflow: a fiscal expansion, a monetary contraction, an increase in perceived profitability, and an asset-preference shift. The latter is a pure increase in preference for bonds denominated in U.S. dollars, holding rates of return and default risk constant. It is shown that such a shock plausibly affects the LM curve as well as the IS curve.

Section three allows for exchange rate expectations and dynamics. It is shown that a profitability shock anticipated to occur next period acts like an asset-preference shock in the current period.

In the final section, I use the results of the model exercises to argue that a slowdown in investment could put upward pressure on real interest rates in the United States in the near term. I then review the key points of the paper.

I.   A Puzzle in the International Term Structure

Let me review a popular explanation for the strength of the

dollar, the real interest parity hypothesis. This hypothesis can be

illustrated using figure (1a).

real interest
differential

0 — — — —

1985   1995
(1a)

real interest
differential

0 — — — — —

1985   1995
(1b)
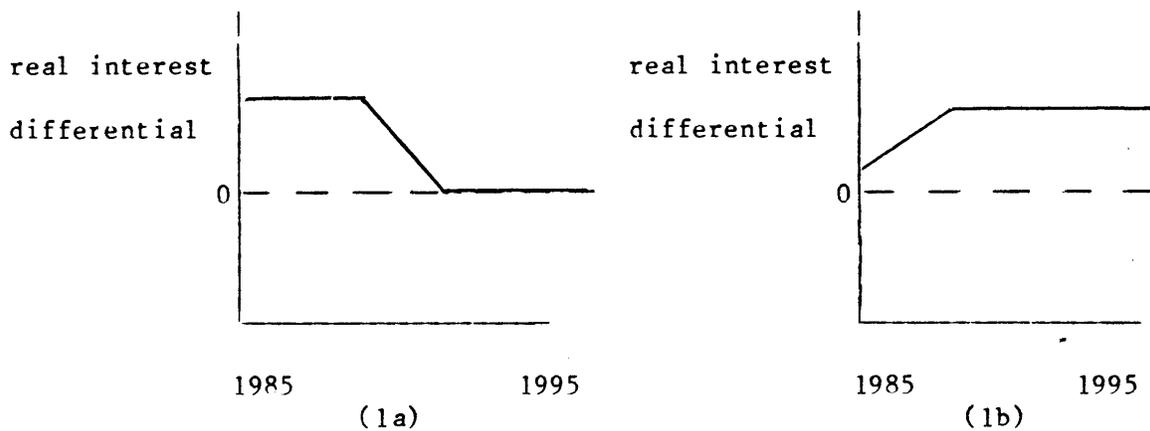
theoretical and apparent actual shape of the term structure
of international real interest differentials

The horizontal axis measures time. The vertical axis measures the short-

term real interest differential expected to obtain between the U.S. and

its major trading partners. Thus, the figure plots a hypothetical term

structure of real interest rate differentials, derived by comparing bonds

of different maturities to a measure of expected inflation.

The real interest parity hypothesis is that the percent

deviation of the dollar from its steady-state value (which could be taken

as the level consistent with trade balance) is equal to the area under

the curve in figure (1a). Under the assumption that investors anticipate

a return to steady state (in which real interest differentials fall to

zero) some time within the next ten years, the area under the curve in figure (1a) can be approximated by multiplying 10 times the real interest differential on ten-year bonds. Frankel (1985) argues that the latter is around 3 percentage points, implying that the market views the dollar as overvalued by 30 percent.

The validity of multiplying 10 times 3 to get the area under the term structure curve is questionable when one looks at figure (1b). As noted by Sachs (1985), among others, figure (1b) offers a more realistic illustration of the term structure of international real interest differentials: the long-term differential exceeds the short-term differential, and the term structure appears to flatten out in the long term. This contrasts sharply with the shape of the term structure curve in (1a), which must be downward-sloping at some point in order to return to zero. The contrast between the theoretical and actual shape of the real term structure represents a puzzle.

One objection to (1b), raised by Obstfeld,[3] is that inflation expectations may alter the shape of the real term structure relative to the nominal term structure. Certainly, the use of recent past inflation as a proxy for expected inflation may be incorrect. In particular, if investors expect inflation in the U.S. to increase sharply over the next decade, the term structure of real interest differentials may look more like that in (1a).

Another possibility, raised by Nordhaus,[4] is that the high long-term rate represents a risk premium attached to long-term bonds. One could argue that the unsustainable policy mix in the United States has added to the uncertainty about long-term U.S. financial assets.

Whatever the intrinsic appeal of the inflation-expectations and risk-premium resolutions to the term structure puzzle, each implies that (risk-adjusted) real long-term interest rates in the United States are not as high as they appear to be. If U.S. real interest rates are not high, then we are left without an explanation for the strength of the dollar. By the same token, it becomes more difficult to explain other apparent symptoms of high real interest rates, such as weak commodity prices. If the U.S. financial system were risky and inflation-prone, one would expect a flight from dollar assets into gold and other real commodities, rather than the other way around.

If, as I would argue, figure (1b) truly portrays the term structure of real interest differentials, then it does not appear that investors appreciate the need to return to steady state. Implicitly, they expect capital to yield a higher return in the United States than in other countries for the foreseeable future. The capital inflows that the United States is experiencing serve to direct funds toward these perceived profit opportunities.

If the term structure of real interest differentials does not embody a return to steady state, then it seems likely that this term structure was generated in the markets by a mechanical extrapolation process. Implicitly, the market is projecting the recent macroeconomic past into the indefinite future, even though this past contains several elements that are not together sustainable: a steady rise in the U.S. fiscal deficit relative to GNP, anti-inflationary monetary policy, and an unusually high perceived rate of return on capital.

Blanchard and Summers (1984) argue that the fiscal and monetary policy mix alone cannot explain high real interest rates in the United

States. They note that expansionary fiscal policy and contractionary

monetary policy would be unlikely to strengthen the stock market,

yet the stock market has performed well since 1978. Moreover, they argue

that investment has exceeded what would have been predicted using

conventional econometric models. I would add to this latter point that

the major sources of recent strength in investment, such as computers and

office construction, reflect specific perceptions about profitability

more than general macroeconomic considerations.

Suppose that I am correct in suggesting that the term structure

puzzle reflects an unrealistic expectation of high profitability for

investment in the United States. Why does the term structure slope

upward? What would be the macroeconomic consequences of an adverse shift

in these perceptions? In particular, would a slowdown in the investment

boom be likely to raise or lower real interest rates in the United States

in the near term? In the following sections, I develop models that can

be used to address such questions.

II. The Basic Static Model

This section sets up a static model to analyze the macroeconomic effects of various types of shocks that could lead to a capital inflow. The model uses an IS-LM framework that is static in the sense that exchange rate expectations play no role. Expectations are introduced in the next section. In order to analyze a shift in asset preferences, the model differs from the standard Mundell-Fleming model[5] by allowing by allowing assets to be imperfect substitutes.

In addition to the mix of fiscal and monetary policy, several "stories" have been developed to explain the strength of the dollar in the early 1980's. These stories relate to investment and international capital allocation: the return on capital is alleged to have increased in the United States, due to tax changes, more favorable regulation, and technological innovation; meanwhile, perceptions of capital profitability abroad have been dampened, as indicated by the terms "Europessimism," and "safe haven effect."[6] All of these stories are consistent with international investors deciding that office buildings in Houston, for instance, appeared to have a higher return than analogous investments overseas. The capital inflow into the United States is nature's way of directing investment funds to where they are perceived to be most productive.

Another type of story concerns a change in asset preferences related to currency of denomination rather than perceived rate of return. That is, on bonds with an equal probability of default, an increase in preference is shown for U.S. dollar-denominated securities over yen-denominated securities. While this story probably has little direct empirical relevance, a comparative statics analysis will serve useful later in illustrating the impact of anticipatory capital inflows.

When international capital flows are added to a standard IS-LM
macro model, both the IS and LM curves become flatter than their closed-
economy counterparts. The IS curve is flatter because the tradable-goods
sector becomes interest sensitive. An increase in our interest rate
relative to foreign rates tends to cause a capital inflow, an exchange
rate appreciation, and a decline in the trade balance. A fiscal
expansion or monetary contraction "crowds out" tradable manufactures as
well as interest-sensitive domestic spending.

Exchange-rate movements also add to the interest sensitivity of
money demand. An appreciation of the dollar helps to hold down prices in
the United States, reducing money demand. Thus, an increase in interest
rates lowers money demand not only directly through liquidity preference
but indirectly through its effect on the exchange rate and the price
level.[7]

The equations of the model, shown in the box on the next page,
employ a "flow-of-funds" variation of the standard IS-LM model,[8]
augmented by an aggregate supply curve. In the usual presentation, the
IS curve is represented by the saving-investment equality, and the
domestic bond-market equilibrium condition is omitted by Walras' Law.
The flow-of-funds framework follows the opposite strategy.

In the model, there are three assets: money, domestic bonds,
and foreign bonds. Even though the United States is a large country in
the international scene, our model will have several "small-country"
features in order to simplify notation and algebra.[9] In particular, the
foreign interest rate and foreign income are taken as fixed, and domestic
bonds are treated as if they were held only by domestic residents.
Nonetheless, because domestic and foreign bonds are not taken to be

The Static Model

(1) $B(r,y,A) - \overline{B} = I(r,y,Z)$ (domestic bond market)
         $+\ +\ +$ $-\ +\ +$

(2) $F(r,y,A) - \overline{F} = T(e,y)$ (foreign bond market)
         $-\ +\ -$ $+\ -$

(3) $H(r,y,p) = \overline{H}$ (money market)
         $-\ +\ +$

(4) $p = P(e,y)$ (aggregate supply)
             $+\ +$

Notation:

B demand for domestic bonds

$\overline{B}$ initial stock of domestic bonds
I private investment
r domestic interest rate
y real income
A a parameter representing asset preferences or a risk premium
Z animal spirits
F demand for foreign bonds

$\overline{F}$ initial stock of foreign bonds
e real exchange rate (a rise in e represents a depreciation for the home country)
H demand for money

$\overline{H}$ stock of money

perfect substitutes, the domestic interest rate may vary from the foreign rate. Further simplicity could be achieved, at no cost to the results of this paper, by taking prices as fixed and ignoring the impact of the exchange rate on prices and thereby money demand. However, I believe that the aggregate supply schedule adds considerably to the realism of the model.

The first equation is the equilibrium condition for the domestic bond market. The demand for domestic bonds, which depends positively on the interest rate, income, and an asset-preference shift parameter, is equal to last period's stock of bonds outstanding plus the new supply of bonds needed to finance this period's investment, which depends negatively on the interest rate and positively on income and "animal spirits". (For simplicity, I omit equity finance or government deficits.)

The second equation is the equilibrium condition for the foreign bond market. Our net increase in foreign bond holdings is equal to our trade surplus. This also can be thought of as a balance-of-payments condition equating trade flows and capital flows. The trade balance depends positively on the real exchange rate and negatively on income. The demand for money, H, depends negatively on the interest rate, positively on income, and positively on the price level, which in turn depends positively on income and on the real exchange rate.

The strategy for solving this model will involve treating equation (1) as the IS curve and solving the other three equations for a reduced-form LM curve. The IS curve is flatter than its closed-economy counterpart: the interest sensitivity of the demand for domestic bonds is increased by the fact that there is substitution from foreign bonds as well as from money.

Combining equations (2)-(4), we have

(5) $H(r,y,A) = \bar{H}$
     $\quad\,\, - \ + \ -$

Because the exchange rate affects aggregate supply which affects the demand for money, this model does not necessarily yield the results that are standard in the Mundell-Fleming analysis. In a two-country model, for example, the Mundell-Fleming model would predict that the mix of loose fiscal policy and tight monetary policy pursued in the United States should be expansionary for our major trading partners, because it would strengthen the dollar and boost their trade balance. Evidently, this stimulus was offset by a leftward shift of the LM curve in those countries, due to policy moves as well as an effect of the exchange rate on foreign money demand analogous to that outlined here.

Furthermore, we see that incorporating the effect of the exchange rate on prices opens up an indirect channel through which a pure shift in preferences from foreign to domestic bonds reduces money demand. In addition, putting (2) and (4) into (3) increases both the income and interest sensitivity of money demand. To the extent that domestic and foreign bonds are close substitutes, the latter effect will be larger, and the LM curve becomes flatter.

Although the IS and LM curves are flatter than in the closed-economy case, fiscal and monetary policy have their usual effects (with regard to sign) on interest rates and income. The difference between a profitability shock (an increase in Z, the perceived rate of return on

capital in the U.S.) and an asset-preference shock (an increase in A, the preference for U.S. bonds over foreign bonds of equal return and risk of default) is illustrated in figures (2a) and (2b).

The profitability increase shown in figure (2a) raises investment demand, leading to the same overall results as a fiscal expansion: a rise in income and interest rates, and a capital inflow. Part of the increased investment (new office buildings in Houston) is financed from abroad.

(2a)
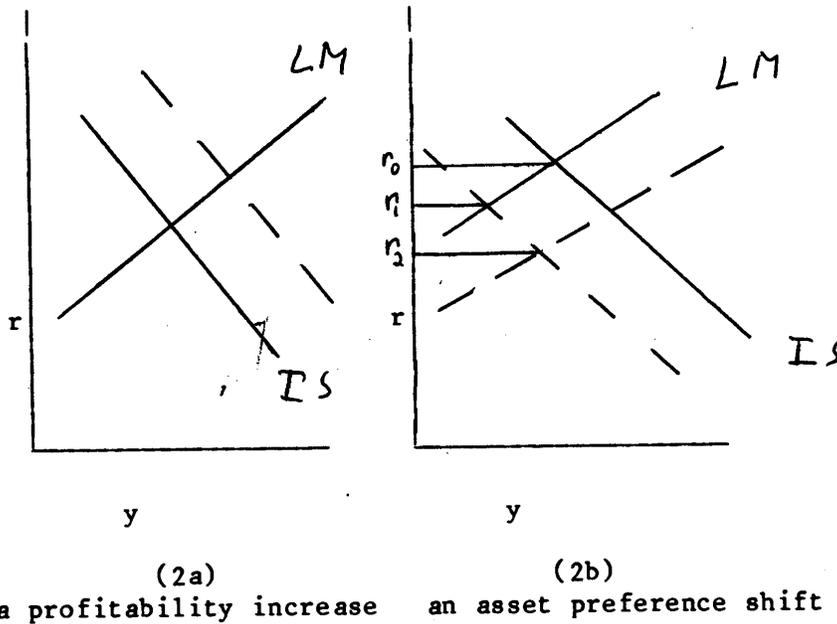a profitability increase

(2b)
an asset preference shift

Figure (2b) illustrates the effect of a shift in international preferences regarding the currency denomination of assets (assuming that dollar-denominated assets ultimately must be backed by investments in the

United States). The supply of capital to the United States increases, putting downward pressure on the interest rate. As the rate falls from r_0 to r_1, more investment takes place in the United States. The new capital helps back the increased claims on the U.S. demanded by foreigners. The capital inflow drives up the exchange rate, reducing the trade balance and shifting the IS curve to the left. In addition, the strong dollar reduces prices and the demand for money, so that the LM curve shifts to the right and the interest rate falls to r_2. The effect on income is ambiguous, depending on the relative magnitude of the "fiscal" (trade balance) and "monetary" (real money supply) effects of exchange rate movements.[10] The interest rate unambiguously falls, and this in turn reduces U.S. national saving, even though only a shift in preferences concerning the composition of bond holdings initiated the adjustment process.

The "real world" analogue to a shift in asset preferences would appear to be a change in the risk premium on foreign bonds. However, we shall see below that in a dynamic context, any event that changes expected interest rates can have a current-period impact corresponding to that of a shift in asset preferences.

III. Dynamic Analysis

The main difference between this section and the previous one is that we allow investors to hold expectations about exchange rates and interest rates. Exchange rate expectations yield a Dornbusch (1976) link between interest rates and exchange rates. Furthermore, interest-rate expectations can cause anticipated expansionary shocks to have a contractionary short-run impact, as shown by Branson, Fraga, and Johnson (1985) and Gavin (1984).

When the exchange rate is expected to move, the dollar return from holding yen bonds depends positively on the expected rate of dollar depreciation, e* - e, where e* is the expected level of the exchange rate. Introducing exchange-rate expectations into the bond demand equations has two noteworthy results: the effect of fiscal, monetary, and profitability shocks on the exchange rate is moderated. A fiscal expansion, for example, results in a smaller capital inflow and a larger rise in interest rates (to generate private saving and less investment) than in the static model; also, an increase in the expected real value of the dollar (a drop in e*) tends to act like an increase in A, the asset preference parameter of the static model.

The choice between domestic and foreign bonds is a function of ρ, interest on domestic bonds plus expected currency appreciation.

$$(6) \quad \rho = r - (e^* - e) = r + e - e^*$$

Putting ρ into the demand equations for domestic and foreign bonds gives

$$(7) \quad B(\rho,r,y) = B(r+e-e^*,r,y) = I(r,y,Z) + \overline{B}$$
$$\quad\quad\quad + + + \quad\quad\quad\quad + \quad\;\; + + \quad\quad - + +$$

$$(8) \quad F(\rho,y) = F(r+e-e^*,y) = T(e,y) + \overline{F}$$
$$\quad\quad\quad - + \quad\quad\quad\quad - \quad\quad + \quad\quad + -$$

Because ρ affects the choice between domestic and foreign bonds, $B_\rho + F_\rho$ = 0. The additional term in r in the domestic bond demand equation reflects substitution between domestic bonds and money.

The money demand and aggregate supply equations are the same as before. Solving for the reduced-form LM curve using (8) rather than (2) gives

$$(9) \quad H(r,y,e^*) = \overline{H}$$
$$\quad\quad\quad - + +$$

Solving (8) for the exchange rate as an implicit function of the interest rate, income, and the expected level of the exchange rate, we have

$$(10) \quad (T_e - F_\rho)de = F_\rho dr + (F_y - T_y)dy - F_\rho de^*$$

The important results from (10) are that the derivative of e with respect to e* is positive but less than one and that the derivative of e with respect to r is negative but less than one in absolute value. These results allow us to rewrite (7) as

$$(11) \quad B(r,y,e^*) - \overline{B} = I(r,y,Z)$$
$$\quad\quad\quad + + - \quad\quad\quad\quad - + +$$

A rise in e* (drop in the expected level of the dollar) creates an expectation of depreciation of the dollar, lowering the demand for domestic bonds.

Mathematically, e* enters the system of equations (11) and (9) in the same way (but with the opposite sign) as the asset preference shift parameter in the static model. That is, a drop in e* (rise in the expected level of the dollar) increases the preference for dollar bonds and generates a capital inflow, shifting the IS curve to the left (by strengthening the dollar and reducing the trade balance) and the LM curve to the right (by restraining domestic prices and money demand).

This dynamic version allows for interesting distinctions between anticipated and unanticipated shocks as well as between transitory and permanent shocks. The static model may be viewed as a special case suited to the analysis of unanticipated, permanent shocks.

As an example of a transitory shock, consider a temporary investment boom. An unanticipated shock occurs at the start of period one that raises the demand for office buildings in Houston. At the end of this period, the excess demand is satisfied, and the economy returns to steady state. Part of the investment boom is financed by a capital inflow that drives up the value of the dollar. With myopic expectations (corresponding to the static model), investors act as if the investment boom were permanent, and the return of the dollar to its steady state value comes as a surprise, creating ex post profits (losses) on foreign (domestic) bonds bought during the investment boom. However, to the extent that investors anticipate the depreciation that will occur as the economy returns to steady state, their initial willingness to shift from foreign to domestic bonds will be reduced. Relative to the static case,

this reduces the magnitude of the capital inflow, requiring more of an increase in domestic interest rates to generate domestic saving and dampen the investment boom.

Next, consider what happens if the investment is delayed by physical lags in the construction process.[11] The perception of a shortage of office buildings occurs in the first period, but the actual construction occurs in the second period, after which the economy returns to steady state. If investors are myopic in period one (after the shock but before construction takes place), the appreciation of the dollar that accompanies the construction boom will cause ex post profits (losses) to accrue to buyers of domestic (foreign) bonds. On the other hand, anticipation of the construction boom and the stronger dollar would raise the demand for domestic bonds in period one, causing an early appreciation of the dollar and a drop in the interest rate in order to eliminate the incipient excess saving.

To treat these stories formally, I will make the simplifying assumption that domestic and foreign bonds are perfect substitutes. This special case corresponds to the strand of literature that follows Dornbusch (1976);[12] also, the model can be reduced to a diagram on which it is possible to see the contrast between static and dynamic models.

Perfect substitutability implies that domestic and foreign bonds are indistinguishable to investors. Therefore, we rewrite the model by adding together the domestic and foreign bond market equations and by representing the foreign bond market equilibrium condition with an interest parity condition that the expected return on domestic bonds

equals $\bar{\rho}$, the exogenously-given return on foreign bonds.

$$(12) \quad \bar{\rho} = r + e - e*$$

Adding together the demand for domestic and foreign bonds gives

$$(13) \quad \underset{+\ +\ -}{S(r,y,Z)} = \underset{+\ +}{T(e,y)}$$

where S is the total flow demand for bonds <u>minus</u> domestic investment. This private national saving will be an increasing function of the interest rate and income and a decreasing function of animal spirits.
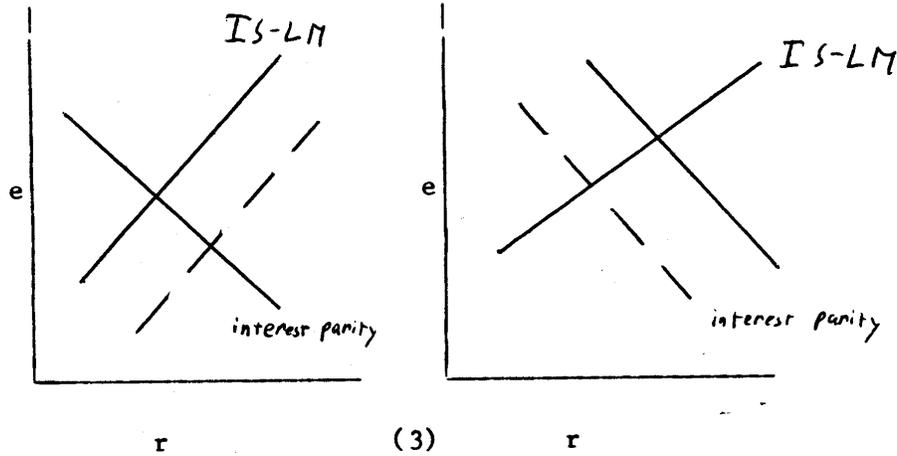
Since the interest parity condition (12) contains only two endogenous variables, e and r, it will be useful to eliminate the third endogenous variable, y, from (13) as well. The LM curve can be solved for income as a function of the interest rate, the exchange rate, and the money supply. We do <u>not</u> substitute for the exchange rate as we have previously.

$$(14) \quad \underset{-\ +\ +}{H(r,y,e)} = \bar{H}; \quad y = \underset{+\ -\ +}{y(r,e,\bar{H})}$$

Putting (14) into (13) gives an IS-LM equilibrium relationship between the interest rate and the exchange rate:

$$(15) \quad \underset{+\ -\ +\ -}{S(r,e,\bar{H},Z)} = \underset{-\ +\ -}{T(r,e,\bar{H})}$$

Equation (15) states that in order to increase private national saving we must run a trade surplus. An increase in the interest rate, which boosts private saving, must be a matched by a depreciation of the exchange rate (a rise in e). Thus, this IS-LM equation is upward-sloping when it is plotted in figure (3) in e-r space.

an increase in profitability   an expected increase in profitability

In addition, I have plotted the interest parity condition (12). For now, we take the expected level of the exchange rate, e*, to be its steady-state value. The interest parity equation is downward-sloping in e-r space.

An increase in Z, the profitability of investment, shifts the IS-LM equilibrium to the right, as the investment requires both more domestic saving (and thus higher interest rates) and a capital inflow (leading to an exchange rate appreciation). If the interest-parity condition were vertical (as in the no-foresight case), the exchange rate

would move further and the interest rate would remain fixed at $\bar{\rho}$. This demonstrates the point that foresight serves to moderate exchange-rate adjustments.

Next, consider the case of an anticipated investment boom. The only effect this has on the current-period equilibrium is through expectations concerning the exchange rate.[13] The anticipated investment boom leads to the expectation of an appreciation of the exchange rate, meaning a drop in e*. This shifts the interest parity condition to the left, requiring either a drop in the domestic interest rate or an early appreciation of the dollar in order to keep investors indifferent between holding domestic and foreign bonds. Thus, an anticipated investment boom has the opposite effect on interest rates as an actual investment boom. The expected increase in investment stimulates an anticipatory capital inflow that drives down the interest rate. In the concluding section of this paper, I argue for the relevance of this result to the actual behavior of asset markets at present.

Conclusion

The recent economic environment can be viewed as a combination
of both an actual investment boom and an expected investment boom. The
actual investment boom shifts the IS-LM schedule in figure (3) to the
right, while the anticipated investment boom shifts the interest parity
condition to the left. The exchange rate is bound to have appreciated,
but some of the upward pressure on interest rates due to strong
investment is relieved by the anticipatory capital inflow. This may
serve to explain why the interest differential is lower in the near term
than in the long term.

Thus, it appears that the puzzling term structure of interest
differentials depicted in figure (1b) can be viewed at least in part as a
result of anticipations of continued high investment profitability in the
United States. These expectations may not be validated if technological
innovation in computers reaches a point of diminishing returns, office
building reacts to soaring vacancy rates, etc. The entire expected
future path of interest rate differentials, as well as the current
differential, might be affected. The result of a slowdown in investment
accompanied by a change in expectations would be an exact reversal of the
shifts described in the preceding paragraph. The IS-LM schedule would
shift to the left and the interest parity condition would shift to the
right. The exchange rate would depreciate, but the effect on interest
rates in the near term would be ambigous. In fact, this analysis
indicates that the near-term interest rate could rise in the United
States, even though current investment demand falls. As expectations of
profitable future investment dissipate, an anticipatory slowdown in the

capital inflow could occur. This would put upward pressure on interest rates that conceivably could more than offset any downward pressure coming from the actual slowdown in investment.

To summarize, I have shown the following:

1) An actual increase in investment demand in the United States (due, for example, to an increase in the perceived marginal product of capital) will draw in savings from abroad, appreciating the dollar. The increase in perceived profitability shifts the IS curve to the right, leading to higher interest rates in the U.S.

2) An anticipated increase in investment demand also results in a capital inflow and an appreciation. However, unlike the actual investment boom, the anticipatory capital inflow lowers interest rates by causing a contractionary shift in the trade balance and by reducing prices and the demand for money.

3) The high value of the dollar and the upward-sloping term structure of international interest rate differentials in 1984 are consistent with anticipated as well as actual high investment demand in the United States.

4) Should a slowdown in investment be associated with reduced expectations of future profitability, a reversal in capital flows could occur that would tend to boost interest rates, even though the investment slowdown itself exerts a moderating influence on rates.

Footnotes

1. See Sachs (1985) as well as other papers and comments in that Brookings volume. Krugman (1985) argues that the dollar could fall spontaneously, without a drop in interest rates. Among some non-academic economists, there seems to be a belief that a flight from the dollar would force an increase in interest rates in the United States in order to retain foreign capital. The academic viewpoint, correct or otherwise, is that a depreciation by itself would be sufficient to restore the willingness of investors to hold United States assets.

2. While I regard as apt the intellectual deference to Keynes suggested by my choice of terminology, I wish to emphasize that this is incidental to the substance of the paper.

3. Obstfeld's comment appears on p. 195 of Sachs (1985).

4. Nordhaus' comment appears on p. 196 of Sachs (1985).

5. In fact, Fleming (1962) did not assume perfect substitutability, although Mundell (1963, 1964) used such an assumption.

6. Dooley and Isard (1985) present the safe haven effect as a fear of confiscatory taxes on capital, which would correspond to a change in the perceived marginal product of capital in my framework. However, as Krugman (1985) points out, the safe haven story is not well suited to explaining the appreciation of the dollar against other OECD currencies.

7. Sachs (1985) and Glassman (1985) survey the empirical literature on the effect of exchange rate changes on the domestic price level.

8. This formulation is adapted from Tobin and Macedo (1980).

9. A two-country model will yield the same set of results as long as the interest elasticity of substitution between domestic and foreign bonds is strong relative to that between bonds and money.

10. For an empirical evaluation of whether or not an exchange rate appreciation is expansionary for the United States, see Kling (1985).

11. Other stories that might give rise to an anticipated shift of the IS curve include a pre-announced fiscal expansion, as analyzed by Branson, Fraga, and Johnson (1985).

12. Behind the foliage, the model in the appendix to Dornbusch (1976) is the system of equations (12) and (15) below.

13. Branson, Fraga, and Johnson (1985) also allow expected future interest rates to affect current investment through their effect on the long-term rate.

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